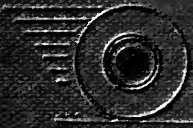
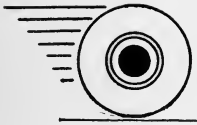


ROLLING WHEELS

By MARTIN H. BURY



ROLLING WHEELS

By MARTIN H. BURY

ILLUSTRATED
BY
JOHN KOOMAR

DORRANCE & COMPANY
PHILADELPHIA

Library of Congress Catalogue Card Number 53-10193

Manufactured in the United States of America

TO SHIM

. . . whose introduction to the automobile was climaxed by motor failure on Twin Peaks in San Francisco some thirty years ago.

. . . and whose assistance in preparing the manuscript for this book was invaluable to her father . . .

Foreword

I AM an automobile dealer.

as such, I have long been aware of the fact that automobile dealers are not always held in high esteem. Or even medium esteem. That's the only thing about being an automobile dealer that I don't like.

Some six years prior to the publication of this book I decided to do something about it. I started a series of semi-weekly, paid newspaper columns. The primary objective was to improve public relations with advice to motorists, information about highway traffic conditions and little tales of happenings within the industry.

As time went on the column achieved a rather surprising degree of public acceptance. Letters from readers asked many questions, suggested many new subjects. There were quite a few bouquets—and a number of brickbats—thrown to me or at me, as the case might be. The bouquets included an ever-increasing number of requests that the columns be published in book form.

This volume is a partial acquiescence to those requests.

Instead of republishing the columns in their original form, I have endeavored to compile their contents under separate chapter headings.

It has been said that when a writer publishes what another writer has written, he is guilty of plagiarism, but when he publishes what many writers have written he is merely reporting the result of research. Much of what I have written here falls into the latter category. Some of it is reiteration of the fundamentals of intelligent motoring.

The rest is reporting of incidents—trivial and otherwise—about motors, motorists and the industry at the beginning of its second half-century.

MARTIN H. BURY

Philadelphia, Pennsylvania
June 1st, 1953

Introduction

VERSATILE is the word for Martin Bury. Not only is he one of the most successful automobile dealers in the country, but his interests—and accomplishments—extend into many other unrelated fields. For instance, he is a connoisseur and collector of fine paintings. He is a traveler who has seen many of the great sights of the world. He is a photographer who has caught beauty in line and form on film. And he is a writer whose words through his column in the *Philadelphia Evening Bulletin* probably have been read by far more readers than is the good fortune of writers whose mediums have been more extensively circulated.

My present concern, however, is with Bury the writer. It is interesting to me, in this day of public relations consultants who do everything from ghost writing to editing a publication, that Martin Bury does all of his own writing—by longhand. I'm told that is the way all good writers have written; that they scorn dictating machines and typewriters.

There is an old saying "Easy reading—hard writing."

I know that the first part of the phrase applies to Martin Bury's output and I suspect that the second part may be true as well. I never knew of anything worth doing which didn't require skill, hard work and perspiration, with emphasis on the last quality.

I commend Martin Bury's book to every owner and operator of an automobile. You will enjoy its brisk style and find much of interest in it. It deserves a place in your library.

F. E. Ballantyne

General Manager, The Automobile Club of Philadelphia. Director, American Automobile Association

Acknowledgments

The author extends gratitude to—

—The American Automobile Association for its comprehensive analysis of automobile operating cost.

—The Automobile Manufacturers' Association for statistical data.

—General Motors Corporation for information pertaining to testing and research.

—Chrysler Corporation for their contribution to the listing of British automotive terms and American "slanguage."

—*The Automotive News* of Detroit for permission to reprint portions of incidents and oddities reported in that publication from time to time.

—Rudolph E. Anderson and his magazine of the National Automobile Dealers Association for human interest items.

—*The Saturday Evening Post* for the use of their listing of the names of 2726 American automobiles, to which some changes have been made.

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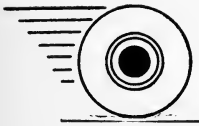
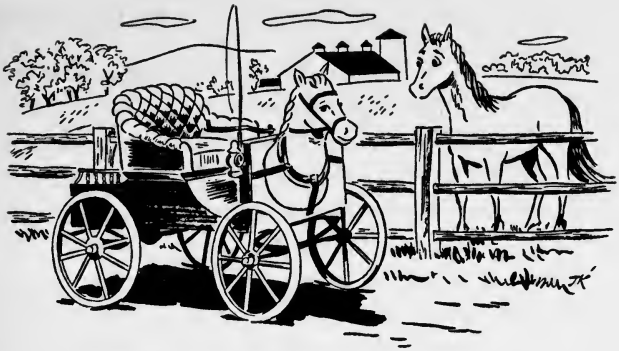


ROLLING WHEELS



1

Notes on the History of the Automobile

THE man who "invented" the first automobile and who secured a patent on it was not an inventor, nor even a mechanic. He had not built an experimental car or a model of one, in fact he did not particularly enjoy working with his hands.

His name was George Baldwin Selden, and according to the United States Patent Office, he *invented* the "gasoline road locomotive." Application for the patent was made in 1879, and it was finally granted on November 5, 1895.

Selden was a patent attorney living in Rochester, New York. In 1876 when he was thirty years old he saw the first two-cycle gasoline engine at the Philadel-

phia Centennial Exposition. It was being shown by its inventor, George B. Brayton.

Returning to Rochester, Selden put his legal mind to work. He knew that if he could apply Brayton's engine to some specific and practical purpose he could secure a combination patent.

In 1877 he sketched some drawings of a horseless carriage. (Later, an automobile that actually ran, was constructed from these drawings.) But Selden knew his law—he knew he didn't have to *build* anything to apply for a patent.

The component parts of his vehicle were not new in themselves. The engine, the clutch and the gear-changing device had all been invented previously. Selden merely assembled them on paper and attached them to the wheels of a road vehicle, *on paper.* The result was a new and useful machine—on paper.

All he actually did was to combine existing ideas of engine, clutch, transmission, steering and running gear, draw sketches of the idea, fill in an application and send it to Washington. And for sixteen years (until the United States Court of Appeals declared the patent invalid in 1911) Selden collected royalties on his legal brainchild.

So it came to pass that George Baldwin Selden, a patent lawyer, an abstract thinker in the field of mechanics, a man who didn't like to work with his hands, a man who had never built anything resembling an automobile, wrangled the credit for having invented it.

So much for the "invention" of the automobile. The *origin* of the automobile is something else; necessarily, it started with the wheel. And the origin of the wheel is lost in the mists of antiquity.

The first steam engine of record was built in 130 B. C. During the fifteenth century A. D., Leonardo da Vinci designed a geared wheel for transmitting power. But excepting for those two items, the situation remained dormant until the seventeenth century.

In 1619, an English patent was granted for "drawing carts without horses." Between 1643 and 1650, both the French and the Germans constructed vehicles to be propelled by passengers. Then in 1655 steam was applied to the propulsion of a carriage in China, by applying a steam jet to a small windmill mounted on wheels.

The earliest piston and cylinder steam engine was invented in 1690. Applied to a carriage, it caused the carriage to move. Not long after that sails were attached to a wagon in Wales, with fair results—when there was any wind. In 1748, Louis XV of France had a carriage propelled by a clockwork mechanism.

Most of these things were experimental or were built for novelty; not until 1769 was a self-propelled vehicle built for practical use. In that year, a Frenchman named Cugnot built a steam tractor for artillery use. And the British Museum houses a small steam carriage that was built and successfully tested in 1784.

Thereafter, and throughout the nineteenth century, many steam-propelled carriages and vehicles were created—and in many forms. In 1820 the first explosion

engine was built; it used hydrogen gas for fuel. Five years later, Londoners were amazed at a carriage drawn by kites. The first electric carriage, powered by a primitive motor, was built in Scotland in 1839. And in 1851 an engine was patented in which gas was compressed before ignition and then fired by a jump spark.

Meanwhile, many other things which were to become part of the motorcar began to materialize. A steering device, not unlike that on present cars, was patented in England in 1818. Chain transmissions were developed in 1827, planet gearing in 1829, and differential gearing in 1835. India rubber tires were first tried in 1845. Water-cooled engines were patented in 1844. Electric spark ignition was developed for practical use in 1860, the clutch or "disconnecting" device in 1865, and the four-cycle engine at about the same time.

And although Selden applied for his patent in 1879, the first "oil motorcar" took to the road in Paris in 1884.

After that, developments gained momentum. Daimler and Benz of Germany and Forest of France each produced practical motors in 1885. Then Charles Duryea built the first gasoline motor vehicle in 1892. R. E. Olds and Henry Ford got going in 1894 and 1895—and the rush was on.

In 1900 the first automobile show was held in New York's Madison Square Garden. It was the dawn of a new era. An era that was to change the living habits

of a nation of people, and, in the process, create the world's greatest industrial fortunes.

The men who blazed the trail—the visionaries—are all but forgotten; those who followed will long be remembered. Unlike Selden, who was an opportunist, or Durant, who was a promoter, men like Ford, Winton, Chrysler and Kettering were responsible for the fabulous progress of the self-propelled—or horseless—carriage.

William Durant was known as the "Little Giant" of the automobile industry, yet he died not so long ago in comparative poverty. His Durant-Dort Carriage Company had made him a millionaire before he was forty.

David Buick was a successful and wealthy manufacturer of plumbing supplies who decided the automobile business would be a more attractive activity. David Buick built a good car, but lacked the supersalesmanship necessary to put it over. He eventually lost his automobile business, and when he died he was a teacher in a trade school.

Despite their individual failures, these two men were responsible—directly and indirectly—for the formation of General Motors.

In 1904 Durant was called in by Buick's stockholders to reorganize a sick business. Within four years the Durant-controlled Buick Company was highly successful. It then had a net worth of about $3,500,000.

Durant, having twice tasted the satisfying fruits of success, had dreams of magnitude. He visualized a holding company which would merge Buick, Reo, Ford

and Maxwell-Briscoe. But Henry Ford shattered the dream by demanding three million dollars for his Ford Motor Company, which was far more than Durant was willing to pay. Durant and Briscoe tried to interest J. P. Morgan & Company, but without success. By this time, Durant's dream had become an obsession.

It was in 1908, then, that Durant's lawyers incorporated the General Motors Company of New Jersey. Shortly thereafter, this new corporation absorbed the Buick Company by exchanging General Motors shares of stock for Buick shares. In the same manner, Oldsmobile was absorbed later that year, and Oakland the following year.

Starting with Buick, Durant, the Little Giant, created a corporate being that was one day to become so gigantic and so complex that, in effect, it devoured its creator.

Around the turn of the century, makers of the horseless carriage wanted a name for their product. "Electrobot" and "Buggyaut" were considered. "Petrocar" and "Automotor" were temporarily popular choices. The secretary of the London Motor Club suggested "Viamote," meaning to proceed in a motor-powered vehicle. Subsequent suggestions from many sources included "Motorig" and "Mechanical Carriage." The United States Patent Office, however, referred to it as a "motor vehicle" and as far as *they* were concerned, that was that.

But a publisher named Ingersoll clung doggedly to the idea that one good word such as "bicycle" was

needed for this growing new product. At about that time, French cars dominated the automotive scene. And French words (like chauffeur, garage, taxicab, chassis and tonneau) became popularly acceptable. "Automobile," a French term, came into scattered use, but a controversy raged about it. Some felt that we should find our own word in the English language. Others maintained that "automobile" was good and intelligible English, since both of its component parts were in use in our language. Still others wanted the named reduced to simpler words like "Mobe" or "Tomo." Then in a helpful attitude. the *Minneapolis Tribune* suggested three names. "Electromobile" for an electric vehicle; "Gasmobile" for a gasoline car-iage; and "Petrolmobile" for a petroleum-propelled vehicle. Henry Ford, meanwhile, called his first car a "quadricycle."

"Automobile" finally emerged victorious. Its exponents claimed to have coined it by combining "auto" (self) with "mobile" (movable) which seemed to best describe its namesake.

Occasionally, you still see an automobile with large lemons painted on its sides and with placards proclaiming the real or imaginary faults of the car and those of the dealer. But this sort of thing is less prevalent now than it was in the earlier days of the industry.

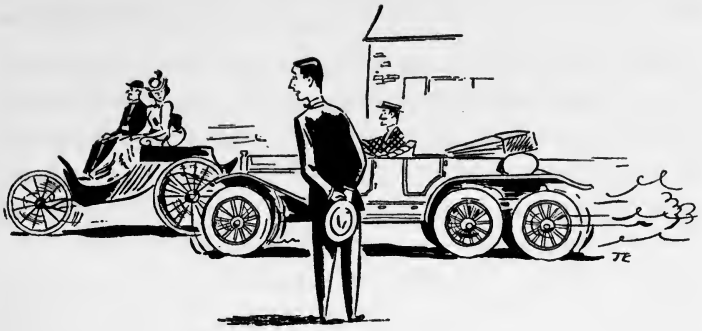
For one thing some lawsuits have been decided *against* the motorists—for defamation of character. Then, too, it was soon discovered that whenever the factory, the dealer *and* the customer were halfway

reasonable, any complaint could be adjusted. And finally, some of the complaining customers who used this method soon learned that they were hurting themselves while actually giving the dealer some valuable advertising—for free.

Anyway, legend has it that the whole thing started with a Winton touring car some fifty years ago. A disgruntled Winton owner at that time had his car hauled through town by a team of horses. On each side of the car was a large placard which stated "This is the only way you can drive a Winton." The incident was a form of more-or-less legal blackmail in those days. The motorist threatened to continue having the horses pull the car around town until he got his money back.

But he reckoned without properly evaluating Alexander Winton. That canny Scotsman retaliated by having another Winton car follow the complaining equipage wherever it went. The second Winton hauled a farm wagon occupied by a tired old jackass. And on the wagon was a placard which read "This is the only animal unable to drive a Winton."

There is a Winton on display in the Smithsonian Institution at Washington. Proclaimed as the first gasoline automobile to be commercially sold, it brought $1000 on March 24, 1898.



2

Automobile Adolescence

ALONG about 1906 a lot of people thought steam cars were here to stay. Certainly, the first vehicle to climb Mount Washington in New Hampshire was a steam car. And an ultra-streamlined steam racer became the fastest car in the world when it traveled over the sand of Ormond Beach, Florida, at 127.66 miles an hour. It held that record for four years, too—until 1910.

In those years, internal combustion cars were called "Gas Buggies," steam cars were referred to as "Whistling Billies," and there was intense rivalry between the advocates of these two types of vehicles.

The steam cars *did* have a greater amount of power (or torque) at low speeds. They required no transmissions or gear shifts, they accelerated rapidly and they were excellent hill climbers.

But beyond that there were certain inherent drawbacks which were never quite overcome. Open-flamed burners and pilot lights were hazards that kept them off ferry boats and out of public garages. And those pilot lights had a disconcerting way of going out at inconvenient times. Boilers corroded or burned out. Burners became clogged, too, until in later years when an efficient atomizing burner was developed. The principle of that atomizing burner is used today in automatic house-heating furnaces.

Then there was the danger of boiler explosions which caused insurance companies to set rigid inspection requirements and to increase insurance rates. Owners weren't too happy either, about the frequency with which they needed to refill water tanks.

Finally, there was the almost insurmountable problem of freezing in cold weather. As a result, northern owners had to drain and store their steam cars during the winter months. It was all very discouraging. As the internal combustion engines developed greater and greater efficiency, the steam car finally gave up the ghost.

Among the "freaks" of early motordom were an eight-wheel car and a six-wheel car. Appropriately named Octoauto and the Sextoauto, they were the brainchild of a banker named Reeves of Columbus, Ohio. His theory was that with four wheels forward and four wheels aft the car would ride better over the unpaved roads of that era. But having built the Octoauto, he discovered that four wheels forward presented a navigational problem, especially on sharp turns. So he eliminated two of the front wheels and called it the

Sextoauto. Not long after that, Mr. Reeves returned to the comparative security of the banking business.

The Peerless, which was much longer-lived, produced a dilly in the early days. My memory is hazy, but I would guess that it was about 1913 when Peerless came out with a steering column that was *hinged in the middle.* The theory was that the steering wheel could be moved sharply forward to give the driver greater clearance when getting in or out. Only objection to this boon to fat men was that the hinged joint sometimes let go while the car was in motion. Disconcerting, to say the least.

There were many devices in those days designed to eliminate hand-cranking. One of these was named the Star Safety Crank. It was a Rube Goldbergian arrangement involving a steel cable and a series of ratchets and pulleys. On the end of the cable at the driver's seat was a lever. A yank on that lever was supposed to spin the front end of the crankshaft and start the motor. Trouble was it only worked when the motor was hot. So motorists always tried to park their cars on a downgrade. And started on gravitational force by letting the car coast and then engaging the clutch.

These days, when you buy a car, the salesman will try to sell you radio, heater, seat covers and other accessories. But present-day accessory sales are mild compared to what they were many years ago. Time was when a top was extra equipment! And for years, the self-starter was optional equipment at extra cost.

Back in 1907, Alanson C. Brush built a car bearing

his name. He advertised that it would cost less to operate and last longer than a horse, and that it was more reliable and required less care than a horse. It didn't quite work out that way, though.

Anyway, the Brush runabout was priced at $500. But if you wanted it *with* tires it would cost you another $50. In a feeble effort to justify this "accessory," the Brush people claimed that with these tires you could go "anywhere that wheels would go and climb any hill that had a road on it."

Incidentally, the Brush had a top speed of 26 miles an hour, would go 26 miles to the gallon and could turn around in a 26-foot circle. Advertising agencies must have loved that.

Cadillac's 1907 model sold for around $2500 *without* head lamps. Bumpers were extra equipment on many cars for years. So were speedometers. But sun visors, which are extra equipment now, were standard equipment on many cars in the early days.

Before that, windshields were an accessory at extra charge. Their metal frame was usually brass. Chrome was unknown. The forerunner of chrome was nickel plating. Nickel plating didn't last too long; and automobile dealers did quite a volume of business replating bumpers, hub caps, and door handles at frequent intervals.

To go *'way* back in this matter of automobile antiquity, history records that one Dr. J. W. Carhart scared the whole town of Racine, Wisconsin, by driving his "horseless carriage" down the main street one Saturday

afternoon. That was in 1871. His "horseless carriage" was a two-cylinder steam buggy with wooden wheels, and it started something.

In 1875 the Wisconsin legislature passed a law offering an award of $10,000 for the invention of a self-propelled carriage which would successfully run over 200 miles of public highway. One section of the law governing the award stated that this self-propelled carriage "shall be a cheap and practical substitute for the use of horses . . . on highway and farm," and that it must "be able to run backward or turn out of the road to accommodate other vehicles in passing . . . and to ascend or descend a grade of at least 200 feet to the mile."

Those were the days when a dollar a day was a good wage and $10,000 was a fortune. Amateur mechanics worked feverishly on a variety of designs. The governor appointed three commissioners to supervise testing of the machines.

July 16, 1878, saw seven brain-children of the embryo mechanics ready to start on a 201-mile course charted for them. But at the word "Go" only two of them got started. Both were steam-driven. One of these two lasted twenty miles and then dropped out because of mechanical difficulties. The other one completed the course—in 33 hours and 27 minutes. He averaged a little better than six miles per hour.

There was much debate in the legislature about whether the winner should receive the award since he did not offer "a cheap and practical substitute for the use of horses on the highway or farm." But in 1879,

opposed by horse-lovers, it finally awarded $5000 to the victorious "steam road-wagon."

A study of old advertisements reveals a wealth of amusing information:

In 1901 the so-called "Phelps Tractor" was a three-wheeled motor contraption to which you could attach a passenger or truck trailer, depending upon whether you were going to church on Sunday or doing your hauling during the week.

In 1902 the Packard car boasted a twelve-horsepower motor. During that same year the California Automobile Company advertised that they would build automobiles to order to be propelled electrically or by gasoline or steam, depending upon the desires of the purchaser.

In 1904 Buick Motor Company manufactured twelve-horsepower motors for sale to other automobile manufacturers. In that year the eighteen-horsepower "Royal Tourist" sold for $2300. It had an aluminum body and a rear door. No top. In 1905 the "Wolverine" could be had with either a rear or side entrance to the tonneau.

In 1906 a Cadillac Model M sold for $950 while a Ford Model K sold for $2500.

The Springfield Motor Car Company of Springfield, Illinois, advertised in 1910 that they would build just "300 Springfield Cars for 300 Exacting People."

It was during this period too that clothing merchants, including Sacks and Company, Alfred Dunhill, and others, created special departments for the sale of auto-

mobile garments. They included "the duster," the rakish caps worn by men, and tied-down, wide-brimmed hats for the ladies.

James W. Packard and his elder brother, William D., conceived the "Packard Carriage" in 1893, but it wasn't until November 6, 1899, that the first one was completed—in a shed at Warren, Ohio. It was a single-seater buggy type with wire wheels, powered by a twelve-horsepower one-cylinder horizontal engine. It was sold in January, 1900, for $1250.

Packard was displayed at the first American auto show in New York during November, 1900, along with forty-one other makes. Of the total only three are still in existence. Packard introduced and developed the H-gear slot and was the first to replace the tiller with a steering wheel.

In 1903 the factory and its two hundred and forty-seven employees were moved from Warren, Ohio, to Detroit into the world's first reinforced concrete building. In 1904 they built the "Grey Wolf," America's first racing car to go faster than a mile a minute. It wasn't until 1906 that the company earned a profit, and in 1907 profits passed one million dollars. Production rose from 12 cars in 1900 to 200 in 1904, to 700 in 1906. Thereafter, growth was steady until the 100,000-per-year mark was passed. And some 55 per cent of all the Packards built are still in service.

In the early days of the company, a prospective customer wrote in for sales literature and information. When James Packard's secretary brought the request to him, the founder thought a moment and then said,

"Tell him to ask the man who owns one." That was the origin of their famous slogan.

In 1904 when this country had less than one million automobiles, leading bankers warned the industry that it was over-expanded. That year, 23,000 vehicles were produced. Today we build that many in eight hours. In 1908 when there were two million cars on the road, a prominent New York investment firm warned that the industry was near its maximum limit. Forty-five years later there were more than fifty million cars, trucks and busses registered in the United States.

The fellow who coined the phrase "survival of the fittest" must have been thinking of automobiles. The only thing tougher than crashing the automobile manufacturing business is staying there afterwards.

Out of some 2300 attempts here are the cars that survived:

Buick, started 1903, now in fourth place.

Cadillac, started 1902, America's finest and highest-priced car.

Chevrolet, started 1912, now in first place.

Chrysler, started 1924, originator of many new automotive developments.

De Soto, started 1928. (There was another short-lived De Soto which started and stopped in 1913.)

Dodge, started 1914, earned one of the country's great fortunes before being purchased by Walter Chrysler.

Ford, started 1903, currently in second place and the best-known car in the world.

Henry J, started 1950, now trying to capture a place in the low-priced field.

Hudson, started 1909. At the height of its popularity it built only one body style.

Kaiser, started 1946, with its companion car, the Frazer (since discontinued).

Lincoln, started 1909, purchased by Ford from Henry Leland.

Mercury, started 1939, by Henry Ford.

Nash, started 1917, a hardy perennial.

Oldsmobile, started 1897, America's oldest.

Packard, started 1899, and retained its design styling longer than any other car.

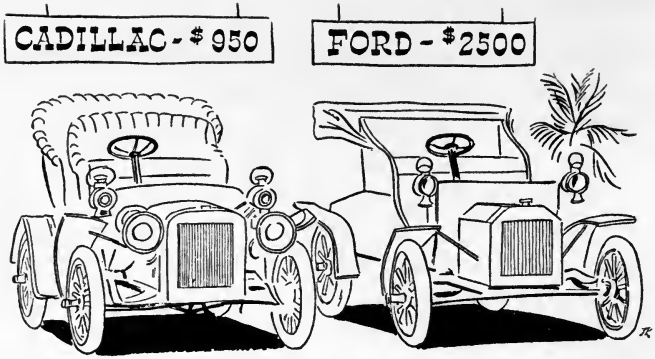
Plymouth, started 1928, and in third place.

Pontiac, started 1926, as a companion car to Oakland, but outlived it.

Studebaker, started 1912, most aggressive of the "independents."

Willys, started 1930, was an outgrowth of Overland (1903) and Willys-Knight (1913).

These nineteen cars are produced by only nine manufacturers.



3

The Uphill Road

OF THE NINETEEN American makes of new cars on the market today, twelve were in existence thirty years ago. In that time these composite changes have taken place:

Horsepower has risen from about 49 to about 133.

Weight has increased about 500 pounds to 3514.

Overall length has increased three feet—from about 14 feet to about 17 feet.

Overall outside width has increased five inches.

Inside width has increased a foot or more by widening into the space formerly used by fenders.

Life expectancy of this composite car has increased fourfold—from about 25,000 miles to more than 100,000 miles.

Today's lowest-priced cars have more horsepower than the highest priced cars of 1923.

Gasoline mileage is greater in a 100-horsepower car today than it was in a 20-horsepower car thirty years ago.

These items were unknown thirty years ago: All steel bodies, four-wheel hydraulic brakes, safety glass, built-in luggage compartments, defrosters, coil spring suspension, automatic spark advance, sealed-beam headlights, automatic transmissions, and a host of other things.

If today's cars were built with 1910 tools and methods at current labor rates, a middle-class car would cost about $60,000.

By comparison, let's consider houses. In 1910 a typical five-room frame house cost about $1600. Today this house sells, new, for about $10,000. One reason is that it is still built with essentially the same hand tools and methods used in 1910.

In 1902 there were more steam cars registered in New York State than all other cars put together. Others were tried with electricity, carbonic acid, acetylene gas, compressed air and liquid air. A few even tried steel springs for motive power.

Some of the early motoring laws sound ridiculous today. These included an eight-mile-per-hour speed limit, and restriction of automobile operation on streets commonly used by horses. In certain cities, automobiles were prohibited from operating between 9 A. M. and 9 P. M. and were forbidden in public parks or on ferry boats. One town—Mitchell, South Dakota—really shot

the works. It passed an ordinance forbidding automobiles within the city limits!

The innovations in 1908 included speedometers, left-hand steering, silent timing gear chains, motor-driven horns, helical gears and baked-enamel finish. A year later, the famous "one-man top" appeared.

In 1911 Cadillac introduced the first self-starter. And Buick came out with a revolutionary idea—a closed body style! The year 1913 brought wire wheels. By 1921 Hudson introduced the adjustable front seat, and many carmakers were experimenting with the new idea of hydraulic brakes. A year later, so-called balloon tires made their appearance.

Four-wheel brakes were introduced in 1923, chrome plating in 1925, and rubber engine mountings in 1926. But it was 1929 before the first auto radios appeared. In 1930, the vogue was toward freewheeling. And in 1932, the factories were singing the praises of no-draft ventilation.

Just about every manufacturer was experimenting with fluid couplings and automatic transmissions in 1934. At least one manufacturer supplied this type of transmission, as optional equipment at extra cost, in that year.

Many automotive features were developed from their earlier counterparts in bicycles: the acetylene light, pneumatic tires, frictionless bearings, chain drives, gearing—and, of course, freewheeling.

There was no shortage of ideas for the automobile's development. The problem was to find methods of

utilizing the ideas so that they would fit into three categories:

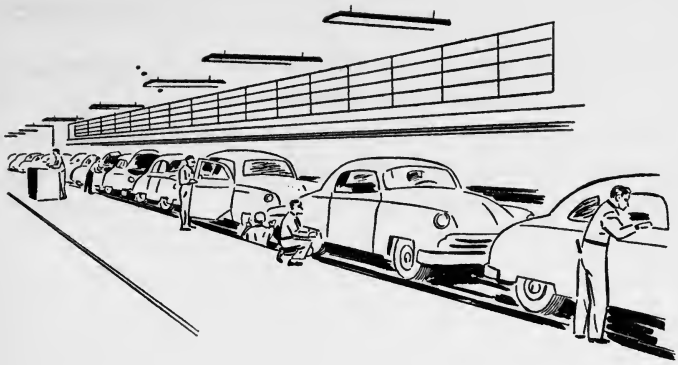
1. They must be reasonably foolproof and easy for any motorist to operate.
2. They must lend themselves to mass production.
3. They must not be too costly.

Automatic transmissions, for instance, are not as recent as you think. They are the result of more than forty-eight years of constant research. Automotive engineers were working on them as early as 1904. Since then, more than 12,000 automatic-shift patents have been issued in the United States, and of these some 4000 are still in force. Most of the early ideas proved unworkable or too costly and complex.

The Sturtevant car in 1904 had an automatic gear-shift, operated by centrifugal force. In 1909 the Carter car used an early infinite-ratio transmission. A large disc, driven by the car engine, was in contact with a friction wheel, connected by a chain drive to the wheel on the car. But these early attempts to eliminate gear shifting were impractical and expensive. It required the development of precision manufacturing and the expenditure of many millions of dollars to develop the present trouble-free automatic transmission.

At one time automobiles were built in fifteen or twenty body styles. Today, generally speaking, there are only four. Convertibles, Station Wagons, Two-Door Sedans and Four-Door Sedans. For many years, the four-door sedan was the prevailing favorite. But in 1949—with the advent of the hard-top coupe—the trend

began to change. About 40 per cent of that year's cars were four-doors and 38 per cent were two-doors. Now only about 33 per cent are four-doors and about 48 per cent are two-doors. Reason is the popular acceptance of the car that looks like a convertible, but has a hard top.



4

Men and Machines

DURING the first fifty years of this century, America's automobile factories turned out 116,413,566 motor vehicle units valued at almost one hundred billion dollars. The automobile changed from a luxury to a necessity, an integral part of our everyday lives. That isn't true in many foreign countries, where it still represents luxury and is a mark of great wealth.

What made the automobile industry great? For one thing, people like to go places sitting down. In a hurry, usually. This desire created a ready-made market.

Under our free enterprise system, automobile factories developed and perfected assembly-line production to the point where cars could be produced in quantities which greatly reduced their cost. Next, they franchised

a nationwide network of dealers and trained them in the methods of mass distribution.

But both mass production and mass distribution were necessarily predicated upon whether enough people could afford to purchase the product so produced. Installment financing solved that problem. The growth of installment-credit institutions paralleled that of the automobile industry. Today, more cars are purchased on terms than for cash. These credit terms put the automobile within reach of nearly everyone.

So we developed in this country the automobile formula. It became the American formula and has since been adopted by most industries. Its principal ingredients are: 1st, Free enterprise; 2nd, Know-how; 3rd, Assembly-line production; 4th, Mass distribution; 5th, Installment selling; and 6th, The combination of these five which broadens the overall market and makes widespread employment possible at wages high enough for the worker to buy and enjoy the products he produces. But behind all this was the ingenuity, the engineering genius and the dogged determination of the men who developed the automobile, and the highly efficient factories which build it.

Here is how a new car is created and how much time elapses from its conception until it reaches you.

Some three years before a new car is available for your purchase, engineers and idea-men are working on drawing boards, fitting the results of exhaustive surveys, tests and experiments into its design.

Two years before the automobile manufacturer

changes models, this design of the new model is approved.

Eighteen months before model change-over time, equipment and supplies for the new car are ordered.

Eight months before model change-over time, the tool and diemakers begin making new dies.

Then about three months before change-over time, material purchases for the *old* model are discontinued. Later, some six weeks before change-over time, production of such parts as axles, sheet steel, frames and chassis are terminated. Finally the huge assembly lines slow down and car production grinds to a halt. The last old model has been built.

The manufacturer now goes through a "cut-off" period, during which no new cars are produced. Another six weeks elapse while new equipment is installed and tested and assembly lines are changed. And at long last, the first or "pilot" car of the new model rolls down the assembly line.

Then there are more tests, inspections, and, frequently, changes. Finally shipments to the dealers begin, and a week or two later deliveries to the consumer are being made.

So the car you'll drive next year and the following year has already been designed and approved, and later models have probably been conceived and are ready for the engineer's drawing board.

Sometimes a design is finished and the dies are made for a new model only to have the entire program shelved because of unforseen circumstances. But not too often, fortunately. Few people realize the cost of changing

models. When all of the nine American automobile manufacturers retool their plants to change models of the nineteen cars they produce, the total cost of retooling and changing the assembly lines exceeds five hundred million dollars before a single car is produced.

All day, every day, the engineers of America's great automobile factories doggedly pursue their research activities. An integral unit of an automobile may be pronounced perfect by both factory executives and the public, but the research engineers go right on trying to improve it. They are constantly making advances in metallurgy, finding new anti-corrosion measures and developing better protection of materials.

Usually this research work is divided into three correlated but separate groups. General Motors, for instance, devotes 40% of its research activity to current service problems, 40% to advanced engineering, and the remaining 20% to long-range experimental projects.

As a result, the automobile has come a long way. In 1919 the average automobile ran just about 26,000 miles before going to the scrap heap. By 1925 its life had increased to 45,000 miles. The average automobile today is estimated to have an average life in excess of 100,000 miles.

An example of what contributes to this longer automobile life is the ball bearing. Millions of people have been fascinated as they watched the bouncing-ball machine at museums, fairs and exhibitions. The machine—a miracle of precision if I ever saw one—is filled with steel balls which drop from a hole onto a steel plate, bounce up through a constantly revolving

bearing ring, then drop to another plate and then, bouncing upward again, disappear through another hole.

There is no trickery about it—just mathematical and laboratory precision. The balls are ordinary steel balls from New Departure's ball-bearing production line. The real miracle is the fact that *any* handful of standard N D balls would bounce the same way. Reason is the strict control that is maintained over their quality from the raw steel to the finished product.

Balls for bearings are made from steel wire. And each "heat" of steel wire is subjected to elaborate metallurgical and chemical tests before it is used. Once the metal is approved, here is what happens.

First, the steel wire is treated and all scale is removed. Then it is drawn through dies to the proper size. An automatic machine next cuts it into slugs, then shapes the slugs into rough balls. This is followed by numerous grinding operations on automatic machines. Hours later, the balls come out of these machines almost perfectly round. Then they go into heat-treating ovens for hardening. After that they go through a finish grinding and lapping process and finally are polished in leather-lined revolving barrels. The result is brilliant, gleaming, accurate spheres.

To pass final inspection each ball must be within twenty-five millionths of an inch of perfect roundness, so nearly perfect that the average super-precision gauge can detect no error. This precision is the real secret of the bouncing-ball machine. It is also the secret of

the smooth operation of your automobile, which contains many of these ball bearings.

Mass production makes an automobile as cheap as it is. And I mean *mass* production. The industry is the largest steel consumer in the world. The average automobile contains fifty different kinds of steel. And 2500 pounds of the stuff are needed for a car that weighs 3300 pounds when completed.

A typical new car, weighing 3824 pounds, is made of the following materials in the amounts indicated:

	Pounds
Steel	2556.29
Gray iron	521.15
Malleable iron	99.60
Aluminum and alloys	11.39
Copper	25.99
Copper alloys	15.61
Lead and alloys	30.39
Zinc and alloys	66.06
Nickel	1.06
Antimony	1.12
Chromium	6.06
Manganese	18.82
Molybdenum	.08
Silicon	17.35
Tin	1.37
Fabric	92.26
Glass	76.28
Paper	55.05
Fibre glass sound deadener	10.83

Rubber	205.63
Plastics	5.25
Tungsten	.008
Vanadium	.0016
Asbestos	2.60
Cork	.626
Mica	.102

I have omitted some of the lesser chemicals and metals, but basically these are the important materials and the quantities of each.

In a given year Fisher Body Division of General Motors built 2,285,000 automobile bodies. In so doing they used enough steel to build 19 Empire State Buildings, enough glass to glaze each of the 16,500 windows in Radio City 100 times. To secure the wool needed 6,800,000 sheep were sheared. And cotton! The seventy-eight million pounds required would provide eight dresses for every woman and girl in the United States.

Some curious materials are used as well. Walnut shells for instance. One company alone buys 160 pounds each week. The shells are ground into tiny particles and then used for "shot" blasting metallic burrs from the machined surfaces of automatic transmission castings. The process involves a chamber inside of which the casting revolves at 250 revolutions per minute while the shells are driven against it at a velocity of two miles per minute. Reason for using walnut shells: They do a better job than scores of other materials that were tried.

And rice. Rice is sometimes used for cleaning carbon

deposits from the combustion chambers of high-compression engines without removing the cylinder head.

Another of the lesser-known materials used in manufacturing an automobile is "metal powder." It is required for making self-lubricating bearings, porous metal filters, etc. One company uses more than four and a half million pounds yearly.

Incidentally, when an error is made in a colossal industry it *can* be a colossal error. One of the automobile factories in Detroit once received an order from its Australia distributor for 5000 wheel lugs. When the order reached the shipping department of the factory its wording had been fouled up somehow, with the result that the factory shipped 5000 wheels. Only after the shipment was on the high seas was the error discovered.

Twenty-four hours a day, every day in the year, General Motors research laboratories (as well as those of other automobile companies) from Miami, Florida, to Phoenix, Arizona, are busy trying to break down the component parts of a motor vehicle. Tests are made under natural weather conditions and in "manufactured" weather.

In Florida, acres of racks, exposed to sun and rain, hold samples of plastics, fabrics, painted panels and plated metals. Research experts constantly study the weather's effects on these samples.

Some of the samples are under glass. Others have sensitive meters attached to them to measure the accumulation of dew and the retention of rain water. A

"Photovolt Glossmeter" is used by chemists to measure the deterioration of the luster of paint finishes.

In Farmington, Michigan, some paint tests are made in moisture-controlled, pressure-equalized plastic domes. Complete fenders are placed in salt spray chambers to test the corrosive action of salt mist. Batteries are tested in "stratosphere chambers" at air pressures from below sea level to 60,000 feet altitude and at temperatures of 76° to 140° F.

Completed vehicles are tested for water leaks with artificial rain driven at them from every direction. At one point a "cloudburst" of 375 gallons of water hits the vehicle under high pressure from 52 jets.

In Arizona, other cars are driven under natural conditions through hot sun, abrasive sand and on steep mountain grades to test cooling systems, air cleaners, and oil filters. Back in the laboratories the same cars are tested at 20 degrees below zero in a simulated 100-mph. wind.

The research and analyses goes on endlessly. Among other things, chemists are trying to develop a fuel that will never "knock"; they hope to create better lubricants for still higher compression engines; and they still hope to find a one-coat paint finish that will last the normal life of the car. Then there's the need for better bearings for high compression engines, and glass that can't be scratched, and scores of other things.

Among the unsung heroes of this business are the car designers at the factories. No matter what they do to improve a new model, someone objects.

Take windshields for instance. Car owners kicked

years ago when the industry shifted from vertical windshields to those slanted at anywhere from 15 to 30 degrees. In spite of some (real or imaginary) optical disadvantages, owners became accustomed to the curved glass. And they definitely *liked* the increased visibility and its contribution to overall design. But the beefing went on. More heat penetrated the larger glass areas. Light glare was more pronounced. And reflections increased. So the industry produced a tinted glass to reduce glare. That brought protests that the glass impaired vision at night. It's an endless process, but meanwhile, car designers go right on planning more and better improvements of all kinds, and resignedly anticipate the new complaints of those who inevitably object.

Most automobile factories have a crew of "ride experts" who devote all of their time experimenting to improve the riding qualities of the new models. Their ambition is to create a vehicle in which the average driver can travel 500 to 600 miles a day without unusual fatigue.

Thousands of laboratory tests go on constantly so that you can be sure of getting the kids to school on time, so that you won't be late for the movies, so that the pleasure of your Sunday drive won't be marred. But it goes on, too, so that your doctor doesn't waste a precious minute in an emergency, so that a police call is a matter of minutes, and so that motoring itself will be safe and dependable.

5

Thumbnail Sketches About Automobile People

FIFTEEN of our nineteen leading makes of cars are named after men. And only one of those men is still living: Henry J. Kaiser. Mercury and Plymouth were named respectively for a mythological character and a place. Four of the fifteen man-named cars represent historical characters: Lincoln, Cadillac, De Soto and Pontiac. These were named for a great president, a French Chevalier, a Spanish explorer and an Ottawa Indian Chief.

The twelve remaining names are those of the men who had much to do with the development of the automobile industry. Nearly all of them had marked mechanical ability. Most of them started quite poor and amassed fortunes.

Some of the biggest bigwigs in the automobile in-

dustry had humble beginnings. Here are examples of how a few of them earned their first dollars.

K. T. Keller, Chrysler board chairman, hemstitched handkerchiefs for $1.83 per week. He was thirteen years old at the time and worked in Mount Joy, Pennsylvania.

Charles E. Wilson, one-time president of General Motors, was a surveyor's rod boy in Mineral City, Ohio, at the age of thirteen.

Lester L. Colbert, Chrysler president, was operating a laundry route at ten years of age, in Oakwood, Texas.

At about the same time, Harlow Curtice, who is now president of General Motors, unloaded fruit at Eaton Rapids, Michigan.

Another General Motors vice-president, L. C. Goad, raised and sold tomatoes as a boy, in Petersburg, Indiana.

Hugh J. Terry, Packard board chairman, cleaned chickens for a Detroit butcher when he was thirteen. He worked Thursday and Friday nights and all day Saturday for $1.50 per week.

E. R. Breech, executive vice-president of Ford Motor Company, pressed pants for Drury College freshmen in Springfield, Missouri, when he was sixteen.

Henry J. Kaiser, board chairman of Kaiser Frazer, hired out as a church-organ pumper as a boy. But in the middle of a hymn, he stopped pumping to see what would happen. What happened? He wasn't paid.

Land of opportunity? You bet. But with a slightly different twist. These men and many others like them reversed the usual procedure. *They* knocked on *opportunity's* door—and kept knocking.

Eddie Rickenbacker, famed head of Eastern Air Lines was—at one stage of his illustrious career—an automobile manufacturer. His "Hat in the Ring" insignia was a familiar sight on the Rickenbacker automobile back in the roaring twenties. Here's a true little story that illustrates how well-deserved is his success.

When Rickenbacker was fifteen, an automobile factory was started in Columbus, Ohio. Week after week he begged for a job there. After he had been turned down for the eighteenth time, he said to the astonished owner of the factory:

"Look here. You may not know it, but you have a new employee. I'm starting work here tomorrow morning. The floor is dirty. I'm going to sweep it. I'll run errands and sharpen your tools. You decide what I'm worth after you've seen me in action."

He got the job, later enrolled in a correspondence course in engineering, became a world-famous ace in World War I, and thereafter rose rapidly to his present eminent position.

Paul G. Hoffman, able head of the Studebaker Corporation, started his business career as a porter in the Chicago salesroom of an automobile dealer. Within a year he had become a used-car salesman.

Hoffman, himself, tells this story of how he sold one of his first used cars: A horse doctor had come to Chicago with $500 in cash to buy a car. Hoffman led him to a Jackson touring car on the floor and extolled its merits. After a bit the prospect indicated that he'd buy it if

Hoffman could prove the car would run the 35 miles to his home.

Hoffman agreed, the trip was completed and the deal was about to be closed in the veterinarian's kitchen, when that individual, looking straight into Hoffman's eyes, asked, "Young man, if you were in my place, would you buy this car?"

And at just about that time Hoffman noticed a sampler on the kitchen wall with the words, "The Lord Hears Every Word You Say." Battling with his conscience, Hoffman finally stammered, "No-o, I wouldn't. I haven't got $500. But, if I had $500, I wouldn't know where to get a better car for the money."

The sale was made, but in recounting it in later years Hoffman said, "I've felt a little unsure of my ecclesiastical standing ever since."

Some forty-odd years ago, Delco—the Dayton Engineering Laboratories Company was organized by a group of nine men in a musty, little Dayton, Ohio, barnlot. One of the men was a fellow named Charles F. Kettering. Object of the organization was to improve the ignition system of an automobile known as the Suburban Sixty. History doesn't reveal whether they succeeded or not, but their efforts resulted in a magneto device which was used on 8000 Cadillacs in 1910.

Kettering and Cadillac's Harry Leland then started discussing an electric self-starter. And subsequently all of the men at Delco concentrated their efforts on an electrical system for a starter, ignition and lighting installation unit.

By January, 1911, they had created an electric starter. Large and crude, but a starter, nevertheless. But when the Delco gang went to install it on an early 1912-model Cadillac, they found insufficient room under the hood, so they went back to work to create a smaller unit. But Leland allowed them only one week to do it. During that week, no one slept and their diet was rum and coffee, but they made it. They made two of them—and got the Cadillac order. One of the units was installed on the Cadillac, the other on Kettering's car.

A short time later Kettering's car overturned, breaking his leg and seriously damaging *his* starter. And the Cadillac, in a garage, was destroyed by fire. So Kettering dragged his plaster cast out of bed and rebuilt the unit. And the 1912 Cadillac had its first electric starter.

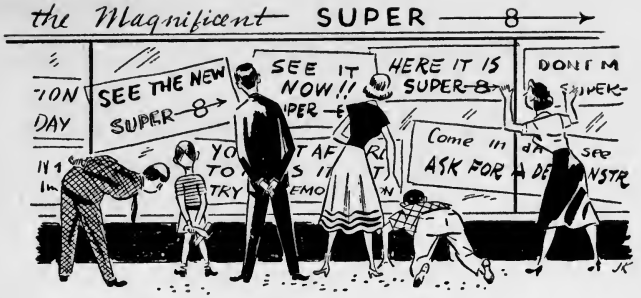
Chrysler's K. T. Keller, who, judging by his success, knows how this is done, defines a successful competitor as "a man who gets into a revolving door behind you and comes out ahead of you."

Many years ago, Henry Ford purchased a new Rolls Royce while on a visit to England. Asked why he chose a Rolls, Ford explained that since he was unable to get quick delivery on a Model T Ford, he was forced to take the next best.

In Louisiana, an automobile dealer once advertised as follows: "Notice: Will the person who stole the new Crosley station wagon from our warehouse please come to the store for his free checkup when the speedometer reads 300 miles."

In Los Angeles, Jimmy Williams is a leading salesman for a Ford dealer. Here is one of the methods he uses to secure prospects. He takes an old pair of socks and goes to one of these self-service laundries. He throws the socks into a wash machine, adds too much soap, and inserts a quarter. Then he sits down with a magazine. First thing you know the soap is going all over the place.

And the women in the laundry start feeling sorry for this poor dope who is spending two bits to wash a pair of socks. So, they're helpful, and pretty soon Jimmy's acquainted with everyone and starts talking automobiles. Claims he's sold twenty-one cars this way. His theory is that it's the woman who influences the family on that new car purchase. And in Jimmy's words, "Where can you find a better place to meet nice women than at a self-service laundry?"



6

Dealers and Dollars

MUCH has been said for and against automobile dealers. Mostly against. But perhaps they're not as bad as they're painted. Certainly those with a scrupulous code of ethics suffer for the misdeeds of the others.

It was the boom period following World War II, of course, which really brought criticism and (sometimes justified) abuse down on the heads of dealers. Cars were scarce, customers were plentiful and demand was terrific.

In 1948, for instance, (almost three years after war's end) there were some seven million unfilled orders for new cars on the books of dealers throughout the nation. Admittedly, many of these orders may have been duplications, but against this possibility was the fact that many more people hadn't ordered their new

cars at all because of the uncertainty of the delivery situation.

The following year the *Wall Street Journal* made a survey of new "used cars" on used-car lots in many cities, and published a table of their findings. They found that used-car dealers were asking a premium over the list price as follows:

	Per Cent		Per Cent
Ford	65	Mercury	31
Chevrolet	60	DeSoto	30
Cadillac	58	Chrysler	25
Plymouth	47	Lincoln	21
Buick	41	Studebaker	20
Oldsmobile	38	Nash	14
Pontiac	38	Hudson	12
Dodge	33	Packard	5

Kaiser and Frazer, they found, could be purchased at a discount: 18 per cent less for Frazer, 15 per cent less for Kaiser.

Many tales of curious incidents reached me during this postwar shortage of new cars.

In Milwaukee, a woman secured a divorce from her automobile-dealer husband with alimony which included a new car every year.

A St. Paul man charged that the dealer's "stalling technique" brought on a case of ulcers; and asked $30,000 in punitive and personal damages for failure to deliver the new car he had ordered.

In Detroit an automobile dealer supplied a car to

the Detroit Athletic Club Beavers who had decided to conduct a raffle. They sold 4200 tickets, including one to the dealer himself. Yep, you guessed it. The dealer won his own car. The Beavers agreed to let him live when he promised to give the car to Father Leonard's parish in the Bahamas.

Then there was the lady who stopped in to see her automobile-dealer husband to ask, "Where are *we* on our new car list, dear?"

In Detroit some time later a couple of brothers reverted to the barter system. They were Hudson dealers and to spark interest in their new and used cars they offered to trade practically anything as part or complete payment for an automobile. Among the items traded were cabin cruisers, diamond rings, silverware, houses and fur coats. Strangely enough, they also accepted money.

On the other hand, a Ford Dealer in Fairbanks, Alaska, had a trading problem of a more permanent nature. Purchasers of new cars frequently asked him to trade furs, prospectors' gold dust, smoked salmon strips, and other unusual things as part payment on a new car. This dealer had been disposing of cars on the barter system for twenty years.

Besides having to know the market value of all sorts of things, he had other problems. On one occasion, when a sourdough wanted a new car right away, quick, the dealer flew a car in from California. It cost the purchaser $1000 extra for DC4 freight. There was no emergency. The sourdough just had a yen

for an automobile—and enough cash to indulge that yen.

And a dealer in Tampa, Florida, advertised a used car at a price of 495 "apples." Did it as a gag, meaning dollars. But a prospective purchaser took him literally—and actually. He arrived with 495 *apples* and drove away with a 1940 automobile.

In Kent, Ohio, another dealer filled a large bowl with pennies, nickels, dimes, quarters and half-dollars. Anyone who bought a car from him was permitted to grab a handful of the coins and apply them on the purchase price of the car. And a lot of people did. In fact the dealer increased business sharply during the week he worked the stunt. But the most any customer could grab in one handful was about ten dollars!

All things find their proper level. In time the 46,500-odd new-car dealers in the United States returned to a slightly uncomfortable, but vaguely familiar, buyers' market. The scarred doors of automobile showrooms were replaced and most dealers' places assumed a new aura of merchandising dignity. You no longer needed to batter down doors in your eagerness for a new car. They held the door open for you—and rolled out the red carpet.

Selling and servicing automobiles is a peculiar business in a way. I sometimes contemplate with envy those merchants who sell radios and furniture and oil burners and washing machines and such.

Take the washing machine. Comparatively simple bit of mechanism installed in your laundry. It's always there. Imagine the washing-machine dealer re-

ceiving a phone call from one of his customers saying, "My washing machine has stopped running. It's lying on the side of the road about 50 miles out of town. Send up for it."

Do the furniture dealers' customers ever complain to him about the mileage their bureau has been getting out of a set of casters? Or about the tea wagon being lazy on a hill? Nobody expects a desk to steer freely, and if the rear deck on a breakfront leaks, who cares? You can't hear the rattles in a dining-room suite because it's standing still. And while the oil consumption of a conversation piece may annoy the listener, no one ever complains to the dealer about it.

Whenever I get to brooding about the greener grass in the other pastures, though, I can always think of the butcher, the grocer and the hotelkeeper. If the butcher and the grocer don't sell their merchandise within a given—and rather short—period of time, they must eat it or throw it out. The automobile, on the other hand, will last indefinitely and doesn't depreciate *too* rapidly.

And the hotelkeeper. Think of him! He sells bedroom space. What he doesn't sell today is lost forever. He can't carry it over and sell it tomorrow because last night is gone forever.

By and large, I'm happy the way things are. We're really lucky in many ways. For one thing, automobile dealers' customers take care of their own local delivery problems. Then, when a car needs service or repairs, its owner brings it to the dealer instead of having the dealer send a truck out for it. And sales resistance

is lower because the car owner nearly always has his *new* car partly paid for by the allowance he will receive for his old one.

But the dealers have their problems. Few people have any conception of the number of cars a dealer must carry in stock to offer a complete selection. Use Buick as an example. In a given year, there were 14 different body styles. Therefore, to have one of each model in stock, a dealer would presumably need to carry 14 cars. Not so. The total is closer to 11,000! All current models. No two alike—and none of them easily interchangeable after they leave the factory.

In the *Special* line there were 5 body styles including the convertible coupé. But the convertible is available in 2 top coverings and 4 upholstery options, increasing the total to 12. And the 4 closed models are available in 2 upholstery options which brings the number of models to 16.

Each of those 16 models were available with or without Dynaflow transmissions for a total of 32. Those 32 models were available with or without heat-and-glare-resistant glass, so now we have 64; and the 64 different cars were available in 19 different color combinations for a grand total of 1216 *Special* models—no two alike.

The *Super* series had only 4 body styles but had more upholstery options, one body was available with electric window controls and all of them were available in 25 different color combinations. So the total of *Super* models available reached 2600 different models.

But the *Roadmaster* really topped them all. Although

Dynaflow and power steering were standard on this model, power braking was optional, there were more upholstery options and 37 color combinations were available. The result was 7252 different *Roadmaster* models.

If a dealer had one of each of that year's Buicks in stock—no two alike—he would have the amazing total of 11,068 automobiles! Some 75 acres of space would be required to display them.

This is no happenstance or whim of the factory; it is a sincere effort to supply the varying desires and tastes of many different people. And in that respect it is highly commendable. But it has been known to aid conscientious dealers in the development of a fine case of ulcers.

Curious things are frequently expected of an automobile dealer. One day we had a visit from one of our customers whom we hadn't seen in almost ten years. Said he'd bought a new car from us eleven years earlier and the cowl ventilator screen was missing . . . We gave him a screen.

One of the things that can, and sometimes does, happen in the automobile business is nightmarish. On occasion when two new cars of exactly the same make, color and equipment are being delivered on the same day, each purchaser receives the other's car. It's a simple thing. Delivery orders can become mixed, or maybe the porter who installs the license tags is just careless.

Sometimes the error is discovered within a week or two and then there's always the problem of whether

the owners should exchange cars (to which they might naturally object) or whether each should apply for new registration for the other's car (which would give each of them a "second" title). And sometimes the error isn't discovered until one of the purchasers tries to trade the car on a new car, a year or two later. By which time, the problem becomes somewhat more involved.

Purchasers of new cars would do well to compare the serial numbers on their invoice and license application with those on the car before taking delivery. However careful dealers may be, they will never be infallible.

By and large, the automobile dealer is a pretty good guy—usually with a genuine interest in his community and its civic affairs. True, he does some goofy things. Like building a showroom with large windows so people can see his cars, and then plastering the windows with signs to obstruct the view. Or selling his used cars to other dealers at wholesale prices and then grumbling about the competition from them. But fundamentally he's a fine person.

What justifies the existence of an automobile dealer in the general scheme of things? Is his purpose only to distribute the product of the great automobile factories at a profit to himself and to them? I don't think so.

It *was* that way in the beginning. Some fifty years ago, automobile makers were intrepid pioneers. Their capital was limited and their product lacked popular acceptance. These were the two principal reasons

why they needed someone to go out and *sell* that product. But it is different now. Automobiles could just as easily be sold by department stores today, if that's all there was to it.

The two primary factors that justify the existence of an automobile dealer as such are the necessity for disposing of the motorist's old car, and rendering service on the new car that motorist purchases.

Excepting for the period immediately following World War II, the used car presented quite a problem. Unlike an old sewing machine or radio or other such commodity, it couldn't be moved into the attic to collect dust. And of greater importance, it represented too great an investment to be discarded or given to a relative. In the early days the new-car dealer sold this old car for his customers' account—sometimes at a ridiculously low price. And then, as time went on, the dealer set aside an ever-increasing portion of his facilities to recondition it, display it, and sell it.

He created a market, frequently rebuilt the car, applied sound merchandising methods, and then instead of pocketing the increase in price that he was able to secure, he passed that increase along to the original owner in the form of a higher allowance.

Under certain conditions, the dealer frequently made "over-allowances" out of his gross profit beyond the true value of the old car. In the years before World War II, it wasn't unusual for motorists to move from a one-year-old car to a new model for anywhere from $200 to $350 total cash outlay.

Traditionally, one-quarter of the factory-delivered

price of an automobile is dealer discount, yet most dealers operated for many years (and probably will again) at final gross profits after overallowance of 10 to 15 per cent. And out of this the dealer paid commissions, rent, heat, light, salaries and all the other multitudinous expenses of operating what has become a very complex business.

The used car was the principal problem that confronted the manufacturers, and the dealer was the final solution to that problem. Many exponents of substitute methods for handling the situation have tried their methods—and failed. Admittedly, the business as it developed, attracted some "horse traders" who didn't help the reputation of automobile dealers as a class. But the dealer's function in the matter of absorbing and redistributing the motorist's old car was nonetheless important.

Then there is the matter of service. Here is a mobile product which immediately it is sold, is exposed to more hazards than any other consumer commodity. Hazards that range all the way from weather and road conditions to immovable objects and human tendencies. Consequently, the servicing demands of motorists are greater than those of any other product.

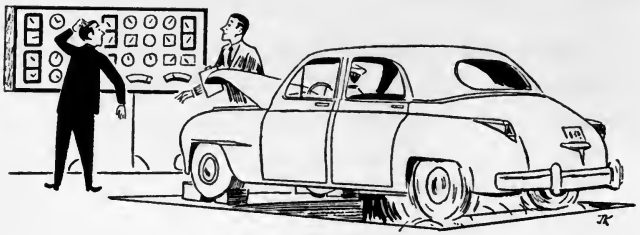
The automobile dealer has been variously accused of being a shyster, a profiteer and a parasite. By and large (and allowing for the normal exceptions that exist in any industry) he is none of these. For the most part, he is a reputable businessman and a civic-minded citizen who contributes a worthy service to his community.

He buys your old car—sometimes for much more than its true value; he supplies your new car in good times and bad—and frequently advances the money to pay for it; and for the life of that car he endeavors to keep it running well and to keep its owner satisfied with it.

Why is an automobile dealer? Because he fills a need and serves a purpose that could be evaluated only if he suddenly ceased to exist.

One evening it was my privilege to sit down to dinner with fourteen of them. Each represented a different make of new car. As these men took their places at the dinner table a prayer was offered. That prayer, although oft repeated, is so profound and was so fitting that I am passing it on here in its beautiful simplicity:

"God grant us serenity to accept that which cannot be changed
And the courage to change that which should be changed
And the wisdom to know the difference."



7

Having to do With Service and Repairs

SOME years ago, we sold a car which was brought back regularly for a noise we'll never forget. It was neither squeak nor rattle. Sometimes it seemed to be on the right side of the car and sometimes on the left. We dismantled and reassembled door lock assemblies and even the doors themselves. We did all sorts of things. The noise was still in the car. Finally, we removed the headlining.

You probably don't know it, but the headlining is secured to small, curved, metal channels which extend under the car roof from one side of the car to the other. In one of these channels we found a ball bearing which had been rolling from side to side and end to end of the channel when the car was in motion.

To this day we don't know whether it got there by mistake or was placed there by some prankster at

the factory. One thing is sure. The top-assembly department in any factory is far removed from the department that normally uses ball bearings.

Time was when automobile repair shops and service stations pursued a hit-or-miss method of diagnosing mechanical trouble and applying a remedy. But not any more. The average repair shop or service station of a franchised new-car dealer of today is staffed by highly skilled, factory-trained experts. They work with precision tools and equipment, following a well-rehearsed, time-saving formula. Hourly rates are admittedly much higher than in the old days, but they are largely offset by reduced working time per job operation and by increased skill.

A complete motor-overhaul job which required two weeks not so long ago is usually completed in two days. A complete oven-baked repaint job can be finished within half a day as compared to a period of three to six weeks during the early twenties.

Some of the work that once kept repair shops hustling has disappeared—apparently forever. A thriving business used to be done in a dealer's nickel-plating department. Chrome changed that. Clutch replacements were once a repair shop's most staple item of business, but automatic transmissions are eliminating clutches. "Spotting-in" bearings—a lucrative, if tedious, item of motor repairs—passed out of the picture when pre-fitted bearings came in. Olite bearings—made of metal permanently impregnated with lubricant—replaced those which needed periodical replacement. The list is endless. Modern automobiles have fewer things which

need the attention of a skilled mechanic than the automobiles of ten to twenty years ago. But many of the modern automobiles do require more mechanical skill than previously.

To keep abreast of these developments, mechanics and their supervisors regularly study new methods and take refresher courses covering earlier methods of diagnosing and repairs. These courses are sponsored by the factories and contribute substantially, if anonymously, to motoring satisfaction.

All of the training, however, fails to condition the mechanical workers for some of the motorists' complaints. They range all the way from the amusing to the ludicrous. One instance involved the driver of a used Chevrolet. He complained that the car had neither power nor speed. In fact, if he tramped all the way down on the gas, the car wouldn't go over 30 miles an hour. After the mechanic made a careful analysis, he corrected the trouble by removing a Polish sausage from under the accelerator pedal.

Then there was the lady who liked her Buick fine, but wouldn't have another one. Asked why, she explained that she didn't enjoy being cold in winter and the heater simply wouldn't heat. No matter how high she turned the heater controls, the interior of the car remained cold. Upon inspection we found the fan blades of the under-seat heater all fouled up with a pair of lady's nylon panties. The heater has been doing fine ever since.

Another customer who was allergic to squeaks, rattles and such, complained that there was a noise in the rear

of his car like the ringing of a bell. We tested the car and sure enough, there it was. A bell. His little daughter had been playing with it in the back of the car and had hung it on the rear-window regulator.

When the first trips in a horseless carriage were made between Philadelphia and New York, Philadelphia and Atlantic City, and Philadelphia and Baltimore, they were made in *two cars:* one to establish the record just in case a record *was* established, and the other "loaded with spare parts and a couple of mechanics. . . ."

In any given year, according to American Automobile Association estimates, some forty-five million motorists need emergency help on the roads. Almost half of their cars are disabled because of battery failure or tire trouble. These two things usually run neck and neck in number. Some four million require towing service, of which two million suffered damage resulting from collisions.

More than seven hundred thousand motorists annually lose their keys or lock themselves out with the keys inside the car. And about one and one-half million annually run out of gasoline. Ignition, starting, carburetion, choking and other such items, are each responsible for their share of breakdowns, but these are in a comparative minority.

Contrary to the opinion of some motorists, repair stations do not pull their prices out of thin air. Service charges are established by *Factory Flat Rate Manuals* which determine how many hours of skilled labor may be spent on any given repair job. And the prices of replacement parts are firmly established by the manu-

facturer. If the repair shop is not that of a factory-franchised new-car dealer, the chances are nine out of ten that he will verify his charges with such a dealer before rendering his bill.

There are many cases in which a mechanic spends ten hours of skilled labor on a given job, only to learn that the customer cannot be charged for more than seven. There are other cases, of course, in which that same job with its factory-stipulated, seven-hour limit is turned out in five or six hours, when the mechanic is especially skilled and there are no extraneous delaying circumstances. But the charge to the customer (as well as the wage paid to the mechanic) is usually the same: seven hours of labor at whatever the respective customer and mechanic's rates may be.

One of the commonest complaints from motorists has to do with excessive oil consumption. When your car consumes too much oil there are only three things that can cause it:

1. How you drive,
2. The quality of the motor oil you use, and
3. The condition of your motor.

When you start a cold motor (in any kind of weather) take it easy. If you race it you'll force oil (and gasoline) right out of the exhaust pipe. It isn't necessary to let the motor warm up while idling and before driving, but do drive slowly until it warms up.

With a warm motor in good condition you can still consume oil. At speeds of 60 to 70 miles per hour the

pistons are whipping up and down in the cylinders at such a terrific pace that some of the oil is driven right out of the crankcase. You simply cannot avoid oil consumption at high speeds.

At these high speeds your motor becomes hot. And I mean hot!—sometimes 400 degrees overall with peaks of many times that at the top of the cylinders. No wonder either, when you realize that some 9000 explosions take place in each mile of travel. At 60 miles per hour that's 9000 explosions a minute. Imagine a machine gun firing at that rate and you'll have a mental picture of the controlled force and power within your motor.

Then think of the strain on every moving part and its effect upon the lubricating oil. Which is why the oil in your crankcase should be the best that scientists and engineers can create. Not only will you consume more oil of a poor quality, but your motor won't stand up as long or as well as it will with good oil. There's no doubt about it, quality oils—the so-called premium types—are the least expensive in the long run.

Let's explore this matter of changing oil a little more thoroughly. Running at high speed your crankshaft bearings turn 2800 revolutions, and your pistons travel 2048 feet per mile. The temperature of your crankcase registers from 250 to 300 degrees fahrenheit. And the forces exerted on bearing surfaces reach 2000 pounds per square inch.

These heavy loads in a modern motorcar must be borne and cushioned by a film of oil only 1/1000 of an inch thick. Your crankcase holds 5 or 6 quarts of

oil; yet at only 30 miles an hour that oil is pumped through the lubrication system at the rate of 11 quarts per minute.

While all this is going on, oxidation takes place, abrasive dirt and dust are drawn into the engine along with the 6000 cubic feet of air which it "breathes" every hour; and carbon and fuel soot deposits accumulate in the crankcase.

Tests reveal that in any large industrial city, air pollution is so great that more than 100 tons of dirt are deposited monthly per square mile. Air filters screen out much of this dirt, but the finest air filter ever made for an automobile won't keep *all* of it out of your engine.

These conditions combine to create "sludge." Sludge is a muggy substance with a consistency roughly equal to thick mayonnaise. After 1000 miles of driving the average car, the motor oil will consist of 25 per cent sludge. Continued driving with that oil to 2500 miles will increase the sludge to 61 per cent. After 5000 miles without an oil change sludge amounts to 74 per cent of the lubricating contents of your crankcase.

And so—The American Petroleum Institute recommends oil changing every 1000 miles. They prescribe these changes for the average car driven under slightly worse than average conditions. Some cars need oil changes more frequently—some not so frequently. By and large, there is no single rule of thumb for all cars. Best practice is to consult the service manager of a reputable automobile dealer and then take his advice

as to how often the motor oil in your individual car should be changed.

Next time you're annoyed by a slight lack of smoothness in the performance of your motor, think of this. The precision requirements of automotive ignition systems are such that each of some 150 sparks per minute must be timed within 1/10,000th of a second.

There are scores of things that can effect ignition timing; faulty ignition timing, in turn, affects gasoline mileage, car performance and motoring comfort. It has always been a source of wonder to me that so many motors function so well so much of the time.

When I was a kid, the youngsters in our neighborhood used to force a raw potato over the end of the exhaust pipe of automobiles parked in the neighborhood. Then they'd watch in glee as an irate motorist tried to start his car. It wouldn't start, of course, until the potato was removed.

An exhaust pipe must have a clear unobstructed opening for proper motor operation. Some of the new cars have exhaust pipes that extend beyond the rear bumper. These pipes sometimes become bent when parking. It would be smart to look at yours once in a while. If it's bent or partly closed, straighten it so that you always have a clear, full opening.

Washing cars has always been a "loss-leader"; it usually costs more to wash a car than the price charged. But it's a service that dealers like to render. Years ago

we went a little farther. If we washed your car and it rained before midnight of that day, we washed it again the next weekday without charge. A Waco, Texas, garage, meanwhile, advertised, "If you are not greeted in 30 seconds, your car will be washed free."

For years I have maintained that the driver, more than any other single thing, is responsible for whether his car is good or bad. I don't deny the fact that occasionally a troublesome car leaves the assembly line, but such instances are increasingly rare.

Many times in my experience as an automobile dealer, have I traded a car on a so-called "policy-adjustment deal." A policy-adjustment deal is a profitless, commissionless (to the salesman) transaction in which the dealer takes back an automobile previously sold and replaces it with a new one, because there is no other way of satisfying a motorist's complaint. But I don't recall a single case where we had complaints on such a "troublesome" car when we later sold it to someone else.

Some of the trouble is understandably mental with the customer. In varying degrees the condition develops about as follows. Mr. Customer takes delivery of a new car. A little later he notices a scratch or mar on a fender. He overlooks that but is subsequently disturbed by a rattle in the vicinity of that same fender. After nightfall or during the next rainfall, he experiences a stalling condition in his motor. So he brings it back to the dealer with a mildly sour taste in his mouth.

The dealer removes the rattle, repaints the fender and adjusts the carburetor. And the customer goes away feeling better. But in the next few days, and again in the weeks that follow, he may find that water leaks into his cowl or rear deck, or the car has a tendency to pull to one side, or it's hard to start in the morning—or all of these things and a host of others.

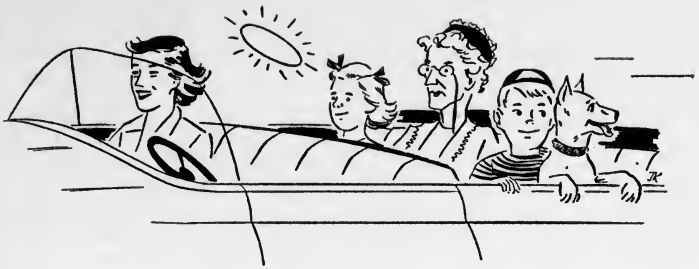
He keeps coming back to the dealer and the dealer continues to adjust and repair. But by this time, the customer has convinced himself that he has a "bad" car. He heard of people who were "stuck with a lemon" ten or fifteen or twenty years ago, and he's convinced that now it's happened to him. In fact he isn't sure but what the car was in a collision before he got it! Or maybe it fell off of the trailer on the way from the factory to the dealer!

About then, the dealer is faced with having an unhappy customer or making a policy-adjustment deal. And he usually does the latter.

Fortunately, the occurrence is rare nowadays. I don't suppose we've made more than one policy-adjustment deal for each thousand new cars delivered in the last five years. Nor have we ever had any difficulty with the *second* owner of such a car.

Automobile service has come a long way since the early days. When the industry was young most service was rendered and repairs made in a hit-or-miss manner. An amusing example is the following suggestion of the Rambler Automobile Company, which appeared in one of their little owner's magazines in 1908. It had to do with removing carbon deposits. Their suggestion: "Put

an ounce of baking soda into each cylinder, add one-fourth of a pint of kerosene; and then turn the engine over a few times to thoroughly soften the deposit." At the end of the article, the Rambler people printed what I consider an all-time classic: "If you try it, let us know how it works."



8

On Behalf of Front-Seat Drivers

MANY years ago we acquired a car with blood stains on the front seat. In our efforts to remove them we used upholstery cleaner, gasoline, ink eradicator and in fact almost every cleansing solvent that occurred to us. No good. The stains were still there. Later when the car itself was being washed, the seat cushion was accidentally soaked with water. When we wiped the cushion dry, the blood stains were gone. And we learned that plain cold water is the best blood-stain remover.

Chocolate stains can be removed with warm water, after which the remaining discoloration can be cleaned with carbon tetrachloride.

Chewing gum is something else again. Moisten it with carbon tetrachloride and then remove it with a dull knife.

Dog and cat hair is best removed by rubbing the upholstery with a stiff sponge moistened with water.

This will gather the hair together, which can then be picked off easily.

Grease spots are removed easily with uncolored gasoline. But if the fabric is soaked with oil, pour fabric cleaner on the area and then soak it up with a white blotter. After that, sponge it with a clean cloth that has been dampened with cleaning fluid.

Ice-cream stains require elbow grease. Rub hard with a cloth soaked in very hot water. Let the area dry and then sponge it with carbon tetrachloride. Milk and cream, on the other hand, can be removed with cold water.

Lipstick can be removed by pouring carbon tetrachloride directly on the stain and sponging it up immediately with a clean white blotter. Continue the process until the stain is gone. This method in a lesser degree will also remove shoe polish.

Battery acid is best removed with household ammonia. Let the ammonia soak in for a minute and then rinse with cold water.

To remove a decalcomania from your car without damaging the paint finish, follow this procedure. Soak a clean cloth in ordinary household ammonia, rub the decal until it dissolves, then wash the area with clean water.

Some popular Cola drinks are good for removing Halloween soap from windows and incidentally will do a good job of removing tar from paint finishes.

Drain your antifreeze each spring and discard it. Here's why. Reputable brands of antifreeze are made

to do two things: prevent your car's cooling system from freezing and (by the use of inhibitors) protect it from acid, rust, corrosion and scale.

The inhibitor's retain their effectiveness for a long time—*under the best operating conditions.* But when a leaky water pump, hose connection or cylinder head gasket lets air or corrosive exhaust gases into the anti-freeze solution the effectiveness of the inhibitor is reduced or destroyed. And that might cause trouble that would be expensive to correct.

The average automobile generates enough heat to warm a six-room house. That's why an efficient cooling system is important. Without the cooling system, the tremendous heat would destroy an automobile engine within an hour.

In freezing weather, don't park your car outside with the doors locked immediately after the car has been washed. Water in the keyholes will freeze and your vocabulary will increase in the wrong direction.

If that ever *does* happen to you, insert the tip of the key into the edge of the lock. Then hold a lighted match beneath the key. As the key becomes warm it will melt the ice and the key will move into the lock. It requires patience though. And if there's a strong wind blowing, you'd better call a taxi.

Finely powdered graphite, now procurable in liquid form, will prevent locks, gas tank caps and trunk lids from freezing.

Ever shuffle your feet over a pile rug and then get

a static electricity shock? Well, the same thing happens when you slide across the slip-covered seat of your car. And the shock is particularly intense if those seat covers are made of the plastic materials currently in use.

The chance of shock can be eliminated in a very simple way. Just dampen an ordinary cloth with rich suds of ordinary washing powders such as Tide, Dreft, Breeze, Fab or Surf, and wipe the seat covers with it. Let them dry for a few minutes and static electricity should disappear.

Here are some winter-driving facts. If you're driving on dry concrete at 20 mph, you can stop within 21 feet, but on *wet* concrete you'll require 26 feet. . . . If you're driving on packed snow at 20 mph with chains on the rear wheels, you can stop within 40 feet, but without chains you'll need 69 feet! . . . But on glare ice, look out. From 20 mph, with chains, you'll travel 88 feet before stopping, but without chains, and depending upon the type of tires on your car, you'll need from 169 to 197 feet to stop. Skidding and sliding distances increase from 10 to 50 per cent on synthetic-rubber tires. The distances above are for natural-rubber tires only. A safe rule on icy roads is to allow yourself 10 to 15 car lengths from the car ahead at all times.

It's a remarkable thing that an automobile radio functions at all. It is subject to constant vibration, sudden jolts, interference from trolley wires, static from neon sign transformers, and a lot of other things. Not the least of these are spark and generator noises and

wheel static from the car itself. And of course the car is constantly changing its position in relation to the location of the broadcasting station.

But work the radio does, albeit with certain qualifications. Anyway, here are some tips about your reception—or lack of it.

Fading can be minimized by keeping your antennae fully extended. *Noises* of all types can be reduced by turning the volume control to the extreme basspoint. *Interrupted reception* is usually caused by an insecure antennae connection or a loose tube in the set. This also will cause a "dead" radio to start playing when you hit a bump. *Poor tone* is caused by a worn vibrator, a weak battery or a defective tube. A completely "dead" radio is frequently only a blown fuse. Or it can be a burnt out tube or a dead vibrator. Sometimes it's just a grounded lead wire.

Commonest complaint, though, is noisiness. Commonest source of that complaint is wheel static. This is the result of electrical charges collecting in the wheels and then discharging to the road surface through the tires. It varies with the type of road: is worst on macadam, seldom present on dirt roads. When present, it isn't often noticeable in the radio under 25 mph but increases in intensity with the speed of the car.

The remedy for wheel static is to install "static collectors" in contact with both the hub and the spindle of each wheel. Sometimes, in severe cases, it is also necessary to put a special powder like U. S. Tire Static Neutralizer inside the tubes.

Ever become frightened when you were in your car during an electrical storm? If you did, here is some reassuring news. Westinghouse has a lightning laboratory in Trafford, Pennsylvania. In recent tests a giant surge generator fired three-million-volt lightning strokes at a steel-topped automobile while an engineer sat at the wheel. The automobile acted as a lightning-proof cage, diverting the heavy currents harmlessly around the passenger. Only damage to the car was a small scorched spot on the metal roof.

Ask the average motorist how many springs his car has, and he'll probably say "four." Actually your car contains more than 400 springs of various kinds. Mostly, they're made of wire and they constitute some 180 different designs.

The biggest springs are the two coils in the car's front-end suspension. They weight at least 15 pounds each. The smallest springs are in the carburetor. They're so small that 125 of them weigh only one ounce. Incidentally the carburetor alone has 11 different springs.

Then there are between 200 and 300 coil springs in the car seats; from 12 to 16 valve springs in the motor; 8 in the clutch; and others in door locks and handles, master brake cylinder, horn button and various other parts of the car.

Each spring is of special steel, processed to give it the strength and flexibility needed for its particular purpose. The coils for front-end suspension, for instance, are made of precision rolled bar steel. The bars are

heated to 1700 degrees and then put through a coiling machine to acquire the shape in which you see them. Then they're quenched in oil, annealed in a furnace, cooled in a water bath, and "shot peened" to make surfaces hard while leaving the cores flexible. Finally, compression strength is measured and the springs are carefully matched in pairs so that each car has perfect mates.

Only one other thing (tires) contributes so much to comfort, smoothness and long life in your automobile as do these 400-odd springs.

There's a mighty midget in your car. It's the battery. Most motorists take it for granted. Besides supplying the current for about twenty-five lamps in the average car, it sounds the horn, runs the windshield wipers, supplies the ignition spark, plays the radio, drives the heater and defroster fans and cranks the motor. Remarkably enough, the battery supplies the current to run the motor which drives the generator which replaces the current that the battery supplied in the first place.

Cold weather greatly reduces battery efficiency. If a battery has 100 per cent cranking power at 80 degrees Fahrenheit, that power drops to 65 per cent at 32 degrees, and to 40 per cent at zero.

More batteries fail because of overcharging than from all other causes put together. Explanations of overcharging are varied. One of them is the fact that people drive more than formerly. Another is the result of higher battery temperatures because batteries are now under the hood and close to the motor. Service stations

are sometimes at fault too, because they either overcharge a battery that is being serviced or set the generating rate too high or both. Grid corrosion and buckling also contribute to battery failure. And all too frequently batteries are faulty only because of a corroded terminal or a loose connection.

One reason that the engine needs 2½ times its normal cranking power at zero temperature is that stiff engine oil adds materially to the load. Number 20W oil is normal for winter driving, but in very cold weather (below 10 degrees Fahrenheit) the use of number 10W oil in the engine will reduce the load on the battery as well as do a more efficient lubricating job.

Hard starting isn't usually the fault of the battery. More often it's traceable to the ignition system. Dirty or wet spark plugs, wires, and distributor cap, are the most common causes. Battery terminals should be clean and tight. Breaker points should be clean, properly spaced and not burnt or pitted.

The speedometer is the most delicate part of your car. It is the result of centuries of effort to find ways to measure speed and distance covered by a moving vehicle.

Long before the Christian era, animal-drawn vehicles had revolving drums geared to one wheel. The drums contained pebbles which fell into a basin at fixed intervals. At the end of a journey the pebbles were counted to determine the distance traveled.

Back in the gay nineties, trains, streetcars and bicycles had crude speed and distance indicators. But not until automobiles became popular were speed-

ometers perfected. A New Yorker named Joseph W. Jones, is credited with inventing the first automobile speedometer in 1901. Until 1925 they were extra-cost items on many new cars.

Today's speedometers are built with the precision of fine timepieces—mostly by women, who excel men in this work. Some parts are so small that they're assembled by a sense of touch, then checked with microscopes.

Speedometers have a flexible drive cable geared to the car's transmission. Each 1000 turns of the cable registers one mile on the mileage indicator. But the speed indicator has no gears. It is moved by magnetic currents that increase in force as the cable spins faster. The magnetic pull is adjusted to a finely calibrated hairspring that seeks constantly to pull the speed indicator back to zero.

The factory sets each speedometer to register a few miles faster than actual at high speeds. This compensates for the fact that as car speeds increase, tires expand, causing each turn to cover more distance. Other than that, however, the majority of speedometers are quite accurate.

Speedometers can be tampered with—and frequently are. Drive-it-yourself companies who rent cars on a mileage basis sometimes install hubometers on one of the wheels in order to check speedometer mileage.

On one occasion, according to the late Ralph Young of U-Drive-It Company, one of his customers realized that he had driven a rental car further than he had money to pay. He knew the hubometer could not be removed or altered, but he had an idea. He jacked

up the wheel on which the hubometer was mounted, sat down on the curb and for the next fifteen or twenty minutes turned that wheel rapidly and steadily *backward*. By hand. Then he took a hubometer reading. The mileage had *increased*! Seems that a hubometer registers added mileage on each revolution of the wheel regardless of direction.

Do you cuss silently when your car stalls under certain atmospheric conditions? The experts tell us that motor stalling occurs most often in a normally adjusted car when the temperature is between 37 and 45 degrees Fahrenheit; especially with high humidity. This is sometimes referred to as chemical refrigeration. A motor that stalls under those conditions can of course be adjusted so it won't stall. But if that is done the motor will not be functioning at peak efficiency in higher or lower temperatures or when the humidity is lower.

Another thing which causes stalling in colder weather is what automobile experts call a "frozen heat trap." There is a thermostatically controlled valve in the exhaust line which automatically regulates the temperature of the motor and helps it to warm up more quickly in winter. Sometimes water condensation from the motor accumulates around this valve and freezes when the car is parked. When that happens, stalling is a natural result until the motor reaches proper operating temperature or the valve thaws or both.

There are many other things—some of them most elusive—that cause stalling. A cracked rotor in the

distributor, for instance. Or a grounded primary wire leading to the distributor. Sometimes the automatic choke doesn't operate properly and causes "flooding" or too rich a mixture of gasoline and oxygen. Or it could be faulty ignition timing.

Then there's all this more recent talk about carbureter "icing." As nearly as we can determine, in automobiles this condition is caused by the gasoline rather than the carburetor. But whatever the cause, it succeeds in stalling the motor about as effectively as the other things mentioned.

When the temperature is 20 degrees Fahrenheit, your car—from a cold start—should be driven about 8 miles at 25 miles per hour to bring gasoline economy to normal. For the first mile the average economy is only one-half of normal. For the next 7 miles, average economy will still be 15 per cent less than normal.

Oil is thicker, and consequently your motor is more sluggish when the weather is cold. Except for caution while warming up your motor, nothing can be done about this. But you *can* have the sludge removed from your crankcase, so you won't be wasting motor energy to warm up foreign material as well.

Never "race" a motor when it is first started, nor accelerate it too rapidly, before it warms up. After your car stands idle—overnight for instance—it is "dry." That is to say, the film of oil getween the pistons and cylinder walls and around other vital parts has drained back into the crankcase. Until your motor runs for a little while there is a metal-to-metal contact with-

out proper oil protection. If you race your motor during the warm-up period, you will cause a degree of scraping, scoring and grinding. And in time, that will cause expensive motor repairs.

Certain things—like not racing a cold motor—are called automobile "Life Preservers." One of the most important of these Life Preservers is front-end alignment. I cannot overemphasize the importance of keeping front wheels properly balanced and aligned. Failure to do so will result in shake and shimmy conditions, as well as wandering and pulling to one side. Aside from that, improper alignment causes uneven and excessive tire wear; and uneven tire wear in turn, accentuates the front-end condition.

Automobiles thrive best on a nicety of balance in all things. For each thing that you want your car to do especially well, you must surrender something else. You can have soft, easy-riding qualities by reducing the air pressure in your tires—but soft tires will increase gasoline consumption, cause hard steering and shorten tire life. If you want top speed and performance, you cannot have maximum operating economy. If your carburetor is adjusted for maximum gasoline economy, your motor won't start easily when cold. A car can be geared for extra power on a hill, but if it is, you lose top speed. Or it can be geared for top speed at the cost of maximum power.

Salt or calcium chloride is frequently used to melt ice and snow on the roads. It does a good job, but it is ruinous to the under side of an automobile. If

your car doesn't have a protective undercoating, it should be pressure-washed frequently during snowy weather or the salt will eat right through fenders and body panels.

Salt used on city streets in winter is injurious to the finish of your car as well. Here is what you can do to combat the effects of it.

1. Wax your car before winter sets in. Sand off any rust spots and apply enamel.
2. If chrome is discolored, clean it with a good household scouring powder. Then apply a thin coat of oil and rub off, leaving a protective film. Do this after each car wash.
3. Wash your car at least once a month including the underbody. More frequent winter washing is preferable.

People who tie a pair of baby shoes on their rear vision mirror and ride along with them dangling in their line of vision, are in violation and subject to a fine. Baby shoes are a nice sentimental reminder and all that, but state highway officials consider them a driving hazard behind the windshield.

Which reminds me of an incident that happened almost a year ago. At that time I was driving down a main street in our town behind a car with a pair of baby shoes suspended from the mirror bracket. But in spite of this constant reminder of his family ties, the driver of that car was earnestly trying to "pick up" each attractive feminine pedestrian he passed.

The quickest way to stop a short-circuited horn from sounding continuously is to lift the hood and disconnect one of the horn wires. Seems like most people should know that, but a surprising number don't.

One of the outstanding human failings that contribute to many automobile accidents is this. Things like poor brakes, poor steering, slipping or worn clutch, etc., sneak up on you. You're not really aware of them because you automatically adjust yourself to the gradual change away from peak efficiency. But it's costly and dangerous to permit such self-adjustment.

Tests show that lost motorists, like lost pedestrians, travel in a spiral path when trying to go straight ahead.

9

Oil's Well That Runs Well

THE petroleum industry got started back in 1859 when Edwin L. Drake arrived in Titusville, Pennsylvania, in search of a substitute for the whale oil then used in lamps. He built a crude wooden derrick thirty feet high and started to drill.

Two months and 69½ feet later, America had its first oil well. From that well came a substance that we now call petroleum. And from that petroleum Drake extracted kerosene. Almost overnight people had a cheaper fuel for light, heat and cooking. And there was enough of it so that it became available to a greater number of people.

By 1869, when U. S. population totaled thirty-nine million persons and the national income was only $6.8 billions, this country had 543 oil companies operating 2,946 oil wells for a total annual production of 4.2 million barrels of petroleum.

The industry soon produced a second product: lubricating oil, and a third: gasoline. With the aid of these petroleum products mass-production machinery was built and used and America's fabulous climb to industrial supremacy and prosperity had begun.

Before the advent of oil-lubricated, industrial machinery, men, horses and mules did 95 per cent of the nation's physical labor. Working hours were sunrise to sunset, six days a week. Seventy or eighty hours was considered a normal work week. Today, man and his animals do only 6 per cent of the country's physical labor. Machinery does the rest—machinery powered and lubricated to a considerable extent by petroleum products. And 34,000 oil companies extract and refine and distribute two billion barrels of oil annually from 435,000 producing oil wells. One of those wells is four miles deep.

Your automobile is comparatively cheap to buy and cheaper to operate as a direct result of the oil industry's magnificent job. And the other by-products of petroleum—such as the asphalt roads you drive on—would fill dozens of these pages. Time was when lubricating oil was the main product of the petroleum industry. Gasoline was the by-product and frequently surpluses of it were destroyed. Things are different now.

And you can stop worrying about depletion of the nation's natural petroleum resources. When the need arises synthetic premium gasoline can be produced in unlimited quantities at prices only three to four cents

per gallon over present service station prices. But aside from that the Standard Oil Development Company says flatly that there is enough underground oil available to supply the world for another two hundred fifty years.

So go ahead and use all you want. Waste it if you like. But it's costly. Gasoline alone amounts to 32 per cent of the total cost of running the average car. On sober second thought, don't waste it. Let a good service station tune your motor and adjust the various gadgets that contribute to fuel economy. Then take the money you save and give it to your pet charity or something. After which you'll drive around wearing your own personal halo. Enjoying it no end. And everybody will be happier. You and the service station and your car and the charity.

Anyway, it has been estimated that the combined research efforts of the automobile and the petroleum industries have increased automobile efficiency 30 per cent since 1930, which represents a saving to the American motoring public of two billion dollars a year.

Ever since the introduction of oilite bearings (which need never be lubricated) rumors crop up at fairly regular intervals about the possibility of sealed-in engines. But the experts point out that such engines will not be available in the forseeable future. Oil changes and lubrication are with us to stay—for quite a while.

A professor at the Royal Institute of Chemistry in England has introduced a new compound created to

permit automobiles to run indefinitely without changing the oil. (To the distress of members of our service department, some of our customers don't change their oil even without the compound. But that's another matter.)

Getting back to the compound, it is based on fluorine, which eliminates hydrogen from oil and makes it noninflammable. Present lubricants have to be changed mainly because they partly burn out. With a noninflammable oil, its lubricating qualities should be practically everlasting. That's what the professor says. He adds naively that the car must have a good oil filter and that the lubrication system must not leak.

Nowadays it seems that everybody is figuring out everything by the pound. I once published a column pointing out that Buicks are cheaper by the pound than any other cars in their respective classifications. That was conclusive and the matter should have been dropped there.

But no. The American Petroleum Institute had to announce that gasoline sells for about four cents a pound. And that one pound of gasoline will provide about two and one-half miles of travel. They go on to point out that one pound of gasoline equals about one-third of a loaf of bread in cost, or one-sixth pound of green beans, or a half-pound of apples or less than a pint of milk. Silly, isn't it? As far as I am concerned, a pound of gasoline is slightly more than one-sixth of a gallon and I prefer to let it lie right there. In fact, I'm sorry I ever brought it up in the first place.

On one occasion I attended a sales conference of the Atlantic Refining Company in Atlantic City and for the first time watched a demonstration of a Geiger Counter at work. A Geiger Counter is just what its name implies. It counts the radioactive content of any substance by simultaneously flashing a light, sounding a signal and registering the frequency of those impulses.

For the purpose of the demonstration two vials of motor oil were used. One contained top-quality oil—the other a cheap quality. Both were taken from the crankcases of cars that had been operated with radioactive piston rings.

To appreciate this test, it must be recognized that whenever metal rubs against metal (e. g. piston rings against cylinder walls) wear takes place. Lubrication reduces this wear as it removes bearing friction, but even with the best lubricant in a motor, infinitesimal particles of metal wear away and descend into the crankcase. The poorer the oil, the greater the wear, of course.

When the detecting rod of the Geiger Counter in this case was placed next to the good quality oil, the Geiger Counter registered impulses about one to two seconds apart. But when that detector was placed next to the poor quality oil, the Geiger Counter responded with a succession of impulses so rapid that they sounded like a machine gun. Quite obviously, the degree of wear was much greater when the poor quality oil was used.

It may startle some readers to learn that if the "fit" of the piston rings in your car permits 1/100th of a drop of oil to pass the rings in a single cylinder, you would refer to the car as an oil hog. For it would consume one quart of oil each hundred miles.

10

How Far on a Gallon?

In the early days of the automobile, gasoline wasn't served to the motorist in a glittering tile and chromium service station. Instead, you drove up to a garage—usually in the poorer sections of town and frequently on a dirt street—and there the garage proprietor wheeled out a fifty-gallon tank from which he hand-pumped gasoline into your car.

Ignominiously enough, that gasoline was often delivered to the garage proprietor in a horse-drawn vehicle! The retail price of gasoline then was around ten cents per gallon.

Back in 1914, only about 10 per cent of the nation's roads were paved. (Even in 1929 barely 20 per cent were paved.) In that period gasoline stations were usually little sheds equipped with mobile tanks.

The miracle of Detroit and the wanderlust of the American people soon changed all that. Today, gasoline service stations costing more than a quarter of a million dollars are common. But as late as 1921 a three-pump station, including two lubrication pits and all grading and paving, could be built for about three thousand dollars.

During the twenties an average of 12,000 new service stations opened every year. Everybody wanted to get into the act. In 1920 this country had one service station for each 615 cars. By 1929 there was one service station for each 218 cars. As with many other things, the boom spirit caused the over-expansion which caused the economic collapse in October of that year.

And the "Free Air" signs! Remember those? I can't recall that anyone ever charged for air, but still "Free Air" signs became standard equipment at every station.

Today, many things are free—from windshield washing to washroom convenience. In fact, if you drive into one of our modern superduper gasoline service stations now, you should either go to the washroom or brace yourself against the horde of attendants who descend upon you to fill your tank, check your oil, clean your glass, fill your radiator, inflate your tires, polish your hub caps and water your battery.

Fuel economy is directly related to driving habits, and speed is probably the greatest gas eater. Gas mileage is best at 30 to 35 miles per hour. At 40 mph gas mileage is 10 per cent less. At 60 mph it is 31 per cent less, and at 80 mph it is 52 per cent less than at 30 mph.

To double the speed requires six times the horsepower. One reason is that at high speeds, wind resistance is proportionately greater. Increased horsepower and increased wind resistance cause greater gasoline consumption.

Mileage tests show that steady moderate driving can save up to 30 per cent on gasoline expense. Driving 40 mph instead of 60 mph can save one gallon out of every four. Planned driving will increase gasoline economy. Start gradually, accelerate smoothly, slow down early and use less brake pedal action. Fewer complete stops in traffic will save gas. An actual ten-mile test in which the driver avoided unnecessary stops saved 25 per cent of his gasoline and consumed only 10 per cent more time.

Cold weather increases gasoline consumption. At a temperature of 30 degrees eight miles of driving are required to warm up lubricants before your car will deliver maximum efficiency. During the first mile the car consumes double the normal amount of gasoline. Winter grade lubricants improve cold weather economy.

Gasoline changes with the seasons. Reason is that it is affected by atmospheric changes. So the blends vary with the seasons and in different geographic locations.

Good gasoline is carefully blended to meet its many requirements. It must start the motor easily and warm it up quickly. It must provide rapid acceleration, maximum power and economical mileage. It must *not* cause vapor lock, form gum or cause the motor to knock.

Is that a tough job? Well, no, but it *is* a delicate job for a top-flight chemist—even with the amazing modern

equipment at his disposal. And to add to the intricacies of blending all these features into one liquid the chemist has to change the balance between his components four or more times a year to meet seasonal temperature variations.

Gasoline that starts your motor easily in winter isn't too good in the heat of summer. Similarly, gasoline that delivers good performance in hot desert country isn't suitable for high altitude mountain driving. On a trip from Maine to Florida you might buy the same *brand* of gasoline at each stop. But you wouldn't get the same *blend* of gasoline. It is varied by the refiner to suit each locality.

Chemical engineers explain that gasoline expands as the temperature rises; therefore, a gallon of gasoline contains less actual fuel in hot weather. So you get more gasoline per *gallon* in winter than in summer. And—presumably—you save by buying gasoline in cool mornings rather than in hotter afternoons. A little far-fetched, maybe, but it's a scientific fact.

Incidentally, it's smart to keep your gas tank as nearly full as possible at all times. Condensation is always taking place in a gas tank. The degree of condensation is in direct ratio to the air space. More gasoline means less air space. Frequently when a car is started after a period of idleness, water can be seen coming out of the exhaust pipe. That's condensation, and it can cause rust and corrosion in mufflers, tail pipes and other internal parts of your car.

But to get back to gasoline mileage. You *can* go too far on this subject. Like the driver in the Grand Canyon

economy run who drove in his bare feet. Theory was that bare feet were more delicately sensitive to the accelerator than shod feet. One driver reputedly sandpapered his toes for greater sensitivity.

For good gasoline mileage under normal procedure the methods are very simple. First, be sure your car is properly adjusted, well lubricated and has correct tire pressures. Then, sit in a comfortable position with your foot resting naturally on the accelerator pedal. Avoid sudden starts, sudden stops and sharp turns. Accelerate gradually, not rapidly. That's about all there is to it.

Years ago, I was a driving instructor in California. One of the tricks I used to teach my pupils then was to place an open milk bottle full of water on the front floor board. To qualify finally, the pupil was required to drive the car over a given course in a normal manner without spilling any of the water. If you would be a really good driver, you might try that stunt today. It's real proof of driving ability.

We hear much about *new* fuels—synthetic gasoline and atomic power and other things. In Sweden a number of cars and trucks are powered by a fuel consisting of 80 per cent kerosene and 20 per cent water. A special carburetor is used, of course. Its inventor says that the carburetor can be installed on any gasoline combustion engine and that it consumes 30 to 40 per cent less kerosene than it would gasoline. But there's a hitch. Gasoline must still be used to start and warm the motor.

Gasoline is also made from coal. The Bureau of Mines reports that they are producing gasoline in

"practical quantities" from coal. Predictions are that an excellent grade of gasoline and many oil by-products can be produced. Scientists point out that progress in the synthetic production of gasoline assures the nation an adequate long-range supply.

Automobiles will not be powered by atomic energy in the predictable future. A member of the Atomic Energy Commission estimates that an automobile powered by atomic energy would cost about three billion dollars. He thinks that most people are overrating atomic energy as a source of cheap power.

Youngsters who fly motor-powered model airplanes have found a desirable substitute for gasoline, however. They use a variety of mixtures of alcohol, castor oil, nitro-menthane and nitro-ethane. Some even put in a little iodine as a catalytic agent.

Ordinary high-test gasoline is not intended to increase gasoline mileage. Its principal function is to increase power and efficiency in a high-compression motor and to reduce knocking caused by advanced spark or carbon accumulation.

Someone has figured that the modern automobile will consume twelve times its own weight in fuel during its lifetime. In other words, about twenty *tons* of gasoline. And for every gallon of gasoline burned in your car, a gallon of water is produced—through the exhaust.

Remember the pleasure-driving ban of the late war? When an A coupon was sometimes good for three gallons? And people with C coupons were regarded with

envy or suspicion? When you treated your gasoline dealer like your wife treated her butcher?

One of the classic stories of that era concerned a lady who drove into a gasoline station to purchase her weekly allowance of the precious fluid. Upon learning that her tank was too nearly full to receive the three gallons to which she was entitled, she obligingly ran the motor to consume some of it.

During the same period, a resident of Carrier Mills, Illinois, ran for a bucket of water when the upholstery of an automobile caught fire. But the bucket happened to be full of gasoline. The car was a total loss.

But to get back to the relation of fuel economy to driving habits, the results of one official test will best illustrate what I mean.

Forty-five drivers were assigned to the operation of forty-five cars. All of the cars were alike—same make, model and running condition. For one month careful records of gasoline tank-mileage were maintained. At the end of that time the records revealed that—

1 Driver averaged 23.4 miles per gallon.
2 Drivers averaged 22.6 miles per gallon.
6 Drivers averaged 20.5 miles per gallon.
9 Drivers averaged 18.5 miles per gallon.
3 Drivers averaged 16.5 miles per gallon.
24 Drivers averaged 15.4 or fewer miles per gallon.

The low man's record showed only 13.9 miles per gallon. All forty-five cars were as nearly alike as engi-

neers could make them and driving conditions were quite similar.

To show what *can* be done, though, two laboratory workers of the Shell Oil Company's Wood River, Illinois, plant made another type of test. They drove automobiles more than 70 miles on one gallon of gasoline. They used only ordinary gasoline, but they first tuned their motors to obtain almost perfect combustion. They adjusted their carburetors to operate with extremely thin fuel mixtures. They carefully lubricated all points of friction. And they coasted wherever they could on the fourteen-mile course over which the test was made.

And if you want to make 150 miles per gallon, it *has* been done. An oil company research expert did it. To do so, he (1) changed the gear ratio of his car, (2) removed all tread from his tires, (3) disconnected the fan, (4) tuned his motor to the peak of perfection, (5) never drove over 16 miles per hour, and (6) coasted whenever possible.

But, as I said at the time, who wants high gas mileage at that price?

Another test was made to determine how much gasoline is wasted by "cowboy" drivers. An automobile was driven over a designated route in a normal manner by a regular driver. Gasoline consumption was computed at 15.8 miles per gallon. Then the same car was driven over the same route by a "cowboy" driver who deliberately tried to see how fast he could cover the distance. The second driver saved less than 5 per cent in running time. And his average gasoline consumption was 9.1 miles per gallon!

Gasoline mileage is good or bad because of *only two factors.* First, the condition of the car and second the way in which it is driven. Poor gasoline mileage may be the result of any or all of the following conditions within the car itself:

1. Dragging brakes.
2. Slipping clutch.
3. Underinflated tires.
4. Tires and wheels out of alignment.
5. Insufficient lubrication of entire car.
6. Dirty air cleaner.
7. Improperly adjusted or dirty carburetor.
8. Incorrect automatic choke action.
9. Weak piston rings.
10. Excessive engine temperature.
11. Worn or dirty spark plugs.
12. Worn or dirty distributor contact points.
13. Incorrect ignition timing.
14. Leaky fuel lines.

But poor gasoline mileage is more often the fault of the person behind the wheel. This does not imply criticism so much as it states a fact. Observation of the following fundamentals of intelligent driving will improve gasoline mileage.

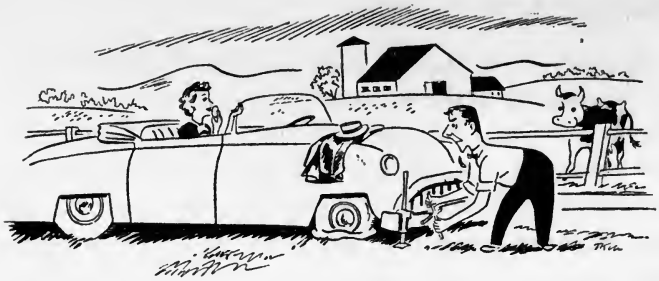
1. Start gradually and drive steadily. Every time you tramp on the accelerator you throw a step-up gasoline charge into the engine to assist the speed change.
2. Anticipate stops and slow down gradually.

Maintaining speed and then stopping suddenly wastes gasoline.

3. When starting is difficult after a stall, hold pedal all the way down. This draws in maximum air to provide best starting mixture. Pumping the pedal up and down usually makes the mixture too rich and pumps gasoline away.
4. When parked, if only for a short time, turn off the engine. Idling requires a rich fuel mixture. In one minute of idling your car will consume considerably more gasoline than is needed for starting.
5. In hot weather keep the gasoline tank as nearly full as possible to reduce evaporation loss. Save further on evaporation by parking in the shade.
6. Be sure your hand brake is completely disengaged. If it is only slightly engaged, you won't be conscious of that fact, but you will be consuming more gasoline.
7. Take curves slowly. Side thrust on the wheels at high speed increases friction and creates "drag" that must be overcome by the power of the motor.
8. Avoid rough or bumpy roads. Every time your rear wheels leave the road on a bumpy surface you are wasting power and therefore gasoline.
9. When starting out with a cold motor, drive slowly until your heat dial indicates normal operating temperatures. Until then your choke remains open and the gasoline mixture is too rich for fuel economy.

10. Above all, drive at moderate speeds. Speed is the greatest gasoline waster.

But however you drive, the fact remains that two gallons of gasoline in a new automobile will do the job that three gallons did in the car of twenty-five years ago.



11

Tires, Tubes and Touring

THE following correspondence was reportedly exchanged between William Hall of Bellows Falls, Vermont, who had just purchased a "horseless carriage" and Alexander Winton of Cleveland who had manufactured the vehicle:

Bellows Falls, Vt.

Dear Mr. Winton:

I am now in possession of my horseless carriage which is giving me fine service. There is one feature, however, which disturbs me, and that is the question of repair of the tires in case of a puncture. I am familiar with the repair of pneumatic bicycle tires, but those of your horseless carriages are much thicker than bicycle tires and there is no one here who knows how to repair them. I would appreciate your advice in this matter.

WILLIAM HALL.

Cleveland.

Dear Mr. Hall:

I am glad to hear that your horseless carriage is giving you the satisfaction that I felt sure it would. As to the tires, you need have no concern. They are made of real rubber and are five-eighths of an inch thick. You will have no puncture. . . .

ALEXANDER WINTON.

Bellows Falls, Vt.

Dear Mr. Winton:

I appreciate that the tires are made of real rubber five-eighths of an inch thick and that a puncture is highly improbable. But I might run over a railway spike or something else that would pierce even the tough resistance. In such case, what should I do? No one here can suggest how a repair might be effected.

WILLIAM HALL.

Cleveland.

Dear Mr. Hall:

In the highly improbable event that you will ever have a puncture in one of your tires, I can only suggest that you remove the wheel and send it back to our factory at Cleveland, Ohio. We will then get the manufacturer of the tires to make the repair and will return the wheel and tire to you.

ALEXANDER WINTON.

Much has happened in the tire industry since that exchange of correspondence. The people of the United States now use about a billion tons of rubber annually. Of this total, 570,000 tons is natural rubber. In 1849 we consumed only 1000 tons of natural rubber, but ninety-two years later, in 1941, consumption had increased to 775,000 tons. After that, World War II cut off the supply and synthetic rubber entered the picture—apparently to stay.

Natural rubber was known before the year 1500. Columbus in his early travels found natives bouncing rubber balls and brought some back from Hispaniola to Queen Isabella. Yet no commercial use was made of rubber until three hundred years later.

In 1745 a Frenchman told of people living along the Amazon River who used a crude form of rubber for raincoats and shoes. And in 1768 another Frenchman made a pair of rubber-coated riding boots for Frederick the Great.

The first rubber patent was issued to an Englishman in 1791. And the first rubber factory was established in Vienna in 1811. But not until 1839, when Goodyear accidently discovered a method of vulcanization, did the commercial use of rubber become practical. He kept his vulcanizing process secret for five years but couldn't find a backer. Then he patented his process (in 1844) and in the ensuing years patented over two hundred applications of rubber—but not tires. He staged rubber shows in Paris and London, and spent much of his lifetime defending his patents. But for all that, when he died in 1860 he was heavily in debt.

The development of the pneumatic tire was beset with difficulties beyond present-day comprehension. Most of those difficulties were technical, many seemed unsurmountable, and some were amusing.

About twenty rubber companies vie for your tire business. In February of 1888 the first set of rubber tires was placed on the wheels of a tricycle owned by ten-year-old Johnny Dunlop. They were crude but they served their purpose. Johnny's father had made an air tube, and pulled it into a tight-fitting canvas sleeve. Then a valve-of-sorts was inserted and the ends were cemented together. That was the beginning.

Twelve years later the rubber industry was making about 2000 pneumatic tires a year. They wore out so fast that they cost about six cents per mile of use. Besides lacking wearing qualities they were poorly cushioned, had little traction, and no flexibility. Many of those early tires were without tread. They were made with a smooth riding surface. They skidded and they slipped, they punctured easily and blowouts were frequent.

In 1895 the Hartford Rubber Works (which later became a part of the present U. S. Rubber Company) made the first set of pneumatic tires for a motorcar. The vehicle was a Duryea Motor Wagon which was entered that year in the *Chicago Times-Herald* Race.

Just before the race a spectator drove a knife through one of the tires. "Wanted to see if they were solid," he explained as the air hissed out.

Today's tires are tough, resilient and long wearing. Even steel is used in the construction of the tire itself.

The five tires on an average automobile contain about 1000 feet of thin, high-carbon steel wire. It's molded into the bead—the part of the tire that fits into the rim of the wheel.

Certain types of tires sell for more than the price of an automobile. Goodyear builds a neat little number known as the All-Weather Earthmover. Made for a 29-inch wheel, it has a 24-inch cross section of the tire itself and weighs slightly more than 1100 pounds. It's almost seven feet high. The price: $2,272. Other tires turned out by Goodyear weigh almost 2000 pounds and sell for as much as $4,500 each.

Total weight of all the tires and tubes on a new passenger car is somewhere between 100 and 160 pounds, depending upon the make and model of the car and the type of tires with which it is equipped.

In the old days, blowouts were common. Today they happen less frequently. But they *do* happen. And when a tire blows there is always danger of an upset or a crash. Blowouts result when a section of a tire casing becomes too weak to hold the air pressure inside the tube. Uusually, such weakness results from excessive wear. Or it may result from underinflation that permits the tire side walls to flex constantly until the basic inside construction weakens or breaks. Not infrequently, it is the result of an inside break from an outside stone or curb bruise.

For instance, a front tire might hit a curb with sufficient force to break the inner fabric construction. When that happens, the break doesn't usually show on the outside of the tire. But the break is there, and it

becomes worse from friction heat if you continue to drive on that tire. And sooner or later, it blows. When it does, look out!

When a front tire blows, your car will swerve toward the blowout side. If it's a rear tire, the car will swerve erratically from side to side until it is brought to a standstill.

When a tire blows, *don't* apply your brakes. Try to keep going forward with a little acceleration until the car is under control. That will counteract the tendency to swerve. Then, as soon as the car is under control, start braking—lightly at first, or the car may skid. Above all, keep cool and hang onto the wheel. Try to keep the car going straight. Many a life has been lost because a motorist didn't know what to do, or didn't think of what he was doing when a blowout occurred.

The prevention of blowouts is reasonably simple:

1. Don't drive on badly worn tires.
2. Keep your tires properly inflated at all times.
3. Avoid excessivly high speeds—especially in hot weather.
4. Travel easily on rough roads.
5. Park your car without touching the curb.

Brakes don't stop an automobile. They only stop the wheels. And if the tires on those wheels don't have sufficient tread to insure road traction you might be in trouble next time you apply your brakes suddenly.

Proper inflation, too, is important. Especially in tires made of synthetic rubber. Synthetic tires ride

harder, generate more heat and won't wear as long as natural-rubber tires. And inflation pressures must be maintained more carefully than in natural-rubber tires. But even natural-rubber tires react poorly to underinflation. An underinflated tire simply won't last as long as a tire that is kept properly inflated.

Assuming that an average tire is good for 30,000 miles, tests prove that at 10 per cent underinflation, 1500 miles of wear are lost. At 20 per cent underinflation, the loss is 4800 miles, and at 30 per cent, the loss is 9900 miles.

When the tires of a car squeal at it rounds a corner, it's a sure bet that those tires need air or that the car is rounding the corner too fast. A lot of people deliberately keep their tires underinflated to improve riding qualities. And that's all right if they're content to settle for less total mileage from both tires and gasoline. Underinflated tires cause constant flexing of the sidewalls. This flexing generates heat in direct proportion to the amount of flexing. And heat kills the "life" of any kind of rubber—robs it of its resiliency.

Underinflation is less prevalent when puncture-sealing tubes are installed. And these tubes have many other advantages.

We once had a curious testimonial of puncture-sealing tubes. A customer traded his two-year-old car for a new one. Prior to taking delivery, and without saying anything to us, he removed the puncture-sealing tubes from the tires of his old car. Then he installed the original but still new, single-thickness tubes in their place. After which, he turned the car in to us and took delivery of the new car.

That evening when the old car was driven by us, one of the tires went flat. And the next day two more went flat. An examination of the tire casings revealed the presence of a nail and some other pieces of metal. They had obviously been picked up at various times by the old car but, of course, didn't cause a flat because the puncture-sealing tubes promptly sealed each puncture as it was made.

When the customer changed back to standard tubes it probably never occurred to him to examine the inside of the casings. And naturally, the pieces of metal, still embedded in the casings, worked their way through the regular tubes after a relatively short period of driving.

The newest development in passenger-car tires is a combination tire and puncture-sealing tube known as the tubeless tire. Basically it is like any other tire except that the inside of its tread is coated with a puncture-sealing compound. It has about seven little ridges molded on the outside of the tire bead at the point that fits against the flange of the wheel. An ordinary tire valve which is separate from the tire itself is fitted into the valve hole in the wheel with two rubber washers. Air pressure applied through the valve forces the tire bead against the wheel rim and makes the tire airtight by its own inflation.

Much has been said for and against this type of tire —and much that has been said may be true. But the fact remains that many motorists who use tubeless tires are well satisfied with them. Our survey included people who had used tubeless tires for as long as four years, and

less than 2 per cent of those questioned expressed dissatisfaction with them.

Tire thefts are common and tire fires are not uncommon. We once permitted one of our employees to borrow a used car for a big date. He parked the car on a parking lot near the center of the city. The attendants at this parking lot went off duty at midnight. When our employee returned at about 1:30 A. M. he "thought the car looked low." It was, too. Someone had removed all four tires. The car was standing on the rims of the wheels.

Of some two million dollars in annual motor vehicle losses by fire, a considerable portion was caused by fires originating in tires. Most of these tire fires were on trucks, but many were on passenger cars. As previously stated, running on an underflated or flat tire causes continual flexing which generates heat. At a given temperature that heat turns into flame. And a tire fire is really difficult to extinguish. An ordinary fire extinguisher usually won't do it.

A previously little-known fact became much better known during World War II and the Korean situation that followed. As a hedge against anticipated shortages, a lot of people bought new tires and stored them in their attics or cellars. Then they learned what automobile people already knew. Stored tires deteriorate almost as rapidly as tires on a car *wear* out.

In Britain, where they never had enough tires for hoarding, researchers tried using water, instead of air, in their tires. They claimed that it reduced skidding, aided braking and cut tire wear in half. That's

interesting, if true. But think of checking the anti-freeze in the radiator *and* in five tires.

Over here we've learned as much from experience as from research. Our experience tells us these things about tire conditions and tire economy. If the tire and wheel assembly are out of balance only 2 ounces the result at 60 miles per hour will be a vibrating force of 16 pounds occurring 720 times per minute. This will cause:

—Shimmy, cupping, uneven tread wear and rough riding.
—Difficult steering and possible damage to steering mechanism.
—Disturbed wheel alignment, uneven caster and camber.
—Possible damage to shock absorbers.
—Loosening of frame and body of car.
—Abnormal wear of wheel bearings, bushings and king pins.
—Noisy operation, with excessive vibration in fenders, lamps and steering.
—Unsafe, tiresome driving.

Remedy: Have your wheels and tires balanced each 5000 miles; oftener if you drive on rough roads or at high speeds.

If a front wheel is one-half inch out of alignment, your front tires will drag sideways 87 feet in each mile of travel. This will cause:

—Excessive tire wear.
—Hard steering.

—Car to pull to one side.
—Excessive strain on steering gear and bearings.
—Unsafe, tiresome driving.

Remedy: Have the front end examined for proper alignment four times a year, oftener if any of the above symptoms appear.

Improper inflation will shorten the life of your tires. For instance:

—A tire constantly run with only one pound underinflation will cut 600 miles from its normal total mileage.
—A tire with 30 per cent underinflation will be worn out in 74 per cent of its normal mileage lifetime.
—Underinflation causes tires to "squeal" when turning corners.
—Underinflation causes excessive wear on both outside edges of the tread and affects steering.
—Overinflation causes excessive wear in the center of the tread and causes hard riding and rattles.
—Irregular tire pressures in opposite tires of a car will cause uneven braking and swerving.

Remedy: Keep tires properly inflated at all times. Neither too much or too little pressure. Rotate all five tires every 4000 to 5000 miles. Follow this method: Spare to right rear, right rear to left front; left front to left rear, left rear to right front, right front to spare.

If the basic conditions outlined above are observed, better tire mileage will result from these driving fundamentals:

—Avoid quick starting and sudden stopping.
—Turn corners and take curves at slow speeds.
—Avoid excessive braking.
—Drive at moderate speeds.

12

The Body Beautiful

TIME was when a repaint job on an automobile was a major operation. Duco and other similar lacquer finishes didn't enter the picture until after 1920.

Before that a standard paint job involved many days of tedious hand labor, up to a dozen coats of primers and varnishes, and seemingly endless days of drying time.

First came a priming coat of paint on the bare metal. When dry, the surface was puttied and glazed to smooth out rough spots. This was followed by a surface coat of paint, drying and sanding with pumice and water. More glazing, another surface coat, and then a "ground" coat was *brushed* on.

Then came the first coat of color varnish which for best results had to be "flow-coated," a technique which only a few of the best craftsmen had mastered. More

days of drying and more coats of color varnish followed with tedious rubbing operations interspersed.

Finally, the car was ready for its coats of clear finishing varnish, each applied by brush. And if all went well, the job was finished twenty-six days after the work started. I can recall many jobs that were in our shops from two to three months in those old days. But for all the careful effort and meticulous workmanship, it was anybody's guess as to how long that finish would stand up.

Today, a complete car can be lacquer-finished in a few days for as little as $100; or a baked-enamel, oven-dried paint job can be had for $49.50. And the latter job can be completed in twenty-four hours or less.

At the close of World War I, the DuPont Company decided to stake its future course within the newly unfolding panorama of modern chemistry instead of its formerly traditional lines of explosives-making. At that time, the paint industry was suffering from a slow and creaking technology. And with the demands for finishes of all sorts soaring, it offered a fertile field.

So DuPont purchased the business of Harrison Brothers, an old and respected paintmaker, and put research engineers to work to find a better paint, a more durable paint and above all, a paint that could be applied in hours—not weeks. The problems were many, the obstacles tremendous, and while progress was made, the vital key to the whole development of "Duco" lacquer was an accident. Here's what happened.

Chemists at the DuPont plant in Parlin, New Jersey, were struggling to eliminate light streaks in motion-pic-

ture film. A new formulation of cellulose base was placed in a steel barrel for a series of tests. But just then there was a power failure which interrupted those tests, and that barrel stood out in the sun for three days.

When they were ready to resume the tests, the intro-cellulose was not a stiff jelly, as expected, but strangely thin and syrupy. The chemists who for years had been working to provide a new lacquer which would give greater film thickness with fewer coats, had at last found the answer to a century-old problem—and all because of a power failure.

DuPont's "Duco" lacquer was rapidly perfected thereafter and in 1924 was first used as an automobile finish on the then-popular Oakland touring car.

Thereafter technological progress in the painting of automobiles was rapid. Today many automobile factories are painting their new cars with the so-called Hot Spray method. This consists of heating a special enamel type of paint to 150 degrees Fahrenheit and spraying the car while the paint is hot.

Result is that the paint hits the car at about 140 degrees, and at that temperature it flows more smoothly and dries more evenly. The finished job has a deeper luster and lasts longer than previously used paint finishes.

Paint colors denote many things besides the preference of the car's owner. Economic conditions for instance. When the outlook is good people buy automobiles in lighter, brighter colors. When things look tough, purchasers incline toward darker, more somber

colors, mostly black. Normally about 20 per cent of the cars sold are black. Of the other colors, green leads with 25 per cent. Grey, blue and maroon follow in that order. But during the last depression, more than 60 per cent of car buyers wanted black or dark-blue colors.

Light-colored cars are more easily seen at night and according to figures available, do not figure in accidents as much as dark cars. A light color makes a car appear larger than a dark color. Black is, of course, the easiest color to touch up when a fender is scratched. And black generally is considered the most dignified color. But a black car or any dark-colored car shows dirt more easily than the lighter colors and requires more washing. Tan and light grey are the best colors for people whose cars cannot be frequently washed.

Color preferences vary in different localities, by customers' ages, by ancestry and by economic conditions. In regions like the Southwest where the sun is strong and bright, motorists prefer vividly colored cars. On the Pacific Coast, light pastel shades are chosen. In New England, the favorite colors are blue, maroon, green or grey in about that order.

A recent color poll indicates that intellectual people prefer blue; athletes, red; egotists, yellow; and extroverts, orange. (Come to think of it, I haven't seen an orange car lately.)

Hindus and Chinese prefer yellow—they consider it a lucky color. Mohammedans—and Irishmen—select green. Blondes of both sexes prefer blue or green. In desert regions, tans and beiges are most popular

with all classes of people, because they show dirt and dust less than darker colors.

Those cars you see that gleam brightly with a special sheen contain tiny flakes of aluminum in the paint. Sometimes called polychromatic finish, this type of paint is commonly available.

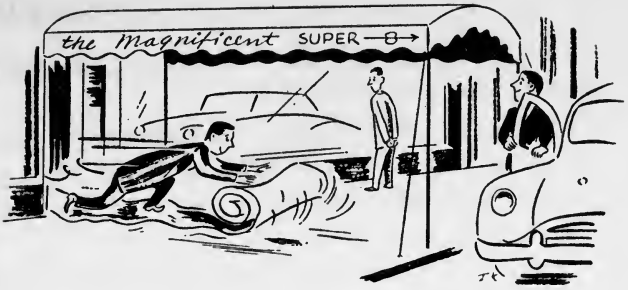
One of the fair-haired boys in our paint shop has figured that by mixing and blending we are in a position to paint a car in any one of some 3000 different colors. And black. Which recalls the statement of Henry Ford many years ago to the effect that purchasers of the new Fords could have *any color* they wanted as long as it was black.

Much as I like some of the cheerful new colors as they are introduced each year, I drive a black car. I've been driving black cars for years and years. And probably will for years to come. Principal reason is that nobody ever likes *all* the colors that the factories dream up. And as sure as I drive around in any color but black, someone will be critical of my choice.

They make remarks like, "Looka that guy! He can have any color in the warehouse, and he takes purple. His taste's all in his mouth!" Or "What that fellow won't do for publicity! Drives around in a mustard-yellow flash just to attract attention."

So, I drive black. Sometimes, it's a terrible temptation to have a gay and cheerful color. Just once. And I get myself all keyed up to the idea. Fine exhilerating pitch of excitement. Lasts for hours. Sometimes days.

And then I get another black car.



13

Motorists in General and Drivers in Particular

EVOLUTION is a wonderful thing. It isn't so much a question of whether or not we are descended from monkeys. Rather, it is what human beings will be like a few centuries hence. Whatever it is, the automobile will have a lot to do with it. The hardships a motorist will endure to go places sitting down are amazing.

Commerce and industry cater to this condition to such an extent that you can now do many things without leaving your car. You can make bank deposits, cash a check, buy a drink, purchase groceries and attend a motion-picture show—all while seated comfortably behind the wheel.

Cars themselves are equipped with beds, radios, heaters, clocks, luncheon kits, writing desks and lamps.

And unlike ordinary homes they are mobile, simple to maintain and free of real-estate taxes.

Children have been born in automobiles, people have died in them. Courtships, proposals and marriages have taken place within an automobile. Future generations may conceivably decide to live in them.

Just think; a newborn infant a few generations hence may never leave its car during a lifetime. Which would obviously develop a race of people with only superficial legs. But of course, there still would have to be other people to man the various drive-in stations and services. This latter group, presumably, might never have a chance to even get into an automobile. But *their* legs would probably be developed to such a degree that they wouldn't be comfortable in a passenger car anyway. So, we might have two distinct types of people. Evolution is a wonderful thing. But imagination is even more wonderful . . .

Some sociologist has come forth with the observation that the automobile has improved the mental stability of our American people. He theorizes that fifty years ago when automobiles were only the hobby of a few eccentrics, most people lived and died within a few miles of where they were born. Their social contacts were extremely limited. So—man's choice of a wife was usually limited to the number of girls he could visit on a horseback ride. And according to the sociologist this led to a distressing number of half-wits in some sections.

Presumably, the automobile has changed all this. The newer generation can still marry half-wits, of

course. And some do. But they now have a wider choice. They are no longer limited to the half-wits in their immediate neighborhood.

If the people of today do have greater mental stability, one motor trip in some of the Sunday traffic I've seen lately will knock it right out of them. But then one of the Nation's top psychiatrists says morons make the best drivers. To be accurate, he says: "high-grade morons," however that might be defined. According to the learned doctor, it's as bad to be smart as it is to be dumb, when it comes to driving. Furthermore, intellectuals can't seem to keep their minds on driving. Seemingly, to be a good driver you need emotional stability, not intelligence.

For a totally different reason women are better drivers than men. A lot of women probably knew that and a lot of men won't believe it, but anyway tests by Iowa State College and the Farm Bureau Insurance Companies of Columbus, Ohio, reveal that women have better attitudes toward traffic ordinances than men; that females between the ages of sixteen and thirty-three are less liable to traffic accidents and violations than men in the same age group; and that women between the ages of forty-one and fifty-three are superior to the male drivers in this higher age group. Men hold a very slight edge between the ages of thirty-four and forty and over the age of fifty-three.

The tests indicated that 66.4 per cent of the females were quicker than the males on reaction—the time spent moving the foot from the accelerator to the brake pedal. And 59 per cent of the females showed

superior control in braking distance. The average score from 20 miles per hour: females 38 feet 7½ inches; males 40 feet 4½ inches.

In Ohio a survey was made of 1300 two-car accidents. It revealed that 61 per cent of the male drivers were in violation of the law as compared to 57 per cent of the female drivers.

Speeding was the commonest violation by men. But women made more improper turns and more frequently failed to signal. The percentage of male and female drivers who drove over the center line was just the same.

Meanwhile the Chicago Motor Club completed a comprehensive survey which reveals that drivers in the sixteen-year-old group have the highest accident rate. The second most dangerous age is twenty to twenty-five.

The figures further reveal that the sixteen-year-old group are responsible for one traffic death for every 2,000,000 miles driven as compared to one death for every 21,000,000 miles by the forty-five-to-fifty-year-old group.

Ever wonder what all the people are doing whose cars are parked in almost any midtown area any weekday? Well, according to a survey, 22 per cent are shopping, 26 per cent are workers, 36 per cent are on business errands, 11 per cent are at medical offices, schools, and restaurants and 5 per cent are on social or recreational trips.

The survey also revealed that the average car car-

ries only 1.6 persons into town. Think of it! If each car would carry *three* persons, only half as much parking space would be needed. Or else there'd be a lot more people in town. . . .

An about-to-be college man wrote us once to learn how many college students drove their own cars at school. He was probably about to put the bite on his old man. Available records indicate that 32 per cent of America's college men have automobiles with them on the campus. Of the total, approximately 10 per cent are current models, 13 per cent are one-year-old models and the rest are older. Some 36 per cent are ten years old or older.

The Bureau of Labor Statistics reports the result of another survey. It reveals that the average city family spends from 5 to 7 per cent of its total income for the purchase and upkeep of their automobile.

I often wonder why some drivers consider it necessary to hold the top of their car with their left hand while steering with their right hand . . . And why taxi-drivers continually blow their horns in heavy traffic . . . And why a lot of people don't remove old paper stickers from their windows . . .

Another curious thing about motorists. They buy nice new automobiles with beautiful upholstery—and then the first thing they do is cover that upholstery with slip covers. The idea has merit, of course. Aside from protecting the upholstery material, slip covers are cooler in summer, easier to slide across in winter and

more or less impervious to the onslaught of children and dogs. But it always bothers me, nevertheless, to have that beautiful material covered and concealed.

I must be in the minority though, because the American people buy well over two hundred million dollars worth of slip covers each year. Ranging all the way from fibre and sailcloth to simulated leopard skin. As in most things there are trends in slip covers. Fibre, once the most popular, is now the least popular, except with price buyers. Plastic, which lasts longest, is losing popularity because it causes excessive wear on clothing. This is particularly true of deep-pile fabrics and fur coats. Nylon is most popular. It is smooth, dressy and fits well.

We have always believed that most of the men or most of the women who constitute our customers had the most to say about the purchase of the family car—depending upon which member of the family we were addressing. But the results of a survey on this subject reveal that 57 per cent of the men and 56 per cent of the women said both take part in the decision to buy a car. Fifty-two per cent of the women believe that they join their husbands in deciding what *make* of car to buy, but only 40 per cent of the men consider that they do. Sixty per cent of the men are actually laboring under the delusion that they, themselves, make the decision.

Among the teen-age motorists these days are the youngsters who play games such as "chicken" and "ditch 'em." "Chicken" is a deadly contest of nerves in which

a group of youngsters ride along in a car while the driver takes his hands from the wheel. Speed is increased until some "faint heart" yells. Sometimes the yells come too late. There are many variations of the "chicken" game—all of them daring and all of them deadly.

"Ditch 'em" is a nonetheless deadly game of tag played in motorcars. One car tries to escape one or more following cars by cutting corners, unexpectedly turning down narrow streets and alleys and generally taking chances—sometimes at terrific speeds—until the leader is trapped or one of the cars is "ditched."

In Detroit, not so long ago, two teen-age motorists were stopped by police. They were driving a car. Together. One boy was steering while standing on the rear seat. The other was operating the foot-pedals with his hands while lying on the floor. When questioned about the odd positions, the boys explained that they always drove that way.

However well I understand what spring and summer weather does to a motorist, I am always disturbed by one manifestation. People who dabble in the stock market usually try to buy when the market is low. Naturally. But the same people seem to act in reverse fashion when they buy an automobile. Which seems strange. When many people rush to buy a new car in spring or summer, they're bucking a seller's market. And when they pass up the winter buyer's market, they're missing an opportunity.

American automobile drivers have another curious

trait. Where their automobile is concerned there seems to be a perpetually open season for little white lies. They used to bother me but I outgrew that annoyance.

When shopping for a new car, motorists are prone to tell a dealer what Joe Doaks, up the street, is willing to allow for the old car, and the figure is invariably higher than Joe Doaks quoted. Quite frequently, the motorist hasn't even been to see Joe Doaks. And some of our most respectable people indulge in this little game.

Had a customer, once, who was a clergyman. In the course of our conversation about the allowance for his old car, he told me what another dealer would allow for it. It so happened that the other dealer was a close friend of mine. And I mean that word "close" both ways. I doubted the clergyman's statement, but hesitated to say so. Later, I telephoned the other dealer and learned what had actually transpired. The clergyman had indeed been there and a salesman had offered him $750 for his old car. The clergyman wanted (or hoped to get) $1000. After an hour or so, the salesman made a "will-you-take" proposal. That is to say, he asked the clergyman if he would accept $950, provided the salesman could induce the dealer to approve this figure. The clergyman said yes. The dealer said no. And that was that. Only when the clergyman reached my showroom he was telling me that the other dealer's salesman had offered $950. He neglected to tell me that the *dealer* had refused to approve that offer.

In this same vein is the matter of gasoline mileage. A motorist who enjoys good mileage almost always brags

about it—on the top side. But the motorist who doesn't travel as far as he thinks he should on a gallon of fuel will invariably complain that he travels even fewer miles per gallon than actual. As a dealer, I have run so many gasometer tests for mileage—and so frequently with results that confirm the exaggeration—that I can almost call the shots before the test.

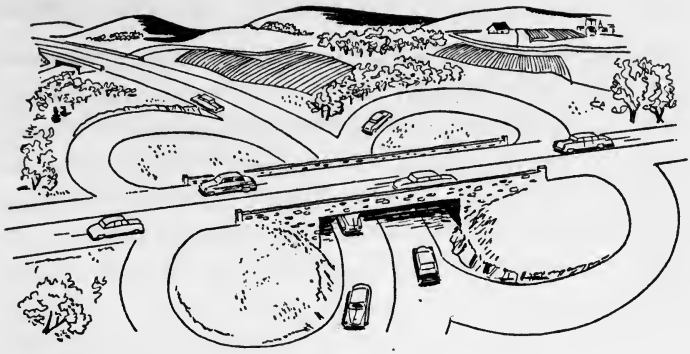
To a lesser degree the same condition exists when a motorist talks about his repair and maintenance bills. They're usually higher than high and lower than low. But these are things we have come to accept in the automobile business. And probably the dealer helped to create them by his own practices in the earlier days of the industry.

In the period between 1930 and 1942, it was common for dealers to turn back speedometers on used cars. Some turned them back to a figure they thought the used-car buyer would believe. Others turned them back to zero. But turn them back they did. Today the practice is still common, but reputable dealers don't do it. In my own business the penalty for altering a speedometer reading is instant dismissal of the employee responsible for that alteration. Only exception is when a customer requests such a speedometer change—in writing. Which brings me back to the motorist.

Many used-car purchasers, after buying a car from us, ask us to change the speedometer reading. They don't want the wife or the sweetheart or the boss or somebody to know how many miles the car has been driven.

That's not so bad, but this one is. A goodly number of new- and used-car purchasers with an old car to trade, turn back the speedometers on the old car before taking it to the dealer for an appraisal. Dealers and dealers' appraisers usually know their business pretty well. And they can spot incorrect speedometer mileage almost at a glance. Even in a well-kept automobile there are dozens of little telltale points of wear. Whenever we appraise such a car, we look under the instrument panel at the back of a speedometer head. At that point there is a knurl nut which secures the speedometer cable to the head. That knurl is fastened so securely at the factory that it cannot be loosened without pliers. And invariably we find the knurl marred with plier marks. When such a car is appraised the appraiser simply marks his appraisal sheet "'mileage incorrect." Whereupon the dealer proceeds on the theory that he is trading a high-mileage car.

As I wrote earlier in this chapter, both the dealers and the retail automobile industry have become more tolerant—more mellow, if you please—through the years. These things no longer bother us seriously. They're all part of the game. And the game is most interesting. What contributes most to that interest is the constantly changing but usually predictable Mr. and Mrs. Motorist. We salute them as the greatest single asset of the industry.



14

Byways, Highways and Superhighways

HIGHWAY transportation is an enterprise that has no counterpart in the world. It is a thirty billion dollar business, but it is also your own car or the bus that takes you to work. It is a system that produces some nine million jobs, but it may also be the firm that employs you. It is an undertaking as close to you as the milk on your doorstep or the fuel in your furnace for both of them probably came to you by highway.

Highway transportation is not just motor vehicles or highways. It is both—and much more. It is a system without which our national progress would have been impossible.

This network includes buses, passenger cars, trucks and truck-trailers, rural roads, city streets, trunk highways. It includes the companies that supply or service these, or which depend on highway transportation in their daily business. It is an interdependent grouping. What is good for one part of that system is good for all. What is bad for one part is bad for all—for the nation, and for you.

Highway transportation is a means of progress that has been built by men's brains, sweat, courage and devotion—qualities expended, be it noted, in a climate of generally fair laws and regulations, and favorable public regard.

Toll roads, with the exception of the new superhighways, have just about disappeared from the American scene. But *tolls* have not. They're still with us.

Time was when you stopped at intervals of fifteen or twenty miles on a journey and paid the tollhouse keeper a nickel or dime for the privilege of traveling on the road. Then the state took over the roads, the tollhouses were abolished and there was rejoicing among motorists. But not for long. In time, road tolls were replaced by the gasoline tax and the motor license tax.

Today you pay "toll" on every road you travel at the rate of about twenty-five cents for each 100 miles. You pay it in the form of four cents or more per gallon state tax on all the gasoline you use. And I suppose that's the way it should be.

The need for more and ever more good roads will continue to plague us. We must either build more highways or fewer cars. As early as 1929 when there

were only twenty-six million motor vehicles on the road, people were predicting that the country had reached a saturation point—that neither the population nor the highways could absorb any more motorcars except to replace existing cars. As this is written, the nation's motor vehicles are around the sixty million mark. And the end is not in sight.

It has been facetiously predicted that motorcar production will cease when the highways become so crowded that the manufacturers won't be able to drive new cars out of the factories after they came off the assembly lines. We will then have reached the saturation point.

More people use the family automobile for their vacations than all other forms of transportation combined. In recent years the figure has exceeded 80 per cent.

And for the first time in history farmers own more automobiles than horses. According to the Department of Agriculture the latest official count is 5,800,000 automobiles; 5,310,000 horses.

Along with the horse, the little red schoolhouse is passing out of the picture. Some 98,000 school buses now in operation have made more consolidated schools practical. There are about 45,000 of these today; and about 25 per cent of all public school students ride buses to school.

Crowded traffic conditions have created the need for many highway laws and regulations. Some are amusing, some are silly, many are profound. From time to time

I have reported on unusual features of these laws, some of which I repeat below.

From the Vehicle Code of one state some of the simpler items are so average as to be either unknown or ignored by many motorists. If you doubt that statement, read the next seven paragraphs and then put test questions to the next ten motorists you meet. If the average of all ten results in 40 per cent correct answers, I'll eat this book.

Every vehicle on the highways must display lights from one hour after sunset to one hour before sunrise—and head lamps must be of sufficient intensity to "render clearly discernible persons and vehicles . . . at least 500 feet ahead. . . ." Rear license plate must be illuminated so that it can be read at a distance of 50 feet. Both license-plate lamp and tail lamp must be controlled by the same switch that controls the head lamps.

A parked vehicle may show only depressed or dimmed head lamps, but must show in lieu thereof at least one white or green light (with a red lens to the rear) mounted on the left side of the vehicle—and visible from 500 feet, front or rear. *One* spotlight is permissible if of an approved type, but *two* are not. Fog lamps or other auxiliary lamps must be not less than 20 inches apart; and not less than 12 inches nor more than 42 inches above the road. If you have a back-up lamp it is unlawful to have it lighted when the car is in forward motion.

Brakes must be adequate to stop a vehicle within a distance of 30 feet when going 20 miles per hour. The emergency brake must stop the vehicle within 55 feet;

and must hold the vehicle stationary on *any* highway grade.

Tires must be rubber. The Code specifies that no tire may have "on its periphery any block, stud, flange, cleat or spike or any other protuberance." Tire chains are permissible only when needed for safety, and then must consist of not less than five cross chains which do not project more than one inch beyond the outside of the wheel and tire.

An habitual drunkard may not be licensed. Nor may a person who has lost the use of both hands. Nor a person who cannot understand traffic signs written in English.

Here's another one you probably didn't know. If a driver signals that he is about to pass you on a state highway it is unlawful for you to increase the speed of your car until the other driver is safely beyond you.

Don't try to beat a train or an interurban railway to a grade crossing. It's unlawful (not to mention unhealthy). The driver of a motor vehicle is required to bring his vehicle to a full stop before traversing such crossing.

There is considerable misunderstanding about many things that pertain to the laws of highway traffic—and this misunderstanding prevails in most states. The answers to some of the questions are listed below. While believed to be accurate, I, of course, cannot guarantee that police officers and magistrates will always see eye to eye with me. But I have carefully studied the motor vehicle codes of many states and I believe my

interpretation of these items to be reasonably correct.

Contrary to popular belief, doctors who carry the physician's emblem on their cars are not immune to arrest for speeding. But because they *might* be on an errand of mercy police are usually lenient with them.

A state trooper is liable, like anyone else, for traffic violations unless the violation takes place during the performance of emergency duties.

Going through a green light does not necessarily absolve you of blame if you hit someone. A green light is only an *invitation* to proceed cautiously.

While the written law is significantly silent on the subject, there appears to be no provision for a state police officer to stop a motorist on the highway and demand his driver's license when there has been no indication of a violation of law.

A state trooper *can* pursue a speeder from a state highway into a town and arrest the offender in the latter jurisdiction.

An officer has no right to arrest a motorist for mere impudence or "back talk." Smart-alecky conduct—however deplorable—is not a violation of the Vehicle Code. But discretion is still the better part of valor.

Some of the curious and interesting highway-traffic developments and regulations of recent years are these:

The District of Columbia experimentally tried a new traffic code. Upon exceeding speed limits down there, a ticketed motorist was given a chance to prove that his driving did not constitute a public hazard. No hazard, no fine.

The Kentucky Highway Department (and a number of other states) is using radar to help set speed limits in congested areas. The device, called the Electro-Matic Speed Meter, records within two miles per hour the actual speed of every car passing it. Kentucky then uses the information revealed to post reasonable speed limits.

In Columbus, Ohio, traffic is controlled at a given place by two police cars, neither of which leaves its station. The first car radios the radar-reported speed and the license number of the motorist to the second police car stationed some distance away. The officer of the second car then steps out and flags the motorist.

California is enforcing a comparatively new law that prohibits fenderless cars from operating on the highways. Aimed primarily at hot rods and stripped-down cars, the law states that the only legal place for this type of vehicle is on the race track or in its owner's shop.

California recently adopted another law with a curious angle. Motorists who wreck their cars on state highways will have to pay to clean up any debris left by the wreck.

And in Detroit a new regulation makes it unlawful for a motorist to splash a pedestrian with slush or rain water. The penalty: $500 fine or 90 days.

Twenty-seven states and the District of Columbia have enacted laws against hitchhikers. In most of these states, the motorist as well as the hitchhiker faces a penalty for violation.

Hit-and-run drivers are going to find it increasingly difficult to escape detection. Police now have a steptro-

photometer (I proof-read *that* myself) that can tell more than 2,000,000 colors apart. A speck of automobile paint found at an accident scene can now be compared with paint on various makes and models as an aid in finding the car involved.

Lincoln, Nebraska, has a law prohibiting the driving of an automobile while someone is sitting on your lap. San Rafael, California, once had a law requiring automobiles to stop within 300 feet of a horse. And the Sparks, Nevada, city council recently voted to order all hitching posts removed from curbs in the downtown section. Motorists had been complaining that the posts dented their fenders.

There's a law in Tacoma, Washington, that requires a visiting motorist who intends to commit a crime to phone the police station that he is about to enter the city. And Memphis, Tennessee, has a statute against driving a car while asleep. Honest.

Virginia's highway department plans to erect large highway map signs on billboards at "confusion points" throughout the state. The first is already erected near Williamsburg. Good idea, but will "confusion points" now become "congestion points?"

A highway between Jersey City and Camden is being reconstructed in three-quarter-mile sections. Each section will be of a different type and formula. Some will be reinforced concrete, some unreinforced, others bituminous, etc. Object is to compare service, cost and other factors under equal conditions.

Passaic County, New Jersey, was chosen to experiment with a new highway safety device. To aid drivers at

night and in foggy weather, white concrete separators with scored surfaces have been laid flat between traffic channels on the highways. When tires ride over these divisions they emit a loud hum which warns the motorist that he is out of his lane.

Cookeville, Tennessee, police welcome visiting truck drivers with a courtesy card that reads "If you want to sleep just park on the public square or on the side of the street. Write below the time you want to be called and police will wake you at that time. Come back again."

Los Angeles has a highway intersection four "stories" high. To aid traffic congestion in the downtown section four different highways cross one point at four different levels.

In Connecticut, they're trying a new highway guard rail that was invented in Denmark. Supposedly crash-proof, it is shaped so that when a car hits it, the wheels are turned back toward the highway. In one test a car was driven into the rail at 45 miles per hour on an angle of 30 degrees and was deflected back onto the highway without dents or scratches.

In Phoenix, Arizona, street-corner mirrors called Road-A-Scopes have been installed at intersections with blind corners. The device has completely eliminated accidents at one intersection where previously there had been fifteen fatalities in eighteen months.

Columbus, Ohio, had a traffic problem on one of their main arteries during the evening rush hour. To correct it, they substituted trolley buses for street cars, removed the rails and prohibited street parking. Result

was an increase of 30 per cent to 40 per cent in the number of automobiles traveling that street between 5 and 6 P. M.

In Chicago, a helicopter was used from five o'clock until dark to relieve traffic congestion. Supplied on an experimental basis by a radio station, it was manned by a pilot and a traffic expert. The latter located traffic tangles and reported back to the radio station, which in turn broadcasted to motorists, so that they could save time by switching to another route.

There's a new machine that will replace asphalt roads in a fraction of the previous time and at half the cost. This machine will rip up deteriorated asphalt, pulverize it, mix it with new materials and lay the combination as a restored road surface, all in one operation. It should make detours shorter and will reduce the time that roads are closed for repairs.

Test roads with a rubber content are now built in eight states and Canada. In Netherlands and Java, natural-rubber-asphalt roads have been in use for as long as thirteen years. Down in Virginia, a test road is being surfaced using a mixture of *synthetic* rubber. Present experimental roads contain anywhere from 5 to 9 per cent rubber mixed with regular road building materials.

In Frankfort, Kentucky, a company has developed a five-ton magnet mounted on a truck to keep roads clear of metal objects which might cause punctures. On a six-mile trial run it picked up 25 pounds of such metal objects. And in each pound there were an estimated 100 possible flat tires.

Buffalo, New York, has an ordinance which makes it unlawful to leave the ignition key in a car when it is parked unattended on the city streets. Designed to reduce car thefts, the ordinance should reduce theft insurance rates as well if it's enforced.

A judge in Columbus, Ohio, handed down a ruling on a $1500 law suit based upon the size of the lettering on a traffic sign. Seems a motorist went through a stop sign and collided with another car. The owner of the second car sued for damages. But the judge ruled that because the stop sign was of an old type with letters only five inches high, the first motorist was not required to stop. A Columbus law requires letters on stop signs to be six inches high. The City Traffic Engineer hurriedly replaced all of the old stop signs.

Motorists of New Castle, Indiana, who have difficulty complying with parking regulations can pay their fines in advance. The city sells $10 books of tickets which entitle the buyer to 20 parking violations per year. I don't endorse this idea—merely report it.

Among the little-known activities of Highway Department employees and police is the disposition of dead cats, dogs and other animals found on the highways. Ever wonder what becomes of them? Well, they're buried—sometimes with appropriate ceremonies—along the highways. But here's what's startling. The state of Virginia has released figures indicating that $55,000 of highway funds is the approximate annual cost in that state alone to conduct these burials.

In an outlying area of Detroit a 500-foot section of roadway has been built containing radiant heating

by electricity. The heating element is a steel mesh 18 inches wide, placed 1½ inches beneath the road surface. Each lane of the highway has two lines of mesh imbedded in it—one for each tire track. Thermostats control the heat to keep the temperature of the road surface at a minimum of 35 degrees. In the event of *warm,* wet or snowy weather, the system can be operated manually.

Highway traffic can also be improved by noise reduction. Admittedly much of this noise originates with the driver. But even so the automobile factories are trying to do their part.

General Motors recently classified the noises made by motor vehicles in trouble into seven basic sounds. The classifications: squeak, rattle, thump, grind, knock, scrape and hiss. Standardized lists are being distributed to service men to assist mechanics in locating the source of trouble more quickly.

But for some cars, seven basic sounds aren't enough. We traded a used car once that had at least two of each of these sounds and several extra noises all its own. It was laid to rest with appropriate ceremonies. And a taxi we rode in the next week was apparently in training for the world's championship. To its own cacophony of miscellaneous noises the driver added a constant tatoo of horn sounding. Maybe he did it in self defense. I was so relieved to get out that I forgot to ask him.

One large Eastern city has an ordinance which reads in part, "It shall be unlawful for the operator of any

vehicle to sound any horn or warning device except when reasonably necessary for the prevention of accidents."

That's a pretty tough one to enforce, but the Police Department is rising to the occasion. Applicants for marriage licenses at City Hall receive a nice little notice from the police, calling attention to this ordinance. The notice goes on to say, "The Police take this opportunity to request that you and your wedding party abide by the above rules while driving on the streets and highways, especially during your contemplated nuptials."

Traffic-noise elimination is becoming a necessary objective. Increasing street noises play havoc with the human nervous system. And the Police Department is on the right track, even though they're barely moving. Traffic noise, like gasoline economy and highway safety, emanates not so much from the car as from the driver. And the driver can control it.

Many states compile "case histories" of its automobile drivers. And there isn't much about individual driving habits that the highway authorities don't know.

Illnesses, injuries and delinquencies—anything which bears upon the motorist's capability at the wheel—are watched constantly and evaluated from the standpoint of safety for everyone.

Potentially dangerous drivers include epileptics, diabetics, alcoholics and sufferers from heart trouble. Each of these is subject to special investigation and the

information thus secured is carefully tabulated. Many of them are no longer permitted to drive.

Epilepsy (like any affliction which causes lack of consciousness or control) is a particularly serious problem. As soon as authorities learn of such a condition, that person's license to drive may be withheld for three years; and thereafter until he is pronounced well by his physician and that opinion is confirmed by medical advisors.

Diabetics constitute a somewhat lesser—but still serious problem. They are investigated just as carefully. In the matter of heart disease, a study is under way to determine what types are most dangerous to a person behind the wheel. Many states get a list of every alcoholic (as well as those who are mentally ill in other ways) that is admitted to a hospital for treatment.

Eyesight is another subject that comes in for a lot of attention. The "case history" cards tell at a glance whether each listed motorist should wear glasses while driving, whether he may drive at night, etc. A person with only one eye, for instance, may be able to secure a license, but only with a special mirror attached to his car.

And of course every accident and its cause is on record. The result of all this: by weeding out the incompetents among motorists, the accident rate has been reduced and precious lives are being spared.

It isn't necessary to *read* highway traffic signs in order to understand their message. Their shapes each

have a standard uniform meaning. Yet in tests only one motorist in a thousand was able to identify more than three of the six shapes when they were displayed without lettering. Anyway, here they are:

1. The *Octagon* says STOP.
2. The *Circle* says RAILROAD CROSSING AHEAD.
3. The *Diamond* warns of ROADWAY HAZARDS.
4. The *Cross Buck* marks a RAILROAD CROSSING.
5. The *Vertical Rectangle* carries REGULATORY MESSAGES.
6. The *Horizontal Rectangle* carries TRAVEL INFORMATION.

Highway traffic control is becoming a more rigidly enforced police condition every year. In an average year, between 400,000 and 500,000 drivers lose their licenses. They are deprived of their privilege to drive because of traffic law offenses and practices detrimental to highway safety. This figure has increased 25 per cent, in the past five years.

Four out of every ten operators banned, lose their driving licenses for driving while under the influence of liquor. In some states drunken driver suspensions run as high as 70 per cent. Other major causes included reckless driving, hit-and-run convictions, involuntary manslaughter, and failure to comply with safety responsibility laws.

The leading causes of traffic arrests are commonplace. A three-year survey of two states reveals the

following violations are most frequent. Speeding seems to be firmly entrenched in first place. Other frequent violations include passing stop signs, reckless driving, disobeying traffic signals and improper passing. Average fine during one year in one state was $6.59.

However much the potential speeder may dread the sight of a state highway patrol car in his rear vision mirror, the driver of that car is usually a fine person. And a very human one. That statement is perhaps best illustrated by this true little story.

A motorist was returning from a week-end holiday one Sunday night. His wife and child were asleep on the back seat. Driving into a service station, he whispered his order, cautioned the attendant not to make any noise and walked around to stretch his legs. Returning to the car, he quietly paid his bill, and still quietly, so that the slumbers of his family would not be disturbed, started the motor and drove away.

More than an hour later, state police caught up with him and suggested that he return to the service station for his wife. She had gone to the washroom while he was stretching his legs.

15

The Chance You Take

In 1904, Kansas City had only two automobiles. And however difficult it is to believe this, the fact remains that those two automobiles figured in an accidental head-on collision with each other.

Today, someone's car figures in a major collision every 10 minutes, 24 hours a day. What is a major collision? One in which the car's frame has been bent or the body has been knocked out of alignment, or both, or worse. Worse? In this case it means physical injury to a human being, or maiming—or death.

One million people were killed in traffic accidents in this country during the first fifty years of the twentieth century. Our war fatalities in *all of the wars since* 1776 were no greater.

In an average large city, 27 out of each 100,000 residents are destined to lose their lives in traffic accidents each year.

According to all known statistics, the most dangerous time to be driving a car is between 4:00 P. M. and 6:00 P. M. on a Saturday in December before a holiday. Experience indicates that more traffic accidents happen between 4:00 and 6:00 P. M. on any day; that Saturday is the worst day of the week; that the rate of accidents increases as the days become shorter; and that the eve of a holiday week end is doubly dangerous.

Life isn't cheap. It's irreplaceable. But here's a monetary evaluation. The National Safety Council estimates that for each highway fatality the *total* cost is $88,000. It arrives at this figure by estimating first that each death in itself costs $15,500. But for each fatality there are 35 persons injured at $1,090 each ($38,150), and 256 accidents involving property damage of $134 each ($34,304). The total therefore is $87,954.

In arriving at the results of its formula, the council takes into account numerous minor injuries and mishaps which are not reported. Also included are estimates of medical expense for injuries, and for services lost.

More and more roadside signs are beamed directly at highway fatalities. A Los Angeles safety poster reads, "One hundred sixty-seven persons died here last year from gas. Eleven inhaled, nine put a lighted match to it and one hundred and forty-seven stepped on it."

And someone doctored a traffic sign on a smooth stretch of road, so that it now reads, "Resume Lethal Speed."

A billboard near Hanover, Pennsylvania, reads, "Drive Carefully—Hanover Township Hasn't a Single Child to Spare."

Next time you're on the open road, study the relation between standard state highway signs and the related parts of your car. Examples:

"Slippery When Wet"—Do your tires have adequate tread?

"Winding Road"—Is your steering in good condition?

"Stop"—Will your brakes hold?

"Bump"—Have your springs and shock absorbers been tested lately?

"Watch for Pedestrians"—Are your head lamps bright and properly aligned?

Every highway sign requires first, the driver's compliance, and second, the proper response from your car. And they're equally important.

Baseball and automobiles probably receive more free advertising on the front pages of the newspapers than all other commercial activities combined. Trouble is that the news about baseball is usually favorable, whereas the news about automobiles is generally unfavorable. Pick up a newspaper almost any time and you'll find headlines about an automobile accident. The number of deaths and injuries is simply appalling.

We reconstruct many accidents when collision-damaged cars are towed into our shops. And almost without exception the accidents could have been prevented. Highway accidents don't happen. They are caused. And they *can* be prevented.

Fifty years ago the Washington, D. C. *Star* editorialized that "The Commissioners might profitably devote a little time to consideration of ways and means of regulating the speed of automobiles, which are becoming weekly more numerous... These machines are capable of a smart pace, and, being a novelty they are frequently sent along the streets far more rapidly than is safe for the occupants or the other street users. It is not unusual to see one of them shooting along thoroughfares on downgrades at the rate of 15 to 20 miles an hour—nearly twice as fast as street cars are permitted by law to run..." Those Commissioners should be around today!

As late as 1922, New Jersey had a motor-vehicle law which stipulated that motorists were limited in speed to "one mile in seven minutes on a curve or turning a corner, one mile in four minutes at a crossroad, in built-up areas or approaching a horse."

Traffic safety studies have brought motordom a new word. It is "tenigue," a combination of tension and fatigue. And it is usually the result of too-constant driving without brief periods of relaxation. In these days of heavy traffic, tenigue can be deadly. Smart motorists on a long run will stop each 100 miles or so for a cup of coffee or a spot of tea, or just to stretch their legs. It will relieve tenigue.

Several cities are trying a traffic innovation which encourages jaywalking instead of forbidding it. When a special pedestrian signal flashes, *all* mechanized traffic halts and everybody on foot at the intersection crosses

the street in every direction, including diagonally. The plan is expected to speed both motor and pedestrian movement and reduce accidents.

In Cleveland, pedestrians, not the drivers, will be liable for prosecution if they are hit in an automobile accident for which they are responsible. The charge, under a new city statute: jaywalking.

In Argentina, on the other hand, a pedestrian never has the right of way. If he is knocked down, it's his own fault.

Under normal driving conditions, these are the distances required to stop your car from the speeds indicated:

Speed	*Thinking Time*	*Braking Time*	*Total*
20 MPH	22 feet	18 feet	40 feet
30 MPH	33 feet	40 feet	73 feet
40 MPH	45 feet	70 feet	115 feet
50 MPH	56 feet	109 feet	165 feet
60 MPH	66 feet	156 feet	222 feet
70 MPH	79 feet	240 feet	319 feet

In normal city and suburban driving, what do we actually gain by speed? Suppose you are traveling seven miles from one point to another. At 30 miles an hour the trip will probably require 20 minutes. At 50 miles an hour, allowing for crossroads, stop streets and traffic conditions, you might reach your destination in 15 minutes. So you save five minutes and risk human lives. It isn't worth it.

Many speeders are not speeding so much as they are responding to the inferiority complex latent in most of us. They tramp down on the accelerator to feel the throb of power and its resultant emotion of superiority. Whenever we do that, those hundred-plus horses under the hood can become a terribly destructive force.

Traffic accidents reveal that the most dangerous place to sit in an automobile is next to the driver. More people have been killed and injured while riding in the right front seat of a car than in any other position.

Automobile engineering is sometimes cyclical. In 1900, when drivers sat high *on* their cars, their range of vision from eye level to road was 40 degrees. By 1905 cars had begun to have a lower center of gravity and drivers sat lower. Their vision was reduced to 30 degrees. In 1920 vision from the new "closed" cars was only 12 degrees, and by 1936 the angle of visibility was down to 4 degrees. Today, in a complete reversal, most manufacturers are exerting all their engineering ingenuity to *increase* the angle of visibility.

The principal items affecting the safe operation of your car are these:

Brakes, Lights, Tires, Steering, Wheel Alignment, Horn, Rear-Vision Mirror, Windshield Wipers, Defroster, Glass, Muffler and Exhaust Pipe. Check them carefully at regular intervals and before and after each extended trip. You might save a life. Maybe your own.

The greatest percentage of drivers who cause death and injuries on the highways is in the age group of 25 to 64 years. And 97 per cent of them have been driving

one year or more. Less than 10 per cent are female drivers. Three quarters of all accidents are on dry roads in clear weather. Surprisingly enough 95 per cent of all cars involved are apparently in good mechanical condition. Only about 5 per cent of automobile accidents are the result of the condition of the car.

Many traffic accidents are caused by *impolite* driving—by lack of courtesy. If two pedestrians bump into each other on the sidewalk, each humbly begs the other's pardon. But put those two pedestrians behind the wheels of motorcars and see what happens! In most cases they yield the right of way only grudgingly—and ignore common courtesy. In Washington, D. C., one year, according to The Traffic Advisory Board, impolite driving was the principal factor in 19 traffic accident deaths.

Here's something else to think about. As cars grow older the danger of drivers being overcome by fatal monoxide fumes increases. That danger is greater in wintertime when car windows are kept tightly closed. It's smart to have your entire exhaust system inspected from time to time.

If people were preparing for war instead of making plans for one of our holiday week ends they'd be greatly concerned about the number of servicemen who would *not* return. Are these people equally concerned about the motorists who won't return from each holiday week end? Well, maybe, but not to the same extent.

No appreciable decrease in the holiday traffic death

and injury toll is apparent and won't be until everyone starts thinking more seriously about it. People are not sufficiently conscious of the highway slaughter that takes place during every holiday week end. Until they are the toll will mount and mount.

In any one week, a lot of wrecked cars are towed into our repair shops. And frequently we reconstruct the accident and its cause. Some of the accidents are caused by unusual conditions. But many others could have been avoided by observing the simple requirements of good driving. Here are the primary essentials:

Keep yourself and your car in good condition. A run-down car and a run-down driver is a killing combination.

Keep your eyes on the road and both hands on the wheel. By all means relax physically, but stay alert.

If the car ahead displays a suddenly smoking exhaust, slow down. It's an indication that the driver has let up on the gas.

Check what's behind with your rear-view mirror before pulling out to pass the car ahead. Another motorist may have started to pass *you*.

After passing, don't cut back until you can see the car you've passed in your rear view mirror.

At night, watch trees or telephone wires bordering the road or hilltops. Reflected light will tell you when a car is coming from the opposite direction—especially on curves.

Watch for shadows or reflected lights from cars that

may be directly ahead of a large truck or bus that you're about to pass. If you don't, you may find, when you get alongside the truck, that you have *several* vehicles to pass. But then it's frequently too late to go ahead or drop back.

When approaching a railroad crossing, be sure you can hear any signals. One window should be open, radio and heater had better be turned off. Too many cars have been wrecked by drivers who failed to hear the engineer's signal.

Come to a full stop at all main highway crossings, even at those where only a caution signal is posted.

Use directional or outside hand signals for all turns or stops. The other fellow simply cannot anticipate your intentions.

As a traffic safety measure Asbury Park, New Jersey, introduced a novel method of traffic law enforcement a year or so ago. The Police Chief of that resort gave neckties instead of tickets to astonished traffic violators. They weren't ordinary neckties, though. They were decorated with such things as the words "Stop, Look and Listen," "Do Not Cross White Lines," "Speed Limit 20 Miles," and "School Street—Slow." Whether or not they wore the ties was up to the motorists. But if you go to Asbury Park, look out. Don't cross a white line just to get a necktie. Police have been trained to distingush between actual and eager offenders.

In Pennsylvania it has been proposed that legislation be adopted requiring operators involved in a fatal or personal injury accident to submit to a suitable ex-

amination to determine the operator's fitness to drive an automobile.

The Pennsylvania Turnpike Commission meanwhile released figures indicating that only one fatality was experienced for each eight million traveled miles during a three-year period. But even so, the famed 160-mile super-highway accounted for 143 killings in that time. Of these, 62 resulted from passenger car accidents and 81 resulted from accidents involving trucks. And while the deaths are deplorable, the record as a whole speaks well for the Turnpike itself, and for high-speed toll roads generally.

Still and all, Johnny Parsons, famed racing driver, claims that it's safer to drive on a race track at 120 mph than it is to handle the family car in regular traffic.

One of the strangest highway accidents happened in Brooklyn. A baby riding with its mother swung a nursing bottle and conked the mother on her head. The mother temporarily dazed, lost control, and the car turned over. Miraculously, no one was hurt.

Ever hear of a Drunkometer? It's a chemical device for registering alcoholic content in the blood. If the authorities suspect a driver of being drunk, they have him blow a balloon. The air in the balloon is then forced through the machine to determine the amount of alcohol in the blood. If the meter registers over .15 of one per cent—which is the equivalent of six ounces of whiskey or six bottles of beer—the driver is too drunk to drive.

Statistics show that when the weather is clear and

the road dry, most drunken drivers find their victims. Saturday night between nine and ten o'clock is given as the time of greatest danger.

Apparently the inside of an automobile is a pretty good place to be if an A bomb falls. A report from the Atomic Energy Commission reveals that in Nevada tests, automobiles a mile away remained relatively intact. Windows were shattered and doors were somewhat buckled, but it was apparent that "a certain degree of protection would be afforded occupants, particularly if they crouched under the dashboard or on the floor in the back of the car.

Just for a change, here's the traffic safety picture in reverse. In an average year, eighty-seven million people will drive three hundred and fifty billion miles without being killed. You can be one of them by simply exercising normal caution.

16

Drive-Ins and Drive Inns

THIS country's first outdoor drive-in movie was built in Camden, New Jersey, in 1933. By 1941 there were 160 such drive-in theatres. Latest figures indicate that some 4000 are now in existence.

Drive-ins of all types are multiplying with great rapidity. Some of them in surprising forms. Motels and tourist cabins are probably the most common. In addition, there are drive-in banks, drive-in laundries, drive-in churches, drive-in shoe repair shops, drive-in grocery stores, drive-in furniture stores and drive-in offices. Latest addition to the list are the offices of some public utility companies, where customers can pay their

light and gas bills from their cars. Postal authorities have installed mail boxes designed to accommodate the motorist. Some libraries provide similar curb-side boxes so that patrons can return books without leaving their cars.

The origin of tourist camps is unknown. In the early days they were unpretentious affairs—usually little more than clusters of shacks—without heat, plumbing or other conveniences. In 1922 there were 600 of them in the United States, and by 1930 there were about 2000. Then the idea really began to spread. In 1940 the total had reached 14,000. Today, it is estimated that more than 35,000 are in existence. They range all the way from ramshackle one-room shacks to modern luxury motels that rival the finest hotels. Once located only in the outskirts, some of them are now to be found in the center of cities.

Catering to motorists has proven profitable to many kinds of businesses. And drive-ins will be an increasingly important phase of future expansions. As to the origin of drive-ins, credit belongs to the automobile industry itself. Since its inception, motorists have driven in to service stations, garages and repair shops for everything their cars need. And sometimes for things they didn't need. . . .

Like ripples from a stone tossed into the water, drive-in services continue to spread in an ever-widening circle. At Rockford's Drive-in Church in Michigan, churchgoers may attend regular services consisting of 45 minutes of hymns and a 15-minute public-addressed sermon.

A Catholic Bishop in North Carolina has a mobile church for use in rural districts. It consists of a trailer with two rear doors opening from the top and bottom respectively. The upper door encloses a loudspeaker which, when open, is directed at the congregation. The lower door, when opened, forms a platform for the pulpit. Behind this platform within the trailer, is the altar.

The insurance business has drive-in facilities too. A Seattle company has set up curb-service offices. A covered driveway accommodates six automobiles at a time, and the drivers can transact their business from their cars.

In Grand Rapids, Michigan, a grocer handles the situation in reverse. He provides taxi service for his customers to any one of his supermarkets and back home again. The service is free if purchases amount to $10 or more.

Los Angeles has a mechanized drive-in eating place called the "Motormat." When the motorist drives into a designated space a metal bin, operating on a network of tracks circling the building, runs out to his car. In the bin are glasses of water, menu, pencil and pad. The motorist writes his order and pushes a button that sends the bin back to the kitchen. While the food is being prepared, the bin returns to collect the money. On the third trip it delivers the food and change.

The same city boasts a drive-in furniture store. It displays merchandise in a large warehouse through which a double driveway has been built. Customers can

look at furniture from their cars or park them on one side of the driveway and wander around on foot.

A Chicago architect has designed a general store which makes possible shopping for groceries, drugs, and all sorts of other products, from the seat of an automobile. Each department of the store is actually an island flanked by a driveway. The motorist drives to the Meat Island, for example, picks up purchases through a window, and then drives on to the Fresh Vegetable Island or the Hardware Island. Certainly solves the problem of what to do with Junior while shopping.

Meanwhile, some enterprising entrepreneur has combined automatic laundry equipment with drive-in movies. While you're watching Gladys Gladheart emote, the week's wash is being laundered. Besides that, there are bottle warmers for the babies, swings and pony rides for the children, and sandwiches, soft drinks and candy for you.

Where do we go from here? I'm afraid to look.

17

Pay as You Park

THE need for parking space in urban areas is measured in terms of "car space hours." Surveys reveal that cities having a population between 100,000 and 250,000 people require a minimum of 16,000 car space hours. For each 500,000 of population in the larger cities, 28,000 car space hours are needed. Yet very few cities of any size can offer more than 10,000 car space hours.

It was of course inevitable that as automobile population increased, parking space would become scarce in reverse ratio. This condition, in turn, created a new little industry—that of building, installing and administering parking meters.

A survey of such revenue in 62 large cities revealed an income of $74 per meter in an average year. Maintenance, repairs and collections averaged only $6.99

annually for each meter. Throughout the United States, motorists put some fifty million dollars into city parking meters each year.

Parking meters are not primarily a revenue-producing device however. Actually they are a form of traffic control which enforces a time limit to provide a greater turnover in available parking space. The revenue itself turned out to be a welcome by-product to municipalities.

Use of the meters by the motoring public soon brought out some interesting little side lights.

A jewelry store in Washington, located on a metered street, keeps a supply of nickels on hand and puts them into meters that are about to run out of paid time, as a courtesy to any and all motorists who park in their block.

Salt Lake City enacted a special law to punish motorists who in one year put 64,673 slugs in local parking meters. Anyone convicted of "slugging" a parking meter in the city may now be fined as much as $299 and sentenced to six months in jail.

In Miami, parking meters are installed in parking lots on a co-operative plan. The city leases a plot of ground from the owner, paves it, installs meters and operates it as a parking lot. The rental paid by the city to the owner is 35 per cent of the meter revenue. The city absorbs the property tax.

Richmond, Kentucky, had a parking-meter courtesy plan for a while. Under their plan, police put a nickel in the meter of an overtime parker instead of giving him a ticket. Then they placed an envelope in the car, requesting that the parking motorist return the nickel

to the Board of Trade. The Board reported only 328 nickels returned for 550 courtesy nickels inserted in the meters by policemen.

One parking-meter firm has developed a new machine to collect traffic fines. The traffic-violation ticket can be inserted with the required money for the fine. The machine then issues a receipt.

A Midwest auto-rental company has experimented with "Meter-misers" on their automobiles. Mounted on the instrument panel, the meters required frequent insertions of half dollars to keep the car running.

Parking meters solve only a fractional part of the parking problem however. They are primarily a curbstone accessory, and as such are limited in number to the amount of street space in any city or town. And *moving* traffic in cities and towns has become so heavy that much curb space can no longer be allotted for parking.

The solution to the problem is off-street parking, which in turn presents new problems. There is the matter of space which is always scarce where it is needed most. And the question of whether local government or private enterprise should take the initiative. (In scattered cases they seem to work very well together.) Then too, multi-storied or underground parking areas require so much money for construction that parking rates must be excessively high unless such projects are subsidized by the municipalities.

A number of cities are on the right track, even though they're not doing as many things as rapidly as needed. Los Angeles, for instance, has a city ordinance that

requires all *new* downtown buildings to provide one car's parking space for each thousand square feet of floor space. A few other cities have provided some municipally owned and operated parking areas. In Washington, D. C., a new office building has a parking garage built into its interior court. Tenants can drive in, park their cars, and take an elevator to their office. But space was provided only for the tenants. There is still the problem of parking the cars of visitors to the offices in that building.

Examples of what *can* be done are provided by Silver Spring, Maryland, and Allentown, Pennsylvania.

Silver Spring, a rapidly growing town just outside of Washington, adopted a realistic approach to its parking problem. In 1946 the town issued $800,000 in bonds to build free parking lots. Four years later the downtown area had eight such lots. They covered 76,000 square feet and accommodated 2000 cars at any one time. Subsequently, additional bond issues supplied money to expand the parking program.

To meet the cost of the lots a special tax was imposed on downtown property at the rate of 40 cents per $100 on personal and improved real property and 20 cents on unimproved land. Business places that provide their own off-street parking space—within county standards as to size—are exempt from the tax. The bonds, bearing 2½ per cent interest should be retired in twenty-five years.

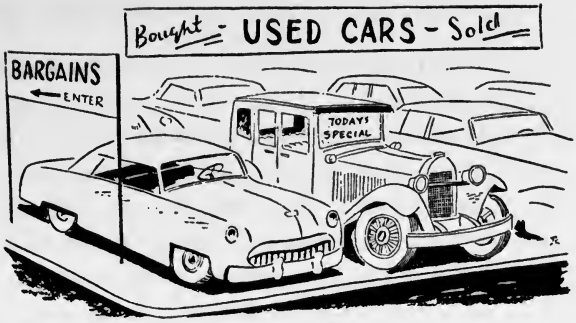
Allentown used a different approach. The city has a population of over 100,000 and draws some 350,000

people from outlying sections into its shopping district each year.

The merchants of Allentown decided that parking was *their* job. So they formed a corporation and called it "Park and Shop." Total capital was $250,000, put up by forty-eight merchants on a quota system based on the square feet of floor area in each store. Then Park and Shop purchased six parking lots and leased four more. The total capacity is about 1200 cars.

Here's how the plan works. A motorist pays 25 cents for four-hour parking. He takes his parking ticket to any Park and Shop store. There, with a minimum purchase—varying from $1.00 to $3.00—his ticket is stamped for a refund of the parking charge. The lots are leased to private operators. Each store that validates a parking ticket pays 22 cents to the lot operator. During the first year of the plan more than 16,000 tickets were validated. But the average customer taking the refund had spent $4.60 in the store. Free parking cost the store less than 5 per cent of the purchase—and in addition to the increase in new business, greatly reduced delivery expense.

As the automobile population increases the parking problem becomes ever more acute. It will be solved only when municipalities and private businessmen approach that solution together—impartially and intelligently.



18

Cream Puffs and Old Iron

THERE is no such thing as a used car "bargain."

The value of a used car is determined by only two factors: its physical condition and the law of supply and demand. Because of the widespread interest in used cars, they find their true economic level more quickly than most other commodities. My definition of a "bargain" in a used car would be one which is offered for sale substantially below that level. Such instances are exceedingly rare.

Approached in another way, however, used cars represent excellent value. The manufacturer of a new automobile builds into it a given number of potential miles. Those miles do not usually accumulate on the speedometer as rapidly as depreciation takes places.

One of our recent surveys revealed that the average

used car offered for sale at 75 per cent of its price when new still had 85 per cent of its original mileage unused. Those selling at two-thirds of their new car prices still had 75 to 80 per cent of their original mileage. And those selling at half their new-car price had an average of 65 per cent of their original mileage left in them.

Admittedly, this condition wasn't true in the used-car boom days of World War II and the three-year period which followed it. But in reverse ratio the percentages of unused mileage will increase as the prices decrease whenever supply exceeds demand.

Used cars are a greater factor in our national economy than most people realize. Three out of five motorists never purchased a new car. They buy only used cars, moving forward periodically in about two-year-model jumps with each purchase. Their philosophy, frequently conditioned by used car dealers, is that "every car on the road is a used car" whether or not it was purchased new. And why should they pay for initial depreciation, when the lower-priced used cars will give them equal transportation?

For all their economic importance, used cars were once the "whipping boy" of the automobile industry. But World War II changed all that. In the era that followed, many used cars brought double the price for which they were sold when new. This condition produced the usual number of Johnny-come-latelys, who jumped on the bandwagon for a cut of a very juicy pie.

Los Angeles had its Mad-Man Muntz, New York had its Smiling Irishman, and other large cities had similar used-car dealers, whose advertising claims were be-

moaned by the more conservative members of the industry.

One of them called himself the Angel of Broadway and he operated four used-car locations in Chicago. He modestly admitted that he was the newest, biggest operator in the motor world. To quote further from a press release submitted to an automotive newspaper, it was claimed that "the Angel of Broadway becomes the latest and greatest of the big moguls in automobile retail sales" and "The Angel buys cars for heavenly-high prices and he sells cars at prices that make his locations paradise for car buyers." "He spreads his wings and flies far to bring his customers heavenly deals on automobiles." The implication seemed to be that he paid more for cars than they were worth and sold them for less than he paid.

These dealers were just as extravagant in their bids to buy old cars as they were in their efforts to sell them. The claims of reputable dealers were bad enough. On a given Sunday I found seven advertisements in the newspapers, each claiming that the advertiser would pay more for a used car than anyone else. I still don't see how it's possible.

During those bonanza days a California used-car dealer had a sign across the front of his lot, reading, "You, too, can become a wealthy pedestrian.

Some of the Used Car advertisements in the newspapers are still amusing, often pathetic. Everybody is apparently trying to outshout his competitor with flagrant claims. There are "Sacrifice" sales, "Lifetime" guarantees, "Ten-percent" discounts, "Ridiculous

terms" and exhortations to "Hurry, hurry" or you'll miss the "Opportunity of the year." There are good values and bad values in used cars, and every dealer has both. And you pay for what you get—which goes for both the car and the terms of payment. Sensational claims are so much hokum. Contrary to some advertisements, no used car is ever "as good as new." A very few sometimes almost live up to this claim. But most of them fall short of it. For one thing, a dealer simply cannot make them as good as new, without increasing his cost far beyond the point at which the cars can be sold.

Yet, for all that, many used cars are so "doctored" by unscrupulous dealers that the layman cannot recognize the shortcomings beneath the surface. If you contemplate buying a used car here are some cautions.

Look out for used taxicabs. That car you see on a used-car lot, gleamingly beautiful in a fresh coat of paint, may be a former taxicab. Many of them have had more than 100,000 miles of hard service.

Years ago, taxicabs in big cities were built like trucks apparently to withstand the rigorous wear occasioned by use in the congested traffic of big cities. But the cost of operating these heavy cars was prohibitive. One after another, most cities changed to lightweight conventional automobiles for taxi service. Taxi rates came down accordingly. But when these small cars outlive their usefulness as taxicabs, they find their way into the hands of used-car dealers and are frequently sold to the unsuspecting public as normal used cars.

Here's how to detect whether the used car you are considering was ever in taxicab service.

Examine the dash panel and the toeboards. Taxicab meters and cables leave holes different from those used for a heater or radio. If the car has new toeboards, find out why they were installed.

Look for traces of yellow or orange paint beneath the hood, under hood lacing and around edges of doors and body. You might even try scraping a little paint from the inside edge of one of the doors.

Look for excessive back-seat upholstery wear. Look even more closely if the car has new seat covers.

Examine the sheet metal immediately above the center of the windshield. Slight indentations can usually be seen when taxicab signs or lights have been removed and the metal has been filled in and finished.

If you're still in doubt, ascertain the name and address of the former owner. Many dealers will be reluctant to give you this information, but the only alternative is not to buy the car.

Having determined that the car is not a former taxicab and that its previous ordinary usage has not been too rough, follow these four steps:

First—When the motor is started watch the exhaust pipe. If it sends out dense smoke the car needs an engine overhaul job.

Second—At a distance of ten or fifteen feet, walk completely around the car. Does it stand upright

and level? If not, you may have spring or shock absorber trouble, or worse—a bent frame.

Third—Is the sheet metal wavy? Squat down and look at your reflection in the doors or body panels. If the reflection is irregularly distorted, the car has probably been in an accident.

Fourth—Do business only with an ethical dealer. One who thinks too much of his reputation to sell any but a sound car that will serve you well.

If you're sure of the fourth step you can usually forget the other three. In fact, the selection of a reputable dealer should be your *first* step. They have too much at stake to gamble with unethical practices.

Then there is the matter of speedometer mileage. Some dealers never touch a speedometer. But many still turn back the total mileage to a figure they think the public will believe. A few turn the reading back to zero. It's a sorry condition, but the fact remains that it is done more often than not.

However, there is a guide which prospective used-car purchasers can use to determine whether speedometer mileage is reasonably accurate. National statistics reveal that the average automobile is driven about 10,000 miles per year. In some sections this average mileage may reach as much as 12,000 miles, offsetting certain groups of motorists whose annual mileage is always less than 10,000. Therefore a liberal approach would be for the prospective used-car purchaser to assume that a one-year-old car has been driven 12,000 miles, a two-year-old car 24,000 miles, a three-

year-old car 36,000 miles, etc. Lesser speedometer readings should be questioned; higher speedometer readings are apt to be honest.

Although the standard warranty on new cars hasn't varied appreciably in many years, used-car warranties change as often as the seasons. For many years, it has been customary for dealers to give a thirty-day warranty with each used car they sell. Reduced to ordinary language, this guarantee means that any defective or broken part of the car will be replaced without charge within the period of the guarantee. And if the car needs maintenance service (repairs necessary as a result of ordinary wear and tear) such work will be done for half price within the same period. Theory is that the buyer of a used car will learn any shortcomings it may have within thirty days.

A few years ago some dealers tried liberalizing this guarantee—at least in print. First we began to hear of sixty-day guarantees—and then ninety days. Pretty soon someone introduced a Five-Day Trial Guarantee (if you don't like it at the end of five days, bring it back and select another car). This was followed by a Money Back Guarantee.

And then one dealer decided to take the bull by the horns with a "One Year Guarantee." Someone else announced a two-year Guarantee. A few weeks later another dealer came through with a lulu. He advertised a "Lifetime Guarantee"! Didn't say what lifetime—the car's the customer's or the dealer's—and I never bothered to find out.

One thing is sure. You get what you pay for. Whatever the used car may need will be known to the dealer and the buyer within thirty days. To prolong the terms of the warranty doesn't necessarily mean that the buyer will receive any more for his money.

The very old cars constitute a traffic hazard. Many of them simply aren't safe. Periodically, dealers (and sometimes factories) propose more-or-less commendable plans for disposing of them. On one occasion it was proposed to attack the problem with a two-pointed objective, utilizing a program about as follows:

1. Automobile dealers would agree to trade old cars beyond a given age and in poor condition at an arbitrary but generous allowance.
2. These cars would then be sold as junk and the titles would be returned to the state capital so that license tags could never again be issued for them.
3. The junk dealer's check for the salvage would be made payable direct to the charity whose drive was then being conducted.

The plan wasn't successful because the public, who owned the jalopies, were reluctant to release them, even at a liberal allowance in excess of their true value. The public is a major factor in all things concerning used cars. Some of the incidents are amusing.

We traded a car one day that was still running only by the grace of God. We didn't dare remove the scotch tape that held it together. *Both* front fenders

had the Toni. And the motor had the hiccups. It was so old that repair parts were available only at the Smithsonian Institution.

Even so, the owner demanded a pound of flesh with his thumb on the scales. We made an allowance for it against his purchase of a new car—but only after gently suggesting that he remove his thumb. Although the car would still run under its own power, we sold it for ten dollars—to a junk dealer.

Every once in a while a customer trades in his old car and tells the dealer that he has owned the car since it was brand new. Just why this is supposed to impress the dealer isn't guite clear, since evaluations are based on age and condition.

In many states the dealer can readily ascertain whether the customer is the first owner of a car or not. Pennsylvania, for instance, issues numbered certificates of ownership. The number on each certificate is preceded by a letter. "A" indicates the first owner, "B" the second owner, and so on. Yet, even this indication of the number of owners a car has had isn't infallible.

We once had a customer who wanted to trade his ten-year old Plymouth on a late model used car. He stated that he had bought it new and had owned it ever since. The title had an "R" number indicating 18 owners, so we disputed his statement. He *insisted* he was the only owner. Finally, after much conversation, he admitted that "on occasion" when he was short of funds he had borrowed money, using the car title as collateral. And, of course, each time he borrowed money, the lender registered a lien on the title.

Which necessitated making application for a new title (with a new letter). Further investigation revealed that our prospective purchaser really was the only owner of the car, but during ten years *it* had had a steady succession of ownership titles—all in the same name.

Dealers are frequently set back on their heels by unforeseen conditions. One dealer in my town operates his used-car department about a mile from his new-car showroom.

One of his customers was trying to buy a new car from him but was not satisfied with the allowance offered by the salesman for the old car. Said he could sell the old car for $100 more than was being offered as a trade-in allowance. After much discussion, pro and con, the salesman told the customer to go ahead and sell the old car—and then come back and buy the new car without a trade.

Well that sort of thing doesn't usually work out as planned, but this time it did. The next day, the customer walked in with a check in his hand. The salesman greeted him affably and asked if he had sold his car. The customer nodded. Had he gotten his price? The customer nodded again.

Just then the dealer himself walked up and with mild curiosity asked the customer the name of the dealer to whom he had sold his old car. Sort of implied by his tone that the purchasing dealer couldn't have been very smart. But his expression changed when the customer replied, "To your used-car department down the street."

Most fabulous of all used-car dealers is Armand Heydriks of Belgium, a onetime auto mechanic. In eight years he has built his once small repair business into a multi-million dollar chain of used-car lots over Belgium, France and Italy.

At the start of World War II, he borrowed $2000 from a friend and set up a repair shop. When the Germans occupied Belgium they "requisitioned" the shop and forced Heydricks to work for a meager salary. But the Germans installed the latest repair equipment, and after the liberation, Heydricks found himself the owner of the best equipped shop in his country.

In the summer of 1945, he chartered a plane, flew over Sicily and bought just as he saw them from the air, 50,000 Allied trucks, jeeps and cars, using borrowed money. Then he capitalized on the postwar scarcity of motor vehicles in Europe.

He is now the largest used-car dealer in all Europe, and perhaps in the world. Moreover he is reputed to be the richest man in Belgium.

The fact that almost everyone who buys an automobile has a used car to trade has created a curious paradox. A salesman usually displays very little interest in his customer's used car. Conversely, the customer is frequently more interested in determining the allowance for his old car than in the details of the car he is purchasing. Sometimes this attitude is almost fanatical. (A fanatic has been described as someone who is wildly enthusiastic about something in which you have no interest.) Anyway, I once watched a pair

of them in action. One of our salesmen was engaged in an animated conversation with a potential customer and vice versa. The customer had a nine-year-old car to trade. He was one of those people who didn't care too much what make new car he purchased, as long as he received a liberal allowance for his old car. And every time our salesman tried to expound the merits of our car the customer came right back with a sales talk about *his* car. I couldn't quite figure out who was selling what to whom. But I think the customer won.

Occasionally, during the past twenty-five years, some fair-haired boy has come along with an elaborate scheme for establishing a central used-car clearing house in the center of big cities. Theory is that a motorist who was about to buy a new car would drive his car to the central clearing house, sell it, and buy the new car without a trade. Used-car dealers would then presumably buy these cars for resale and new-car dealers would concentrate on new car sales and service.

It was never tried because it would never work. For many reasons. Principal reason is that the American motorist likes to swap—to bargain—to maneuver for a better deal.

To really appreciate a used car, one should visit the Canary Islands, off the Spanish West Coast of Africa. Down there an automobile is highly respected regardless of its age. A new car is a rarity. And the natives spend most of their spare time keeping up the

appearance of their jalopies. Many of the cars in the Canary Islands were shipped there by American used-car dealers after American motorists had disposed of them.

The classification of these used cars by the natives is simple and to the point. It goes something like this: "If it runs, it's a car; if it runs well, it's a new car; if it runs without breaking down every day, it's a miracle."

Some automobiles really get around. There was an occasion once to trace the bill-of-sale for a car sold in Hickory, North Carolina. The investigation went from there to Lisbon, Portugal, then to Vera Cruz and Monterey, Mexico, to San Antonio, Texas, and finally back to Detroit, where the car had been built in the first place.

The used car is an important American institution. It was as cheap as dirt in the depression-ridden era of the early thirties; yet its value reached astrological heights in the postwar years following the mid-forties. It has been damned and praised. It has driven dealers into bankruptcy; and it has made dealers successful. It has a very definite place in the economic scheme of things. For one thing, it is available to the purchaser who cannot afford a new car. Moreover, its ready sale prevents the industry from reaching a premature saturation point. That combination contributes substantially to the continuing prosperity of the nation.

19

Funds and Finances

THE *automobi*le and its by-products—tires, batteries, petroleum, repairs, etc.,—accounts for more than 20 per cent of all U. S. retail trade. It is a twenty-five-billion-dollar-a-year industry. More than sixty-five million dollars are spent *every day* for motorized transportation. Wonder what the pioneers would think of it now? Especially those livery-stable owners who insisted along about 1905, that the automobile would never replace the horse.

The principal reason for the phenomenal growth of the automobile industry was the advent of "easy terms." The installment plan of automobile purchasing was first introduced in 1905. Easy terms made possible mass purchases of automobiles, which in turn supplied the impetus for mass production. Mass demand had already been created by the irresistible appeal of the automobile itself.

The typical time-buyer of an automobile is a man between thirty and forty-five years of age in the lower or middle income bracket. He is a farmer, a manual worker or a clerk rather than a professional man, an executive or a proprietor. Usually, he already owns a car which represents his down payment.

By income, typical time-buyers fall into the following brackets:

48.4 per cent of those earning $2000 or less.
50.6 per cent of those earning $2000 to $3000.
40.7 per cent of those earning $3000 to $4000.
34.8 per cent of those earning $4000 to $5000.
25.9 per cent of those earning $5000 to $6000.
11.9 per cent of those earning $7500 or more.

When an automobile is financed, an encumbrance is registered on the ownership certificate. This encumbrance is seldom more than 75 per cent of the car's actual value. In this connection, an incongruity revealed itself when the affairs of the ill-fated Lustron Corporation came to light. At the time RFC loaned many millions to Lustron, it took a blanket mortgage on all Lustron properties, including a station wagon. And RFC registered their mortgage completely. During the later liquidation of Lustron's assets, it was found that the Ohio ownership title for that station wagon listed an encumbrance against it in favor of RFC—and in the amount of $15,500,000!

One of my favorite stories about automobile financing concerns an individual. It's quite true in every respect, but for obvious reasons I have withheld names.

The purchaser was a resident of Wilmington, Delaware, who had purchased a car and financed two-thirds of the purchase price. The financing was handled by the car dealer, through General Motors Acceptance Corporation in Philadelphia. For six months the monthly payments arrived regularly and the account was considered a good one.

Then one day the purchaser's wife called at the office of G. M. A. C. and requested some asistance so that the monthly payments would not be so high. Asked the reason for her request, she replied that her husband had died a few months earlier and she'd been struggling to meet the monthly payments that were still due after his death. Said she didn't use the car much—didn't really need it—but she felt that she was duty-bound to meet her late husband's obligations. Now, however, the going was rough and she would like a little assistance in the form of reduced payments and a longer time to complete the obligation.

The G.M.A.C. man excused himself and went into an office to examine the records of the transaction. When he returned there was a quiet smile on his face. And as he talked to the lady there was a mixture of incredulity and gratitude on hers.

The original finance transaction on that purchase included insurance on the purchaser's life in the total amount of any unpaid balance. The lady was given a clear title for the car and a refund check for the total of the payments which she had paid since her husband's death.

Financing the retail purchase of an automobile is a sound business procedure. Many of our largest financial institutions devote a major portion of their time, effort and space to this activity. The average car purchaser, however, regards it as a convenience or a necessary evil and doesn't stop to analyze the relative importance of terms and rates.

When government restrictions on automobile financing were lifted during 1952, there was a rush to buy cars at terms which were basically unsound both for the dealer and for the purchaser. Strangely enough, the same people who previously purchased cars for one-third of the purchase price as a down payment and the balance over an eighteen month period, suddenly demanded terms of 25 per cent or less as a down payment and anywhere from twenty-four to thirty-six months for the balance.

From the dealer's standpoint long terms are undesirable, because in the hands of some drivers the cars depreciate in value more rapidly than the monthly payments reduce the unpaid balance.

From the purchaser's standpoint there is a further undesirable condition. It is the *cost* of long-term financing. Assume that a purchaser selects an automobile for $2250 and pays a normal down payment of one-third or $750. His unpaid balance of $1500 is the basic figure on which finance charges are added. But first, insurance charges (fire, theft, collision and sometimes life) must be computed and added to this balance. Insurance charges, while not too high in themselves, really mount

up when computed for two or three years in advance—instead of for 12 or 15 or 18 months.

The finance charges represent a percentage of the unpaid balance plus the insurance charges. That is why—even in a state where finance rates are regulated by law—the total charge for financing becomes a substantial sum.

The tables below indicate how these charges can mount when long-term financing is required. They are based upon the purchase of a new Chevrolet, Plymouth or Ford in a Metropolitan Area.

Terms of Months	24	30	36
Amount financed	$1500.00	$1500.00	$1500.00
Fire, Theft & Comprehensive, $50-Deductible Collision Insurance ...	$253.00	$309.00	$365.00
Life Insurance	13.14	16.94	20.95
Finance Charge	177.38	229.06	283.77
Total Charges	$443.52	$555.00	$669.72
(A) Percentage to Amount Financed	27.5%	37%	44.6%
Total Monthly Payment	$80.98	$68.50	$60.27
(B) Charges are equivalent to monthly payments	5	8	11
(C) Payments are lower by	.....	$12.48	$20.71
(D) Monthly Charges increase by	.....	3.73	6.28

(A) For 36-month terms, total charges are almost half (44.6%) the net amount financed. For 24-month terms this figure drops to slightly more than a quarter (27.5%) of the amount financed. And, of course, if only 18- to 12-month terms are required, the figure comes right down to normal.

(B) On a 36-month contract, eleven payments are necessary just to equal the insurance and finance charges as against only five payments on a 24-month contract. Therefore twelve additional months (from 24 to 36 months) is a net gain of only six months. The other six installments represent the penalty you pay for longer terms.

(C) Nor is the reduction in monthly payments quite what it seems. True, a 36-month term reduces monthly payments by 20.71, but the cost of doing so is an additional $119.81 for insurance and $106.39 for finance charges—a total of $226.20. Since insurance would probably be carried in any event, this item cannot be computed for the purposes of this comparison. But the finance-charge item alone amounts to $8.86 per month for the 12-month increase. That's a high price to pay for a monthly reduction of $20.71 in the total payment.

(D) A 30-month term increases the total charge by $3.73 per month for 30 months and a 36-month term increases the total charges by $6.28 per month for 36 months as compared to the regular total charge for 24 months.

There is still another angle to this matter of long-term financing. Many people trade their cars on new cars before the final payment on the previous finance

contract has been made. As previously stated, when terms are too long, depreciation and market value frequently move faster than reduction of unpaid balance. The result is that the motorist sometimes doesn't have enough equity in his old car to equal the required down payment for the new purchase.

Automobile financing is a necessary part of most automobile buying, and these facts are not meant to discourage credit buying. Rather, the purpose is to point out the increased cost of long-term financing. It is a statistical fact that 47 per cent of all new cars and 60 per cent of all used cars are sold on extended-payment terms in one form or another.

In the process of arranging finance terms for the car-buying public, the dealer experiences many amusing incidents. One of these concerns a small loan company. There is a definite place in our economic system for the small finance and loan companies. But their rates, while admittedly legal, are necessarily high. Sometimes used-car purchasers, unable to finance a car purchase through regular channels, borrow the money from one of these small loan companies.

Anyway we once traded a car on which our customer still owed a balance that had to be paid before he could secure title for it. When we asked the customer where he had borrowed the money he replied, "From the Blood Bank."

Another of our customers, while filling in a credit application, confided to me that each time he did so he had a secret yearning. After the question "Occupation," he has for many years wanted to write the word "Witch."

Years ago, finance companies substituted the word "age" for "born" on these applications. One reason may have been that many wags, when they came to the word "born," simply wrote "Yes."

In the face of steadily increasing inflation, interest charges for financing an automobile have been lowered. It isn't so long ago that 10 per cent or more was a normal interest charge for a twelve-month finance term on a new car. Today, the top rate is 6 per cent, and many banks and finance companies charge less. True, rates are governed by law in most states, but even without legal restrictions, 90 per cent of all financing institutions would not increase their rates. Whether he knows it or not, the American Motorist benefits from the tremendous volume of auomobile business and automobile financing.

Automobile prices are higher, but not as high as the prices of other commodities. All things are relative. In a period when food prices increased 22 per cent, house furnishings 20 per cent, and consumers' spendable income 18 per cent, automobile prices rose only slightly more than 10 per cent. It still requires fewer bushels of wheat or fewer hours or labor to buy a new car than it did three years ago or ten years ago or fifteen years ago.

Another relative comparison is this. In 1925 automobiles were priced at about 43 cents per pound. They were scrapped at an average mileage of 25,720. Today their price has increased to about 58 cents per pound, and they're scrapped at an average of 120,000 miles. Cost per pound therefore increased about 35 per cent,

while built-in mileage increased almost 400 per cent. On top of that, motorists receive an extra dividend in greater comfort, safety, luxury and superior performance.

Were it not for the comparatively low purchase price of a new automobile, operating costs would be considerably higher. Depreciation, already the highest single item in the breakdown of operating costs, is nevertheless relatively low.

The cost of operating any automobile depends upon a number of variable factors. Mileage, original price and size of the car are the most important of these. A car in the $2300-price class that was driven 18,000 miles per year, would have a mileage breakdown cost about as follows:

Gasoline and oil	2.29 cents
Maintenance	.69 cents
Tires	.46 cents
Insurance	.48 cents
License Fees	.08 cents
Depreciation	3.19 cents
Total per mile	7.19 cents

The variable costs (gasoline, oil, maintenance and tires) amount to 3.44 cents per mile or $619.20 per 18,000-mile year. But a privately owned car that was never taken out of its owner's garage would still have fixed costs (depreciation, insurance and license fees) of $675.00 per year.

Both the mileage cost and the annual cost vary, of

course, depending upon total mileage. Since fixed cost is $675.00 per year and variable cost is 3.44 cents per mile, a car driven only 10,000 miles annually will have a total operating cost of $1019.00 per year or slightly more than 10 cents per mile. But if that car is driven 25,000 miles annually the total operating cost moves up to $1535.00 per year while the mileage cost moves down to 6.1 cents per mile.

Based upon annual mileage only, this car would have a range of operating costs about as follows:

5000 miles per year	16.94 cents per mile
10000 miles per year	10.19 cents per mile
15000 miles per year	7.94 cents per mile
20000 miles per year	6.82 cents per mile
25000 miles per year	6.14 cents per mile
30000 miles per year	5.69 cents per mile

Any table of operating costs is necessarily average—and therefore variable in individual cases. The most variable of all factors is the human element. An unusually good driver or a deplorably reckless driver can knock these figures into a cocked hat—in either direction as the case may be.

20

Thefts and Rackets

AN AVERAGE of 464 automobiles are stolen in this country, every day. Fortunately a high percentage of them are recovered, but the cars don't always come back in the same condition as when they were stolen. About 70 per cent of the thefts are invited by motorists who leave their keys in their cars.

According to the Federal Bureau of Investigation a lot of people get stuck, buying stolen cars. The FBI has jurisdiction only where there is interstate or foreign transportation of the stolen vehicles. Yet in an average year some twelve million dollars worth of stolen cars are recovered in listed FBI cases.

The purchaser of a stolen car is almost certain to lose the car *and* the money paid for it. To prevent buying a stolen car, here are some precautions:

Examine the keys. Original factory keys have the manufacturer's name and a key number. Du-

plicate keys seldom have either. If the keys aren't original, find out why.

Study the front vent glasses and the moldings around them. If the glasses are original, there will be an etched trademark in the lower corner. If no trademark, find out why glass was replaced. Also look for markings around the vent glass to see if it was pried open at any time.

Examine motor numbers of the engine block. Figures 3, 6 and 9 can easily be changed to 8. Also entire numbers can be changed by filing off the old number and stamping on a new number. File marks are a dead give away.

Ignition lock and coil will sometimes reveal tampering such as caused by using a "jump" wire from battery to coil cable to start a locked car.

Above all, know the man from whom you buy the car or learn all about him before you part with your money.

What happens to the 8 per cent of stolen cars that are not recovered? Well, I'm not sure, but I had a hand in breaking up one of the slickest automobile theft gangs in the country about twenty-odd years ago. The story of how they operated might account for some of the cars that don't come back.

Members of this particular gang usually proceeded in their nefarious operations by legitimately buying a current-model car and securing a Pennsylvania title for it. Sometime later they reported the title lost or destroyed, and applied to the state capital for a duplicate title.

Their next move was to steal a car identical to the one they had purchased. Then they changed the numbers on the stolen car to agree with those shown on both titles. Then the stolen car and the original title were sent to another state where it was sold. Meanwhile, the purchased car with the duplicate title was either sold in Pennsylvania, or, as in many cases, it was traded on another make, after which the general procedure was repeated.

They met their Waterloo when one of their members tried to buy a car with counterfeit money. Suspicious of the two $1000 bills which this member tendered me for a $1700 car, I explained that I didn't have $300 change, but would send out for some. Instead I sent a messenger to the bank with the bills themselves. The messenger telephoned that they were counterfeit. Meanwhile, the pseudo purchaser disappeared. But a description of the car he was driving enabled the police to apprehend the man a few hours later.

In the next few weeks, most of the dozen or so members of the gang were resting in a resort where automobiles are rather useless. One piece of their equipment which the police confiscated was an eye-opener. It was a completely equipped automobile paint shop inside of a large truck. The exterior of the truck indicated it to be a cross-country moving van. Inside, however, were ventilators, powerful drying lights, and a series of heavy-duty batteries to supply the necessary current. The procedure in some cases was to steal a car, drive it into the truck and head the truck for some distant point where the stolen car was to be sold. Upon

arrival at its destination the car had been repainted a different color, and was otherwise disguised to avoid detection.

The members of that gang were big-time racketeers. But there are many *little* rackets as illustrated by this story of a talkative individual who had developed a technique for mulcting motorists under the guise of a good Samaritan. Let's call him John Hestor, which wasn't his name. Hestor's procedure was to approach a parked car on the street, lift the hood as though he were the owner, remove the fuel-pump filter cover, close the hood, then wander a short distance away and wait.

Sooner or later the owner appeared, started the car and drove away. Hestor followed on foot. The car stopped within two or three hundred yards because the missing filter cover prevented gasoline from reaching the motor. Well, of course, the driver was baffled and probably irritated, and like most of us, kept grinding his starting motor. Hestor then approached the driver and inquired solicitously, "Having trouble, Mister? Perhaps I can help you. I happen to be a mechanic."

Could he help, indeed! Sometimes the motorist almost embraced him. Anyway, Hestor, instructing the motorist to stay at the starter, would then lift the hood and start tinkering. In a little while he replaced the fuel-pump cover and the motor started again. Usually, the motorist rewarded Hestor generously, but if he made no move toward his wallet, Hestor, while wiping his hands on his handkerchief, would say something like, "Anything you care to pay me will be appreciated."

His downfall came about when one motorist whose car he had so "repaired" recognized Hestor as he was "working" on another car. When police terminated this enterprising activity, Hestor admitted receiving from $1 to $5 for each job and that sometimes he completed as many as fifteen jobs a day.

Many years ago Philadelphia detectives were warning automobile dealers against what was then a new racket. Names and locale given are fictitious, but the detectives swore that the incident really happened as related here.

A well-dressed man—call him Jones—registered at a New Haven hotel. He gave a Boston address. He went about his business quietly, usually carrying a brief case and sometimes with a roll of blueprints under his arm. At the end of his first week's stay he paid his bill with a check on a Boston bank.

One afternoon during his second week in town he walked into a Cadillac showroom and asked for a demonstration. After trying the car carefully, he sat down with the salesman to discuss price. There was considerable haggling—Jones asserting that without a trade he should receive a discount. Finally a price was agreed upon and Jones signed an order, using the hotel as his address. He wrote a check on the same Boston bank. The time was 3:10 P. M.

Then Jones asked how long would be required to get the car ready. Said he wanted to get away promptly. The salesman, thinking of the check, said they couldn't possibly deliver it before the next afternoon. Jones said, "Sorry, if I can't have the car now, I don't want it."

Reluctant to lose an order the salesman consulted the owner of the agency while Jones waited patiently. The conversation between salesman and owner went something like this: "It's a desirable sale. But we shouldn't deliver until the check clears. Still, he must be legitimate, or he wouldn't have driven a hard bargain. But is it a coincidence that he waited until after the banks close to buy the car? We'd hate to lose the sale. Whoa, wait a minute! Let's call the hotel and see what they know about him. . . ."

The hotel reported that he seemed reputable. They had accepted his check, and it had been honored by his bank in Boston. The Cadillac dealer decided to deliver the car.

Jones produced license tags from his brief case and was shortly on his way in his new car. He headed straight for Hartford. Arriving there, he went to the Packard showroom and asked the price of the Packard on display. Then he asked how much they would allow him for his Cadillac.

The Packard dealer looked at the Cadillac and exclaimed, "Why it's brand new!" Jones admitted that it was, said he'd just bought it, didn't like it and wanted to get rid of it. The Packard dealer detected something queer but pretended to proceed with the sale. He asked Jones for his bill of sale to prepare the sales papers for the Packard and retired to his office. The bill of sale was stamped paid—"*by check.*"

His duty seemed clear. He telephoned the Cadillac dealer. That individual became highly excited. He told the Packard dealer that he'd been suspicious of

Jones all along and this confirmed it. In a state of hysteria, he requested the Packard dealer to hold Jones, call the police if necessary to do so, until he could get to Hartford.

The Packard dealer hung up, looked out into the showroom, saw Jones pacing back and forth nervously, and called the police. The police arrived and detained Jones. In due course, the Cadillac dealer arrived and preferred charges.

Subsequently a lawyer secured Jones' release and then called upon both the Packard dealer and the Cadillac dealer. Seems the check Jones had given was perfectly good and Jones intended to sue each of them for $50,000 for false arrest. Dreading the resultant publicity, the dealers reportedly settled out of court for $10,000.

Many of the tales that circulate about automobiles and the automobile business are legendary. And they crop up periodically through the years as having just happened. One such tale was first told to me more than twenty years ago. Recently, several people have told it to me again averring that it just happened.

It *may* have happened. If it did, I haven't proof. Anyway, here's the tale—covered with but not subdued by legendary whiskers.

A man—call him Joe Doaks—walks into a dealer's service station or repair shop. He tells a story about having wrecked his car, which subsequently was towed into a garage at some other point in the city. And he would like the car towed out of that garage to be repaired. Nice amiable guy, too, this Joe Doaks, because he agrees to go along and help with the towing.

The tow truck arrives at the designated garage, parks in a no-parking area, and while the driver stays in the truck, Joe Doaks goes into the garage to secure the release of the wrecked car. In a little while, he comes back. Seems the garage has a twenty-dollar charge against the car and Joe Doaks doesn't happen to have any money with him. So the driver—staying with his truck in a no-parking area—advances the money. Joe Doaks goes back into the garage with it—and vanishes.

Law violations are many and varied. Probably the most common of them have to do with worthless checks. According to Washington figures, dealers in all lines of merchandise lose some fifteen million dollars annually to bad-check passers. I know of one automobile dealer who intends to paper the wall around the inside of his cashier's window with checks that have bounced.

Typical was the case of Joe Koorstad, of Chicago, who went around placing deposits on new cars, giving a check of some corporation. The checks were payable to himself and endorsed to the dealer. But the checks were always in an amount greater than the deposit. So Koorstad requested—and got—the difference in cash. Dealers found out when the checks bounced that the "Corporations" were nonexistent.

In Evanston, Illinois, a car was stolen and later recovered by the police. In the glove compartment police found some 26 parking-violation tickets. All unpaid. The records revealed 13 other traffic violations that were unpaid. So the police returned the car to its owner—with a bill for $117 plus penalties and interest.

In Rockville Center, New York, members of an automobile mechanic's class learned their lessons *too* well. Eight members of the class were arrested in conjunction with the theft of a score of automobiles which they allegedly used for joy rides. The students, all thirteen to fifteen years old, discovered a new way of "jumping" the ignition lock of a car.

Fort Worth police were temporarily confused recently by a thief who admitted stealing more than 100 cars only to abandon them. His racket was to steal a car from the street and drive it to a used-car lot. There he would pretend to be a customer wishing to trade "his" old car on a better one. Having made a choice, he would ask to drive the chosen car around the block. Leaving the stolen car, he drove the dealer's car to another used-car lot where he sold the spare tire. *Then* he drove the second car to a third used-car lot and repeated the whole process.

In Chicago, one Marvin E. Stevens alias several other names walked into a dealer's place of business and asked for a demonstration of a used Lincoln. After riding a few blocks with the salesman, he complained of a rattle in the rear of the car. When the salesman got out to investigate, the "prospect" drove away with the car. Next day it was used in a department-store robbery.

At the end of World War II, and for five years thereafter, values of and demand for automobiles precipitated a rash of new rackets. A few of them were just inside the law, many were grossly illegal, but most were

variations of the gray or black market. Perhaps the outstanding swindler of that era was John Singleton, who is now serving ten to seventy years in the Ohio Penitentiary on 14 counts of "larceny by trick." Actually, he was found guilty of mulcting some 500 cash-in-advance automobile purchasers of $904,017.10. Here's an abbreviated blow-by-blow description of how he did it.

I first heard of Singleton early in 1947. At that time word spread around Cleveland, Ohio, that anyone could buy any make new car from him for list price and secure delivery in six weeks. Legitimate new-car dealers who were sold out for a year or more were curious, but passed it off as some crackpot scheme that would soon fizzle. Six weeks later, when Singleton started making deliveries as promised, these same dealers became concerned. As deliveries continued to be made, several investigations got under way.

The Cleveland Better Business Bureau and the Cleveland Automobile Trade Association, along with others, were determined to find out what put the whiz in this particular "wizard." Their findings only added to the confusion.

Car after car which Singleton sold was traced back to its origin. Without exception, every purchaser swore that he had paid no more than the list price. But the records indicated that Singleton himself had secured the cars from used-car dealers in the Detroit area, at premiums of $300 to $800 each above list price. The used-car dealers in turn had purchased them from that segment of the public who had been able to secure them from their dealers. None of Singleton's cars came

from a factory-franchised new-car dealer and of course none of them came direct from any factory.

Singleton did little or no advertising, but his fame spread throughout Ohio. His customers were required to pay for their cars in full at the time the order was placed. No token deposits were accepted. In return for full payment they were given a cognovit note which stated that the purchaser would receive his car in six weeks or the money would be repaid with interest.

Meanwhile, the Better Business Bureau unearthed the fact that Singleton, fifty, was an ex-convict, a forger and a swindler. He had been in prison four times. These facts were published by the press. But the public went right on depositing their money with Singleton and new-car dealers continued chewing their nails. Cleveland motorists were berating the legitimate new-car dealers for failure to deliver while this upstart, operating from a gas station, went right on delivering cars by the score.

Then, on November 17, 1947, the bubble burst. Customers arriving at Singleton's lot that morning found neither their cars nor their money. What's more, they didn't find Singleton. A receiver in bankruptcy was appointed. And on Thanksgiving Day Singleton was arrested when he returned to his luxurious home just outside of Cleveland. His car-hungry customers received less than eight cents on the dollar for their cognovit notes.

How did Singleton hope to win? Maybe he expected that before his bubble burst he would be able to buy new cars for less than the list price and start realizing

a profit. Maybe he enjoyed the limelight at any cost. Or, maybe—probably—he was just a swindler.

In Edwardsville, Illinois, Robert L. Knetzer was in the same racket. And he did a land-office business. While it lasted. But the law caught up with him, too. This time auditors were put on the job to check every dollar of receipts and disbursements. Confronted with the audit, Knetzer and his partner, Arthur Kramer, admitted that they owed $3,135,116 to some 1800 creditors. They were not an established firm, they didn't have a building to operate from and such cars as they handled were stored on and delivered from an alfalfa field.

During this period both black and gray markets were flourishing. A black market exists when an article is sold in excess of government price ceilings. But a gray market is created only when people are willing to buy merchandise at prices higher than those established by the manufacturer, but at a time when price controls are not in effect.

When production of new cars was resumed following World War II, reputable dealers soon learned that they had a problem on their hands. Many of the new cars promptly found their way into the black market and —after the abolition of government controls—into the gray market.

When new cars first appeared on used-car lots or were offered for sale through newspaper advertisements, they were promptly traced back to the original new-car dealer. The process was simple. An investigator in the guise of a prospective buyer called on the seller to in-

spect the car. In the course of the inspection he surreptitiously secured the serial number of the car. A telephone call to the factory quickly revealed the name of the franchised dealer who first received the car from the factory. Later, the black-market operators became more cautious and covered the serial number with adhesive tape, whereupon tracing the cars became more difficult.

While many of these cars were secured by used-car dealers directly from new-car dealers, many more were secured from the public. Most dealers had long lists of unfilled orders from legitimate retail purchasers. As cars were delivered to these purchasers, their names automatically appeared on state registration lists. Thereupon the retail owner was deluged with telegrams, telephone calls and visitors, each offering him a quick profit. An unbelievable number accepted that profit. Some of them just couldn't resist it, but others believed they could secure another car within a reasonably short time. They were wrong though; black and gray markets thrived for almost five years.

21

How Good Is Insurance?

MY FAVORITE insurance story concerns a man who purchased a used car on a chance visit to our showroom one day. Financing was arranged and the car was delivered the next day.

Whenever a car is sold on monthly budget payments, it is necessary that such car be covered with fire, theft and collision insurance to protect both the finance company and the owner. This particular sale was no exception. But unfortunately (or perhaps fortunately as it turned out) our salesman neglected to tell the customer specifically about the insurance, and the customer neglected to examine his invoice or the budget payment agreement, on both of which the insurance items were plainly listed.

In any event, it wasn't until some time later, when

the insurance certificate arrived from the finance company that the customer became aware of his insurance coverage, and—more important—the premium charge for it.

When he did, he came right back to our showroom. With fire in his eye. Said he'd never carried insurance, didn't need insurance, didn't want insurance and wouldn't pay for insurance. Our salesman did his best to explain the situation, but to no avail. The customer just plain didn't want insurance.

All this took place about the time of a paralyzing snowstorm during the middle of December. And at the time of the final discussion between customer and salesman, the customer's car was parked out front and the streets were still slippery. Then, just as that final discussion reached a deadlock, a light truck (itself uninsured) came down the street, got out of control on the ice, and crashed into the side of the customer's car to the tune of about four hundred dollars of damage.

At last reports, the motorist was a firm believer in the merit of insurance coverage. Said he'd never be without it.

The first automobile insurance policy was written in Boston on June 2, 1902, at a time when there was no specific authorization for such insurance. The then Attorney General of Massachusetts ruled that marine insurance could be written to cover automobiles since marine insurance was being used to cover railroad cars and their contents.

R. C. Emory received that first automobile insurance policy. It covered a two-seated, surrey-style, single-cylinder Stanley Steamer for a valuation of $950 and its "tools, implements and personal effects" for an additional $50. The policy covered the automobile while within buildings against the risk of fire only, while on board railroad cars against the risk of fire and derailment only, and while on board steamers against marine perils only.

The policy was *not* liable for any claims arising from explosion or burning of gasoline or other fuel while within the automobile. Not until March, 1905, was it possible to also insure this or any car against theft.

Today insurance has become almost as important as tires or a motor. And if rates are high, it is because motorists make them so. In New York State, for instance, some twenty million dollars of additional insurance premiums are paid by motorists because of youthful bad driving. It amounts to five times the cost of public-school health service in that state.

The only real way to reduce automobile insurance rates is to reduce accidents and, therefore, claims. The very rate of automobile insurance premiums is in itself indicative of the urgent need for full protection. Yet, many motorists still do not have insurance protection. During 1950 a terrific chemical explosion in Louisiana took many lives and caused untold property damage. Of 580 cars damaged or destroyed in the holocaust, only 38 were insured.

Sometimes insurance losses have a curious twist. This

one may never be duplicated. During the latter part of 1941, four new cars from the factory were being unloaded at our warehouse, when one of them was mysteriously stolen. A few months later, with the car still missing, the insurance company paid us for it.

At that time, new cars of the type stolen delivered in Philadelphia for around $1200, but our insurance coverage was for something less than the delivered price and in any event didn't include freight charges. The insurance company's check was for about $900.

Almost five years later, police found an abandoned 1941 car in an isolated section of our town. License tags and state inspection sticker had been removed and it was difficult to determine ownership. But finally, the police, using the motor number which had not been molested, ascertained through the factory that the car had originally been shipped to us. And when we were called in to check ownership through the serial number, we found our stolen car. The FBI, who were called in later, reached the conclusion that whoever had been in possession of the car had gone into the army and had simply abandoned it. And to this day *we* don't know who that person was, nor whether he was the person who stole the car five years earlier.

Meanwhile, the car belonged to the insurance company, not to us. They had paid us some $900 for it and it now became their property. And therein lies the point of this tale. During those five years, new-car production was nonexistent and used cars skyrocketed in demand and value. The 1941 Buick for which the insurance company paid $900 as a new car

was resold to a dealer as a five-year-old used car for $1250.

Another amusing tale concerns a motorist who had just installed storm windows on his house, and was giving them a coat of paint. His automobile was parked in the driveway beneath the ladder on which he was working.

A neighborly wasp, who until then had been minding its own business, decided to inspect the paint work, and thereby became a source of considerable irritation to the motorist. Several times he tried to discourage the wasp and finally after two or three swings of his paint brush he succeeded. Later, upon descending from his ladder, the motorist found his car splattered with white paint some of which had gone into the open car windows onto the upholstery. So, he promptly made claim for damages to the insurance company under his comprehensive policy. But the insurance company wasn't so sure that it was liable. I never did find out who won. And anyway, I like the story better without its solution, which probably was a compromise.

A different situation involved a motorist of Ontario who refused to pay $10 worth of damage which he caused to another man's car. Said he wasn't to blame and wouldn't appear in court. Then things began to happen. He was notified that under Ontario highways-department legislation his license was cancelled. Later his insurance was revoked.

So he engaged a lawyer and paid his fine. But then he found that no company would insure him, and

Ontario insisted that he tender proof of financial responsibility to recover his license. At long last he came to the realization that without insurance, "proof of financial responsibility" in Ontario means $11,000 in cash or marketable securities for each car owned. And he owned a light car and a truck.

Sometimes a simple thing causes a lot of confusion. That is exactly what happened in the case of this Buick owner. One Sunday night his car suffered a collision. Apparently the trouble wasn't too bad, because he drove it home under its own power. Then, he decided he hadn't better drive it further until the wheels were realigned. And since he was leaving town early the next morning for a few days, he told his wife to have a towing company tow it to Wilkie Buick for repairs. Next morning she dutifully telephoned the towing company, who called for the car.

When the motorist returned to town he visited the Wilkie Buick service station to authorize the work. But the car couldn't be found. No trace of it and no record of having received it. The motorist telephoned his wife, who in turn telephoned the towing company. She then called her husband to report that they had delivered the car as instructed.

Finally, the motorist decided to report it as a stolen car. He notified the police and called his insurance company. The latter sent an investigator to carefully check our entire plant and warehouse. Still no car. So, in a few weeks the claim was processed and the insurance company replaced the car for the motorist under the terms of his policy.

Meanwhile, Davis Buick, a dealer located about six miles away, had a different problem. They had a car that had been brought in to them for repairs and they couldn't locate its owner. When some six or seven weeks had passed, they telephoned City Hall to secure the owner's name from the tag number. City Hall promptly told them that the car had been reported as stolen.

The motorist's wife, to whom one Buick dealer was no different than another Buick dealer, had directed the tow wagon to deliver the car to Davis Buick. But, by this time, the motorist was out of the picture, since an adjustment had been made. So, the insurance company, in return for being exceedingly prompt in settling the claim, found themselves to be the owners of one used Buick—slightly damaged.

Prompt settlements of automotive loss claims are not unusual. Most insurance companies are not only prompt but liberal. And this in face of the fact that loss ratios (the relation of net premiums received to loss claims paid) are rising steadily. Many things are being done to reduce the number of claims.

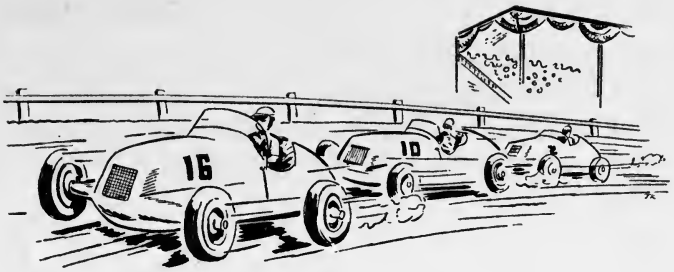
In several sections of the country legislation is being considered that would make the motorist liable for theft loss if it was proven that he parked his car without locking it and removing the keys. Furthermore, in that event the motorist would be responsible for any physical damage which might be caused by the car while in possession of the thief.

Many insurance companies charge increased rates if any of the drivers of the insured car are under twenty-

five years of age. Others refuse to insure drivers whose experience indicates more than a normal average number of accidents.

Meanwhile some states have compulsory automobile insurance laws, others have financial responsibility laws, and still others are considering new and different automobile insurance legislation. The value of insurance diminishes as the rates increase. And unless the steadily increasing toll of accident insurance claims is checked, the rates will continue to increase.

Sometimes people, in the serene knowledge that they are fully insured, are inclined to be a little careless. It is a known fact that a large number of accidents are caused by experienced drivers who become careless and take chances because of their skill. The solution to the insurance problem is in the hands of the motoring public. Only when insurance protection is unavailable to the motorist does he fully realize its value.



22

Racing

THROUGH the years since 1911, the eyes of the automobile world have been focused on Indianapolis each Memorial Day.

Many features on our present cars were first tried and frequently proven in this event. These include the rear-vision mirror, balloon tires and four-wheel brakes, to mention just a few. There have been many other "firsts." On one occasion, Bill De Vore entered the world's first *six-wheel* racer—but the car failed to place in the trials. And Peter De Paulo first attained a speed of 100 miles per hour at Indianapolis in 1927.

For my money, the big thrill occurred in 1919. The line-up for that race included Ralph DePalma, Louis and Gaston Chevrolet, and a couple of chaps named Wilcox and Hearne. DePalma, driving a Packard, was the favorite. Both Chevrolets were driving Frontenacs. Wilcox was in a Peugeot and Hearne was in a Durant.

At the start of the race, Louis Chevrolet took the lead with DePalma following. Somewhere around the 100-mile mark, Chevrolet's Frontenac threw a wheel. That put DePalma into the first place with Wilcox trailing him.

Then for some reason DePalma went into the pit. Wilcox took the lead and held it for more than 100 miles. With the race about two-thirds over, Wilcox suddenly felt an alarming vibration beneath him. Swinging into the pit, he found that the frame of his car had broken just forward of the left front wheel.

Meanwhile Hearne was burning up the track in the lead position. DePalma was out of the pit again running in sixth place, and the Chevrolet boys were in seventh and ninth places respectively. Wilcox took a long hard look, shouted to his mechanic to tape the frame as best he could, and was back in the race.

In a car with a broken frame held together with friction tape—a car that was vibrating dangerously—Wilcox thundered around that track, overtook Hearne, passed him and won the race.

It is for thrills such as the Wilcox victory that a great mass of people crowd into the Indianapolis Speedway each year. The thrill-chill-spill classic is second to nothing in the automotive world.

Look beyond all that, though, and you'll see something just as intriguing: An American holiday. The speedway officials always prepare for an attendance of 150,000 people, who park about 50,000 automobiles in that area. The Indianapolis Speedway grounds cover 430 acres.

Before the day is over, some of the visitors get lost, some are hurt and some become ill. About 650 people require medical attention, and for this purpose a staff of 237 doctors and nurses is on duty.

The crowd usually eats about 150,000 hot dogs, drinks some 20,000 gallons of beer and soda pop, and consumes countless thousands of home-packed picnic lunches. The visitors are served by 840 vendors and concessionaires; and they are protected by some 1500 policemen and guards.

The rest rooms are staffed by 75 maids and porters. And 225 ushers direct the people to their seats. On top of all that, there is a complete fire department including a force of 220 men.

So that the race may be followed more intelligently, 250 people are required to operate the scoreboard. These operators, in turn, work under the direction of 185 timers and scorers. The chief starter watches a two-mile-a-minute stream of cars pass his post for four solid hours. His men are stationed all around the track watching for infractions of the rules and maintaining safety standards.

In the background, unseen and unsung, is the permanent staff of the Speedway Corporation. These 11 people work all year around for this one-day event.

Not more than 33 drivers gamble shattered nerves, injuries and perhaps death against short-lived fame and prizes totaling close to a quarter of a million dollars. Strangely enough, the trial runs before the race are considered more dangerous than the actual race. Only the 33 fastest cars enter the race. To qualify, each

potential racer must go out alone on a clear track and do ten miles in the shortest possible time. He must average about 135 mph to be considered eligible.

In 1948 Ralph Hepburn, in a Novi, went roaring around the south turn of the track on his trial run at a pace that showed promise of setting a record. He never completed that run. Apparently he took the curve too fast and a tire caught on the inside of the track. The car rocketed to the wall, hit, bounced away and hit again. It was demolished. The driver's helmet and goggles were found 150 feet away. Hepburn had gambled—and lost.

Each year, eleven rows of three racers each, closely bunched together, start on the 2½ mile oval track. By the time they complete the first circuit to cross the starting line they'll be doing 90. Then it's anybody's race. But those who can walk away after the race—unscathed—are all winners. The real losers are the crippled, the seared and the dead. But in automobile racing, as in many other dangerous sports, they keep coming back for more—year after year.

The vast property of the Indianapolis Speedway doesn't stand idle between races. It is used by one of the large rubber companies to test tires at prolonged high speeds.

While Indianapolis is the scene of the most famed automobile races; it hasn't cornered the racing market by any means. Other automobile race tracks are scattered around the country and racing meets are held on them at regular intervals. It is the midget races, however, which are experiencing the greatest

growth in popularity. These doodlebugs got their start almost accidently.

Racing driver Al Gordon (who was killed some years ago on the Langhorne Speedway) is credited with having originated them. He was fond of a neighbor's boy and one day decided to build for the boy a real racer on a miniature scale. Powered with a cycle engine, it was an almost perfect miniature reproduction of a full-size racer.

Gordon found himself as intensely interested in it as was the boy. Many evenings were spent chasing it around the neighborhood of the Gordons' Los Angeles home. Pretty soon other drivers were building miniatures. Gordon's back lawn took on the aspect of a miniature race course. And neighbors were coming out regularly to watch the "races."

A promoter named Descarti saw the crowds, perked up and, in effect said, "Hey, what gives here? Let's put a fence around this thing, and organize it, and charge admission." So he did. The first midget race was held in Los Angeles in 1930. Speed wan't great, but the sport mushroomed.

In those days 60 miles per hour was a thrilling speed for the midgets. Today on a banked-turn track, they frequently exceed 100 miles per hour. And the whim that became a hobby which developed into a sport is now a thriving business.

Automobile racing—whether full scale or midget—has made a valuable contribution to the modern passenger car. Design, construction and technology have all improved as a result of it. While the prime ob-

jective of the drivers has always been to win the race for fame and fortune, the real winner has been the American motorist who drives a better and a safer car because of things learned on the race track.

23

The Lighter Side of Advertising

WHEN we were kids, supremacy was frequently determined by the ability to outyell other kids. Sometimes fisticuffs were more positive, but mostly it was the power of our vocal chords. For one thing, to lose a yelling bout wasn't so painful.

Some of us outgrew it. In others the instinct to shout louder simply took a different turn. While the advertising of new automobiles isn't as bad as that of some other products, dealers' individual advertising leaves much to be desired. At best, it is only second best. It is overshadowed by the powerful, national advertisments of the automobile manufacturers which are prepared by experts in the art of making you say "I want one of those."

The average dealer can't begin to equal this ad-

vertising on his own. He lacks the know-how and his limited budget won't stand the expense. So he approaches his individual sales promotion problem in a manner that is sometimes ludicrous.

One automobile dealer actually advertised that with the sale of an expensive model he would throw in "a year's supply of tooth powder, a year's subscription to *Esquire,* a season baseball pass, a year's supply of gasoline, a year's pass to a first-run movie house and a year's supply of cigarettes." He didn't say much about the car. Seemed to think *that* was taken for granted.

Basically the dealer does have an unusual advertising problem. He sells and services only one or two main products, and those products are no different in quality or list price than the same products handled by many other dealers. So he is somewhat limited when it comes to writing advertising copy. There simply are no superlatives available for his use which cannot also be used by any other dealer handling the same product. Finally, in frustration, he gravitates to the position of offering to undersell or overtrade his competitors. And shouts loudly about it.

What happens? Well, frequently his competitor offers more concession. And shouts a little louder. That starts a vicious cycle which ends only when all participants pass out from financial exhaustion.

Unfortunately some automobile dealers don't always mean what they say in their advertising copy. They play "angles" and use "gimmicks" calculated to bring the prospective purchaser into their showrooms. Then they hope, somehow, to break down the prospect or

build up the product toward the end of a more profitable transaction.

Not infrequently, dealers' used-car advertisements are hopelessly inconsistent. During that period, not so many years ago, when used cars were bringing two or three times their true value, these inconsistencies were most apparent. On one occasion a newspaper advertisement of a large metropolitan used-car dealer screamed the following message in bold type.

SELL YOUR USED CAR TO US
WE PAY THE HIGHEST PRICES!
CARS URGENTLY NEEDED FOR EXPORT

On the facing page of that same newspaper was another advertisement of the same dealer with this message:

CLEARANCE SALE OF USED CARS
LOWEST PRICES IN THE CITY!
OVERSTOCKED! ALL CARS MUST GO!

Sincerity in advertising can never be underestimated. After the end of World War II we added a line of small passenger-car trailers to our stock of merchandise for sale. The object was to bolster our sales volume at a time when new cars were being produced too slowly for our demand or our overhead. For some reason our efforts were unsuccessful. We just couldn't seem to sell them. More than a year later we published the following candid advertisement:

Every so often, someone around here gets a brainstorm about some new product or process. Some of them are good and we adopt them. Some are not and develop into headaches. Right now we have a junior headache which we'll try to transform into an opportunity for you.

Some months ago, one of our fair-haired boys bought a lot of small utility trailers—on the theory, I suppose, that no self-respecting car should be without one. Well it seems that a great many cars do very nicely without trailers. So we still have them. And we don't want them.

They're nice little trailers, though, and very convenient for hauling furniture to that summer home or taking camping equipment on a vacation. They're grand for light deliveries. In fact, they're useful for many purposes. Some have a single wheel, some have two wheels, some have open bodies, some are enclosed. And they hitch easily onto the rear bumper of your car.

However nice they are, we still don't want them. We don't want them so much that we're cutting the price to dispose of them. You can buy them for as low as $75 each. They're brand new, standard makes, and have carrying capacities from 750 pounds to 1½ tons. Believe me, for anyone who can use them, these trailers represent good value.

I think we had fifteen or twenty of the little darlings when that advertisement appeared. Four days later we didn't own a single trailer. Candid advertising has always seemed to pay off for us.

Many gallons of midnight oil have been burned by the copy writers of the large national advertising agencies in an effort to produce slogans for the automobile makers. And there have been at least as many slogans as there were cars. But like the cars for which they were coined, only a few have survived. Packard's "Ask the Man Who Owns One" and Dodge's "Dependable" are examples of the survivals.

In retrospect, many of the slogans that fell by the wayside or died with the car, are amusing. There was a car named Yale with the slogan "A Car With the Doubt and the Jar Left Out." Then there was "Buy a Bates and Keep Your Dates" and "He Who Looks Before He Leaps Buys a Blair and Buys for Keeps." Cute?

The Metz, one of the earlier gearless cars sloganized its advertising copy with "No Clutch to Slip, No Gears to Strip," while the Jackson, also in rhyme, gave out with "No Hill too Steep, No Sand too Deep." The American built its advertising around "No Noise But the Wind," while Marmon was "A Mechanical Masterpiece," and "Lexington Leads Because It Lasts."

Many of the early slogans should have been nominated for the Hall of Oblivion by their sheer asininity. One such was Thomas' "You Can't Go By a Thomas Flyer, So Go Buy One," and Oakland's "The Car With a Conscience." Another early slogan that belongs in this category was, "The Sun Never Sets on Orient Buckboards."

Then there was "The Car That Obviates the Tow" (Knox), "The Car That Shuns the Repair Shop"

(Thomas), "The Car Without a Crank" (Harrison), and "The Car for the Masses" (Columbia). And there was one that really extended an invitation to punsters. It was Searchmont's "All That It Is Cracked Up To Be."

Buick has a master slogan which periodically gives birth to a lot of little sloganettes. And they always play on words beginning with the letter "B." It was in 1905 that Fred Vesper, Buick's Sales Manager, created "When Better Automobiles Are Built, Buick Will Build Them," which is still one of the best-known slogans in existence. The sloganettes which followed, included "Better Buy Buick," "Buick's the Buy," "Best Bet's Buick," "Best Buy's Buick," and others. One reason the original Buick slogan has survived these forty-six years is the pleasing phonetics of the words themselves.

Sometimes the public coined slogans for the car manufacturer. And these slogans were usually the reverse of the manufacturers' favorable slogans. "Word-of-mouth" advertising is still the most powerful of all mediums. It can build a car's reputation—or tear it down—faster than all the newspaper, magazine, radio and television advertising combined. Detrimental word-of-mouth advertising is often unintentional. It starts as good-natured ribbing and ends in disaster—for the car. In the old days, motorists frequently formed synonyms for car names and for their manufacturers' slogans. And very few of them were complimentary.

The Scripps Booth for instance was frequently called the Slips Loose because of its noisy body. The old EMF was sometimes referred to as Every Morning Fix,

but was more frequently called the car with Every Mechanical Fault.

The Mitchell with rakish back-sweep body lines was tagged by a wag, "The car that's going 40 miles an hour standing still"; and the Twombley, a narrow two-passenger, tandem car, was "The Mother-in-Law Car."

The Essex was often called Excess, the Saxon because of its very light body was supposed to have a can opener in its tool kit as standard equipment, and the Star was believed to have lost its twinkle just as each one left the factory. Then there was a Chevrolet that was actually named "The Baby Grand."

Sometimes, attempts to create good public relations backfire, too. A case in point occurred during one political convention. Ford had just introduced a new car. With a grand gesture, Ford dealers, at the factory's suggestion, made available for delegates to the convention a fleet of new cars. More than a hundred of them. Then they hired college students at the dealers' expense to drive the cars. The dealers supplied licenses, gasoline and all maintenance expense. Some dealers other than Ford dealers wished they had thought of it first. Later, they were glad they hadn't.

Seems that the taxi drivers in that city resented this encroachment on their business. They grumbled. And criticized. Loudly. They complained to their union officers and to their employers. They even threatened to picket all Ford establishments. Before it was over Ford dealers wondered whether the delegates' good will

would outweigh the ill will of the taxi drivers and their sympathizers.

In Newburgh, New York, the newspaper advertisement of a Packard dealer commanded unusual attention when a single line of type inadvertently appeared at the bottom of the ad. It read "When Better Automobiles Are Built, Buick Will Build Them." The dealer reported greater response to that advertisement than he had experienced from any of more than a dozen similar ads which had appeared earlier. Most people, of course, just telephoned or stopped in to laughingly call his attention to the error. But a number of them also became interested in the purchase of a Packard.

An equally amusing little incident occurred one evening in a Lincoln-Mercury showroom. The salesman was extolling the merits of the new Mercury to a prospective purchaser who was sitting behind the wheel of the car. Playing with the various instrument panel controls, the prospective purchaser switched on the radio in the car. And just as the salesman finished saying that no car on the market could equal the Mercury for value, the voice of an announcer on the radio stated emphatically that the new Chrysler was the finest motorcar value in America.

Billboards hide the scenery, mess up the appearance of the highways and generally disturb those people who are esthetically minded. But billboards display some of the most pithy messages to be found. For instance, the sign at a highway intersection in New Jersey reads "Cross Road—Better Humor It."

In Buffalo a tombstone manufacturer has erected a sign shaped like a tombstone with this message: "Drive Carefully—We Can Wait." Conversely a junk dealer has erected a sign at a railroad crossing in Denver which says, "Go Ahead—Take a Chance. We'll Buy the Wreck." In Texas, one town has traffic warning signs saying, "20 Miles per Hour or $19.90." And a billboard in the midwest waxes poetic with,

"Hardly a Soul Is Now Alive
Who Passed on a Hill at 75"

Aware of the American propensity for spectacular advertising, an Indonesian sent a letter to one of the automobile manufacturers a while ago. The letter read:

> Do you like to place an advertisement on top of the most famous mountain of Indonesia: the Keli Mutu with its three lakes, red, blue and green? Every traveler who visits the Island Flores wants to go to the top of it. I hire the place from the King of Mio. It will be the first auto advertisement on its top.

24

It's Fun to Write a Column

MUCH OF the mail received during the first five years that my newspaper column was published was about the column itself—rather than about things automotive. Naturally then, a number of the columns dealt strictly with the column as a medium.

When I started it on March 18, 1948, I had mild hopes for it. But I wasn't sure that the necessary energy or material would last too long. To say nothing of my fears about its reception by the public. The reception turned out to be the least of my worries. The interest evidenced by thousands of letters, telegrams, telephone calls and personal conversations supplied the incentive to continue writing. Energy isn't difficult

when sparked by enthusiasm. And the material for the column seemed to flow endlessly in this amazing industry.

But, no matter how fine the effort, how informative the subject or how amusing the story, someone frequently found fault. If I expound my liking for rhubarb pie, for instance, someone is apt to write, telephone or visit me and tell me off. He's apt to say, "Fine stuff! I'm a good customer of yours. I have an apple orchard, and *you* advertise rhubarb pie!"

When we published a column about the American Automobile Association and its Philadelphia Automobile Club, one of our customers promptly demanded to know whether he was a stepchild or something. Said *he* belonged to the Keystone Automobile Club and why hadn't I written about them?

When I stated in one column that it wasn't compulsory to change oil every thousand miles, I promptly received letters from three oil companies outlining the awful things that take place inside an engine if motorists don't change their oil more frequently.

And *unsigned* letters! They became the bane of my existence. I'm never sure about their sincerity. On one occasion in answer to a reader's inquiry, I published the following paragraph in one of the columns:

> My guess about when a new car priced near $1000 will be available (and it is purely a guess) is not for five to ten years. Principal ingredient in a motorcar is labor, and labor isn't going to accept less money without a fight.

Promptly, I received an unsigned letter asking me who I thought bought the mass market automobiles if it wasn't the working man, and blaspheming me for criticizing him! What right had I to imply that labor wasn't worth its wage, etc., etc. Well, I hadn't implied anything of the sort, but there was the criticism, nevertheless.

Among the noticeably beneficial things that result from the column are the letters and telephone calls it prompts. Through them we learn of things that otherwise we might never know. Important things. Important to us and to our customers.

Many people are curiously reticent when they buy automobiles. A number of them beef about real or imaginary complaints. But the great majority say little or nothing to the dealer about the petty irritations and annoying conditions which arise from time to time. It is most difficult to *prevent* these aggravations in a mobile product or in the organization which sells and services that product. It *is* possible to correct them when they occur. But the dealer must *know* about them first.

That's where the column does a fine job. People write and telephone to tell me about their troubles. (Frequently, they tell me about troubles in a car that wasn't even purchased from us.) And once we are informed of whatever irks the customer, we do something about it. And we like that, because our first function is to keep our customers happy with their automobiles.

An erroneous impression exists as to the overall function of an automobile dealer. Some dealers themselves

are guilty of a misinterpretation of their place in the general scheme of things. When you buy a new car, a variable portion of the price you pay goes to the dealer. In return for that portion of the price which he retains, the dealer has certain well-defined obligations to you. It is true that he pays salesmen's commissions, rent, light, heat and all sorts of things out of his gross profit. But that's just part of his routine operation. The dealer's real responsibility—and the only one that justifies his existence—is to make his customers happy with the automobile of their selection—and keep them that way. The column has been a great aid in doing just that.

There were some beautiful bloomers too in the column's formative years. As stated before, an automobile dealer cannot openly come out in favor of anything. If he does, someone is bound to take exception. In one column I mentioned inexpensive magnifying spectacles as an adjunct to the contents of an automobile glove box. For reading maps. And I mentioned that you could buy them in dime or variety stories. That did it!

I promptly began to hear from oculists, opticians, ophthalmologists and optometrists. They wanted to know—and rightly so—what license I had to recommend "ready-made reading glasses" without the prescription of an eye specialist. Some of the criticism was from our customers who suggested that maybe they shouldn't bring their car back to an automobile dealer for service. And one of them wrote to me cancelling the order which he had previously placed for a new car.

See what I mean? But aside from the penalty *we*

might pay, I was more unhappy about an implied, though unintentional, slight to the members of a noble profession. To each of them I extended abject apologies and humble regrets. My intentions were good—my judgment was undeniably poor; and my education as a columnist received one more knock of knowledge.

Another and more flattering complaint had a different twist. A professional columnist in my town (who gets paid for what he writes) was complaining about my column (which we pay to have published). To quote him directly, he said, "If this fellow, Bury, keeps on turning out that stuff and paying for it, too, I expect the time is not too far distant when the newspaper for which I write will tell me to go get myself a sponsor." The idea may or may not have merit. Certainly, radio and television do it. But the point is that I get blamed for all sorts of things.

On one occasion I approached a degree of profundity and published the following, just before Independence Day:

> Among the self-imposed rules for writing this column, two are paramount. One is that it must be automotive in character, the other that it must not preach a sermon. If, by a liberal stretch of my yielding imagination I seem to be violating either of these rules in this column, please forgive me.
>
> Next Monday, we Americans celebrate our independence. And on the anniversary of July 4th, 1776, I feel that we might benefit by mixing a bit of clear thinking with our holiday plans. Borrowed

thinking, as it happens. Borrowed from Abraham Lincoln in fact. Borrowed because no amount of original thinking can quite equal it.

Many years ago, Lincoln in his undisputed wisdom uttered these words which might well be the solution to many of our ills:

> "You cannot bring about prosperity by discouraging thrift. You cannot strengthen the weak by weakening the strong. You cannot help the wage earner by pulling down the wage payer. You cannot help the brotherhood of man by encouraging class hatred. You cannot help the poor by destroying the rich. You cannot establish sound security on borrowed money. You cannot keep out of trouble by spending more than you earn. You cannot build character and courage by taking away man's initiative and independence. You cannot help men permanently by doing for them what they could and should do for themselves."

The mail in response to that one was unusually heavy. Many readers lauded it. Others wanted to know when Lincoln said or wrote the words quoted. And a considerable number simply wrote to tell me I was wrong —that the words were not authored by Lincoln, although he had sometimes been credited with them. See? I was wrong again. But this time the criticism was tolerant. The readers were now trying to be helpful.

Sometimes objections were made in person. In response to one column about the Motor Vehicle Code

a State Trooper came to see me. He wondered if maybe I wasn't interpreting the Code too liberally. And when an early column called a spade a spade about the Tucker fiasco, I was called on the carpet by an executive of the newspaper in which the column appears.

But whether I'm right or wrong, I receive objections just the same. If, for instance, the column were to recommend carrying 24 pounds pressure in tires I might expect at least two letters. One would tell me I was wrong, that 20 pounds would result in greater riding comfort, fewer body rattles and increased road traction. The other would tell me I was wrong, that 28 pounds would improve gasoline mileage, increase speed and reduce tire squealing on a curve. Both are right, of course, but the fact remains that 24 pounds is the happy medium. But in those readers' minds I was wrong.

There were times when I had to sidestep certain reader requests. Two different sixteen-year-olds wanted me to write an opinion on their desire to borrow their parents' car "for dates, etc." I referred that one gently but firmly back to the parents.

Requests from readers have ranged all the way from pleas to "fix" traffic violation tickets to inquiries as to the best brand of petrol to use when motoring through Europe. Most frequent question is still whether I write the columns myself. I do. In longhand. Sometimes laboriously—and these usually read that way. Sometimes effortlessly—and these are the better columns. Mostly, it's fun. Especially if I'm not rushing to meet a newspaper deadline.

25

Rolling Wheels Around the World

OUR cousins across the seas, along with others whom we do not exactly rate as cousins, sometimes get the jump on us in automotive matters. It is a known fact that European countries were far ahead of the United States in developing the automobile during the early part of this century. Our supremacy today is the result of mass production, engineering ingenuity and free enterprise. From the motorists' viewpoint, automotive problems abroad are not unlike our problems at home. But sometimes the foreign approach to those problems takes a curious turn.

In Yugoslavia, for instance, police have their own way of punishing speeders. Instead of giving the motorist a ticket they let the air out of his tires. In Stockholm

you can be arrested for sounding your horn. In Paris, police have been known to rap offending motorists on the knuckles with those little batons they carry. In Great Britain, many city governments levy an extra water tax on citizens who wash their own cars.

Britain has a health and welfare program which in some sections includes motorized baths. Many English towns have numerous homes without bathtubs. So the Health Department sends around a car to help the old folks have a bath. The car is equipped with a twenty-gallon tank of hot water, yards of rubber tubing, a pump and a zinc bathtub on wheels. The tub is wheeled into the house and the water is pumped into it from the car. Makes it convenient.

In India, cars of a yellow-green color are taboo. It's a sacred color worn only on the turbans of those who have made the journey to Mecca. In Cairo, camels must carry license plates.

In Puerto Rico only 48,000 automobiles are registered. Yet, in an average year, one out of every four is involved in an accident. In one normal year, 7000 people were injured and 227 people were killed in these accidents. Highway traffic safety precautions are far behind the United States in most foreign countries.

Buenos Aires has more than three million inhabitants but doesn't have a single traffic light. The result is traffic chaos. The first motorist who races across a busy intersection wins the right of way—if he doesn't demolish his car. People with new cars don't take them into town until the newness wears off. It isn't that the City Fathers of Buenos Aires haven't tried. In the past,

traffic lights were installed but motorists ignored them. So they were removed. And a recently adopted traffic code is already forgotten by most of the motorists in this Argentine capital.

In Russia all automobiles are manufactured by the Government—not by private enterprise. Although the Soviet Socialist Republics extend 6000 miles from sea to sea and have one hundred and ninety-six million population, the entire country doesn't have as many automobiles as there are in the city of St. Louis. Moreover, Russia doesn't have as many surfaced roads as the State of Michigan.

An American automobile factory operating under our free-enterprise system produces an automobile a minute. The largest Russian automobile manufacturer is the Zis Works in Moscow. It produces one car *a day*.

Until 1949, ordinary Russian citizens couldn't buy a Soviet automobile. Prior to that time the Russian product was available only to such individuals as were favored by the State. After 1949, citizens were permitted to buy the Moskovitch, a car slightly larger than our Crosley. It is priced at around 12,000 rubles. And anyone can buy it now. Anyone, that is, with 12,000 rubles, which is about $2400 in American folding money. And rubles are far more scarce in Russia than dollars in America.

Most foreign cars cost from three to five times as much per pound as our American cars. And "by the pound" is a good way to measure the value of *any* automobile. Manufacturers won't add any weight that can

be avoided. Increased weight increases cost—both initial and operating.

Operating economy is more of a factor in foreign countries than here at home. Gasoline costs anywhere from $1.10 to $1.42 per gallon in countries like Italy or Spain, and it isn't very good quality. Lubricating oils are comparably high, as are tires.

Of all the foreign countries, France is the most interesting from an automotive viewpoint. There is a French traffic regulation which applies to parking on two- and three-lane streets and roads. The gist of it is that on the odd-numbered days of the month you may park only on the odd-numbered side of the street, while on the even-numbered days of the month you must park on the even-numbered side of the street. Therefore, the areas on these streets where parking is permitted, change every day!

When the annual Auto Show is held in Paris, the used-car dealers don't sit back and let the new-car dealers steal the spotlight. Not for a moment. The used-car dealers promptly put on their own show with as many as 700 different used cars on display.

Also in Paris, motorists are forbidden to sound their horns from 9:00 P.M. until dawn. All signalling must be done by flashing lights instead.

Paris is a dream city though—until you tangle with taxi drivers in Paris traffic—and then it becomes a nightmare. Normally your life isn't worth a devaluated franc if you try to cross the street at any busy intersection. The Paris taxi driver simply sits on his horn and goes through. And if some of those World War I

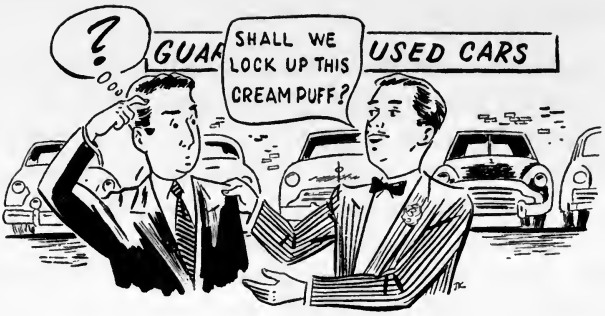
vintage taxicabs have brakes, I've never seen them in use. Never, that is, until one October fifth.

The whole thing started earlier that year, when the Parisian police decided to impose some mild restrictions on Parisian taxi drivers. And the taxi drivers resented the restrictions. So they decided to register a protest.

By mutual agreement and without organized leadership they decided that on October fifth they would not only heed the police restrictions, but they would also meticulously observe every traffic law, rule, requirement and courtesy. So they stopped at all intersections, looked carefully to the right and left before proceeding, permitted pedestrians to cross at leisure, gave all other vehicles the right of way, observed a 1912 speed limit, refused to park double even to load or unload passengers—and generally reduced the normally frantic Paris traffic to a confused and confusing mass of almost motionless vehicles occupied by frantically desperate passengers. Many passengers, in fact, left their vehicles and proceeded much faster on foot.

The police were powerless, of course, because the taxi drivers weren't breaking any laws—they were *observing* them—a hitherto unheard-of condition. And some of those laws are hopelessly antiquated. The taxi drivers, on the other hand, seemed to be enjoying themselves immensely.

I might have enjoyed it too, but for one thing. On my way from Venice to the sailing of my steamer at LeHavre, I had only one day in which to do about a dozen errands in Paris. And that one day happened to be the day the taxi drivers decided to observe the laws of the city.



26

Slanguage

THE jargon of the automobile business is strange and wondrous. The average *up* in a used-car showroom is looking for a *cream-puff* or an *original.* He can spot a *dog,* a *crate,* a *cracker* or a *junker* at a hundred yards.

After the salesman has *locked up* the *deal* it is frequently necessary for the dealer to *carry the paper,* otherwise the *deal* might *unwind.*

Frequently the *up* is just a *looker* or a *hoptoad.* But if he's an *earnest* he usually wants a car that's been *kept under wraps* (not to be confused with a car that has been *wrapped up*) or *under the bed* by its original owner. *Smokers* or *sagamores* find very few takers. If the car is *stinking new* (still has the factory smell of a new car) it *finds a new home* quick. With *heat and music* it is worth more money.

Fly-by-night dealers who get into the business only

in a seller's market are called *jockeys.* And *jockeys* always protest that they never—but never—sell *dogs* that have been *kicked around.*

Everybody in the business drools over a *sharp* car or a *straight* car. And if the *doughnuts* and *bladders* don't show too much wear they are respectfully called tires. But not too often. Mostly, they're *gums, hoops* or *shoes.* Very thin tires are *skins.*

Jalopies which are only one jump better than *junkers* are frequently *doped up* into *hot rods* by youngsters who like to *pour on the coke.* These youngsters like to hear the motor's roar coming out of the *smokestack.* Sometimes when they feed *benzine* into the *pots* too fast the *gallopers,* the *buckets* and the *gates* make so much *racket* inside the motor that you can't hear the exhaust anyway.

Many automobile salesmen have *bird dogs* who supply them with *suspects.* If the suspect *clicks,* the *bird dog* rates a varying fee. Some *bird dogs* are just *kibitzers* but others do well enough to become *regulars* or *juniors.*

Used-car buyers who don't want a *rough,* a *cripple,* or a *wrong number* might do well to do business only with a reputable dealer. A *bender* is a stolen car, but a *fender bender* is an inexperienced body repairman. A *cracker* is a car that has been in a collision, while a *crate* is a car no better than a box on wheels. And a *jalopy* is a car that is ready for the junk heap. An *original* is a used car on which no repairs or replacements have been made, while an *orphan* is a make of car that is no longer manufactured. *Pretty iron* refers to a used car of nice appearance but in poor mechanical condition.

A *hoptoad* is an individual who visits showrooms inspecting and trying cars without ever buying one. *Sagamore* refers to a car that lists to one side because of weak or broken springs. *Molasses* is a single coat of cheap, thick paint. *Garbage* is the term used to describe needless accessories, fox tails, baby shoes and other such items which bedeck some of the cars on the road.

Any list of automotive slanguage should include what the armored outfits called their vehicles. G. I.'s called a command car a *jeep,* called what you call a jeep, a *peep* —and bicycles were called *creeps!*

In London a few years ago I was surprised to learn that over there a *shooting brake* is a station wagon. And their name for a manual choke is *straight valve.* A convertible coupe is called a *runabout* or a *two seater.* And a sedan, whether two door or four door, is a *saloon.*

The British counterparts of our terms are not slang in the true sense of the word, however. For the most part their names are simply different than ours. Below are listed some of their most commonly used terms.

American	*British*
Automobile	Motorcar
Bumper guards	Over-riders
Chamois	Wash leather
Choke	Strangler
Convertible Top	Drophead
Cowl	Scuttle
Dashboard	Facia
Defroster	De-mister
Dimmer switch	Dip switch

Dump truck	Tipper
Fenders	Wings; mudguards
Act of filling battery or shock absorbers	Topping up
Full (maximum) speed	Flat out
Gasoline	Petrol
Gearshift	Gearchange
Generator	Dynamo
Glove compartment	Cubby locker
Headlight	Head lamp
High gear	Top
Hood	Bonnet
Horn	Tooter
House trailer	Caravan
Hub caps	Nave plates
L-head engine	Side-valve engine
Muffler	Silencer
Odometer	Distance recorder
Parts	Spares
Radiator ornament	Mascot
Remove carbon	Decoke
Rumble seat	Dickey seat
Sedan	Saloon
Shock absorbers	Dampers
Spark plugs	Sparking plugs
Tachometer	Rev counter
Tire	Tyre
Top	Hood or head
Touring car	Tourer
Transmission	Gearbox
Truck	Lorry

Trunk	Boot; luggage locker
Turning signals	Trafficators
Vent window	Ventilators
Window	Light
Windshield	Windscreen
Wrench	Spanner
Wrist pin	Gudgeon pin
Wrist pin bushing	Little end bush

The British don't have a tire blowout, they have a *burst.* They don't race the motor, they *rev-up* the engine. The sidewalk is the pavement and a paved road is a *build up.* A battery is an *accumulator.* A lug wrench is a *wheel brace.* A British motorist doesn't step on the gas. He just *hits up.* It goes on and on.

Strangely, I can't understand why the British don't understand what we mean when we describe a car as an *original* or a *creampuff* without trace of *sagamore* that's never been *beat on the back* to get somewhere in a hurry. Its owner was never a *line hopper* or a *traffic whipper* and he never *went to a fire.*

Both the British and the Americans have terms (varying widely) which they apply to erratic Sunday drivers—but these are unprintable.

27

Nuts, Bolts and Washers

THE automobile business is blamed for all sorts of things. One accusation has to do with the continuing fall in the sale of men's hats. Quoting the accuser, "It's impossible to wear a hat and at the same time get your head in and out of an automobile without leaving half of the hat impaled on the rigid section of the car roof which swoops down to form the upper frame of the car door." Maybe so. But automobile design is predicated upon the desires of the motorist. And by and large the motorist wants low, sleek lines. With or without a hat.

Some years ago, one automobile manufacturer produced a line of cars with plenty of headroom. It was perfectly grand to get into and out of those cars—with a hat on—but the public didn't like their appearance. And even though market conditions were

excellent, sales dropped while the streamlined models of competitors were selling like hot cakes.

There are two cases on record of special cars being built to allow extra headroom. Both were for foreign dignitaries. One had an unusually high body so that the occupant could wear a high silk hat while riding. The other car was more or less normal, excepting that a section of the top over the rear door was hinged so that it would fold back leaving the area above the door open. This car was for a tall man who didn't like to stoop when entering his car.

Among the curious inquiries from automotive enthusiasts is the perennial one that has to do with the number of individual parts in an automobile. I haven't any idea why they want this information or what they'll do with it after they get it.

If you were to dismantle a typical modern passenger car, unscrewing, unbolting and otherwise taking apart every component that could be disassembled from anything else, you'd end up with about 15,000 parts, large and small. Carrying that a little farther, if the car cost $2000, each part would be worth an average of about 13 cents—when assembled. Unfortunately, when you want to buy a fender, the average doesn't apply. Anyone who is thinking of assembling a car for himself had best proceed cautiously. If he were to buy each of those parts separately and then assemble them into an automobile, total cost, including his time, would be something like $7,000.

From still another angle, a single person, working

eight hours every day would require over seven years to build an automobile entirely by hand. A garage worker in Gibbstown, New Jersey, once built a complete automobile entirely from salvaged parts. It was a smart-looking, rear-engine job with many unique features. Other than the parts he salvaged, he spent only sixty dollars for new materials. But he estimated that at a mechanic's normal rate of pay the car cost him more than $8000.

A Caspar, Wyoming, businessman meanwhile covered the entire exterior of his car with 37,700 foreign postage stamps. The car itself hasn't been driven very far, even though it is more than ten years old. Its owner reported that 1,576 hours of actual effort were consumed in affixing the stamps. That's almost seven months at eight hours a day. I hope he used a sponge. His mouth must have tasted awful if he didn't. Anyway the body, roof, hood, radiator shell, trunk and fenders are completly covered with the stamps which represent every country in the world. For protection from weather and road wear, a single coat of clear lacquer was applied over the entire stamped area. When the owner of this postage-stamp car asked Lloyd's of London to insure it, they looked momentarily dismayed—and then declined the honor.

All sorts of weird things take place where automobiles are concerned. At irregular intervals some embryo motorist painstakingly saves enough money to buy an automobile and then brings his currency to the dealer just as he saved it. Typical case it that of the man who

walked into a showroom and plunked down 3,361 coins, all quarters, half dollars and dollars, as payment for a new car. The total sum was the result of four years of saving. The dealer consumed four hours more just counting it.

Long years ago two men drove up to our showroom and selected a used car. They didn't have any money between them to pay as a deposit, and one of the rules of our firm at that time was that we simply wouldn't hold a car without a deposit. The prospective purchaser pleaded and cajoled and argued, but to no avail. Rules are rules. Finally, in desperation, the man rolled up his pants leg, unstrapped a wooden leg, and said, "Here—this will prove I'm serious. I'll leave my leg with you until I bring a deposit tomorrow."

Then there was a man—obviously a panhandler—who came in to see our treasurer one time. Only instead of asking for the usual "buck" he calmly asked for thirty-five dollars. When our treasurer expostulated at the amount, this man pulled out his false teeth and laid them on the desk as proffered security.

On another occasion another purchaser left a dog with me in lieu of a $30 shortage necessary to complete settlement for his car. It was a rather nice Boston bull terrior that sat quietly in my office with only an occasional whimper as he waited for the return of his master. It was a long wait. In the seven years between then and the time the dog departed for all time, he and I became close friends. I was always secretly pleased about the fact that I never laid eyes on the customer again.

Motorists of a type that are well known to most automobile dealers are best described by this mythical story of three of them:

Jones owned a Plymouth, Smith owned a Ford and Brown owned a Chevrolet.

Jones had trouble with his Plymouth. The carburetor never seemed to function properly, and his front wheels were constantly out of line from bumping curbs. Jones was disgusted. He traded his car on a Ford and swore he'd never own another Plymouth.

Smith was constantly having trouble with the clutch on his Ford. And there was a water leak at the bottom of his left front door. These things irritated him no end. He built up a dislike for the Ford within his mind. Finally, he traded it on a Chevrolet and vowed he would never own another Ford.

Brown, meanwhile, was greatly disturbed by some real or imaginary faults in his Chevrolet. He wasn't satisfied with his gasoline mileage, he seemed to be constantly developing rattles in the front end and his brake action caused the car to pull to one side. The annoyance became an irritation, the irritation developed into an obsession and before long he decided to get rid of the Chevrolet. He traded it in on a Plymouth and told friends, "That's my last Chevrolet." The moral? There are several, but you'd better draw your own.

While the average feminine motorist knows less

about automobiles than her male counterpart, she seems to get along better with both the car and her service station. Somehow or other the lady driver always seems to triumph over situations from which the male driver would never emerge victorious. If a male driver were to collide with a fireplug he would quietly take his car to the shop and have it repaired. And that would be that. But when a lady actually ran into a fireplug in Hampstead, New York, she declared that the fireplug was located too close to the street. Furthermore, she insisted that her husband examine it. He did so, and found that part of the fireplug extended two inches over the curb line. Armed with that information, the lady proceeded to collect $25 damages from the town treasury.

A Washington lady protested a parking ticket on the grounds that she had parked her car on the opposite side of the street from that on which it was tagged. No mere male would get away with that! Perhaps to humor the lady, the police investigated and found that pranksters had carried her midget car across the street to a no-parking area.

A lady in California belongs in a different classification. She is a self-styled "color and music therapist" who expounded her conception of the need for a network of wine-colored highways in that state. Said England had tried orange-colored highways and thereby reduced its accident rate 50 per cent. The lady, however, preferred a rich wine color to orange because she thought it would be more soothing to drivers who are "subconsciously disturbed."

The whole thing is faintly reminiscent of an old radio gag of Colonel Stoopnagle. At the time the Colonel proposed painting the white lines in the middle of the highways with black paint so that they could be seen in the snow.

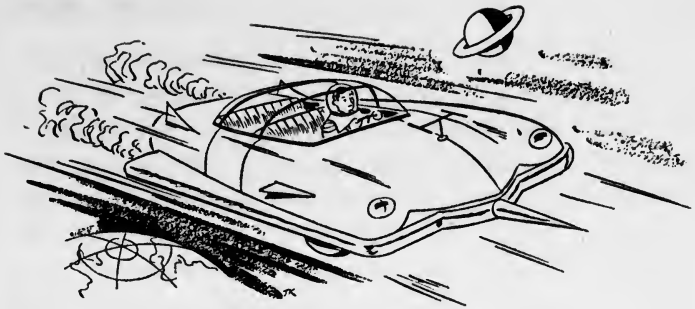
For no reason that I have ever been able to determine there's a society in Detroit called the "Auto Maniacs of America." It is described by its founders as a "kind of half-screwball organization" open to all automobile fanatics. Delegates to its conventions range from collectors of old license plates to hot-rod drivers and builders of cars from junk parts. One of them collects old fuel pumps, of all things.

Presumably, members who come from any of the towns bearing the same name as an automobile are entitled to special membership rates. There are plenty of these towns. Just in case you didn't have this bit of useless information, there's a town in West Virginia named *Auto*. And post office listings of towns with automotive names indicate that the industry is well represented. There are 23 Lincolns, scattered around the country. Plymouth is second with 19 and Hudson third with 17. Then there are eight towns named De Soto, and five Dodges, four Fords, four Pontiacs, three Nashes. There's a Chrysler, Alabama, a Packard and Chevrolet in Kentucky, a Cadillac, Michigan, and a Mercury, Texas. Buick and Kaiser both are towns in Missouri.

Oh well! As long as there are automobiles—and people to drive them—there will be curious and

amusing incidents. Like the Chinese driver in Hong Kong who was fined $150 for carrying 22 adults in a station wagon, the body of which measured five by six feet. Or the proprietor of a Texas hamburger drive-in who erected a sign which proclaimed "We Can Serve 5000 Cars"—and in much smaller letters, "50 at a Time." And the man who advertised in a Louisville, Kentucky, newspaper that he would "exchange seven acres of coal land for a good used car."

Curious or amusing, intelligent or crackpot, we must nevertheless agree with the one-time American Legion Commander, who admitted that many a jest is spoken in earnest when he said, "Every American is entitled to life, liberty and an automobile in which to pursue happiness."



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Where Do We Go From Here?

THE only thing that hasn't changed about a conveyance vehicle since the days of ancient Rome is the wheel tread—the space between the two parallel wheels. The early chariots had a wheel tread of 4 feet 8½ inches. Today's railroad cars and today's automobiles have just about the same wheel spacing. Progress in all other transportation development has been increasingly rapid. Automobiles of the future will probably be more and more automatic—meaning that there will be less and less for the driver to do. Twenty-five years ago, motorists were proud of their skill. They could shift gears, start a motor without flooding it, regulate the ignition spark from the steering wheel and dozens of other things. Today, that kind of skill isn't needed. Good judgment, yes. Safe driving, yes. But skill, no.

Automatic transmissions have eliminated gear shifting. Most cars have automatic chokes for starting. And, of course, automatic spark control has been standard equipment for many years. Many of the new cars have automatic windows—controlled by push buttons. And self-tuning radio sets that permit you to select any station you want without taking your eyes from the road. And convertible coupe tops that raise or lower on the flick of a switch. Power steering and power brakes, while not automatic, reduce the amount of effort needed from the driver.

A recent experimental car has 15 separate electric motors to do the work that motorists have been accustomed to doing manually. One of them operates any one of four built-in jacks, located in front of each wheel. To jack up the car, just press a button. Another of the motors swings your head lamps out from the radiator grille for night driving. When approaching another car at night the head lamps automatically drop to low beam. If rain starts falling while the car is parked with the top down, the top will automatically raise into place and the windows will close themselves.

In our progress to this point the industry has had to weather protests and criticism. When windshield wipers were introduced, some people expressed alarm that the constant swishing back and forth would make people nervous. When Kettering developed the self starter, so-called experts protested that it would attract lightning—might even electrocute a motorist.

It was one of these fearsome people who instigated

the first all-steel body. In 1902 a customer who was afraid of fire asked H. Jay Hayes to build a fireproof body for his Eastman Electric. Hayes did so, and the first steel body was born. Hayes also first adapted bicycle lamps to an automobile (in 1898) and created the first fender —which was then called a mudguard.

Many things that have contributed to the development of the automobile started as gadgets, became accessories, and graduated as standard car equipment. Back-up lights are a case in point, as are grille guards, gasoline filters, heating defrosters and many other things. The cars of the future may be superior products because of other products and processes which are presently critized or scorned.

In Michigan, an inventor has patented a transparent top for sedans. It is made of two or more sheets of plastic which form a chamber that will hold liquid or air. The top will reputedly absorb and radiate heat from the sun in cold weather and deflect it in warm weather. And a Californian has patented what he claims is a nonglare windshield. The device is a special illuminating tube installed in the windshield casing. By infusing the windshield glass with an even flow of light it is supposed to counteract headlight glare and even sunlight glare. There is also a new safety glass, tinted a bluish-green, that shuts out more than 15 per cent of heat-giving infra-red rays and will filter out a considerable portion of the ultraviolet rays that fade upholstery. But its prime purpose is to prevent sunshine glare while motoring.

Other new things recently announced include in-

sect screens for car doors; "Flour-Ray" glass coating for head lamps, to reduce glare; and fog lenses to fit over head lamps in thick weather. Meanwhile, scientists assure us that a new polarizer containing carbon and hydrogen will "comb out" the glare on future head lamps. No matter what the method, glareless head lamps are on the immediate horizon.

Glass fibre and Vinylite resin have been combined to create a new convertible coupé top fabric that will be stronger and more washable. In early tests, mildew, oil and grease marks were cleaned from it completely and without effort.

A comparatively simple device has been developed to give a motorist traction on slippery roads. It consists of little grit-filled hoppers located in the luggage compartment. Tubes attached to the hoppers go through the floor to a point over the front of the rear wheels. A switch on the steering column releases the abrasive when needed. Braking distance has been reduced as much as 50 per cent by using the grit.

A Connecticut firm has an automatic register for use in an automobile. Installed under the instrument panel, it registers a permanent record of mileage, speed, stops, and other similar information. It is intended for use on fleets of cars and trucks, school buses and by professional men to give them documentary evidence for billing and tax purposes. It can also be set so that a light flashes to warn the driver of excessive speed. A tape locked inside the device reveals the speeds at which the car has been driven.

There's also a new gadget for those who want to

know how often they violate speed laws. It's a recorder— attached to the speedometer—on which the motorist sets the existing speed limit. Every time this speed is exceeded a counter moves up one notch.

Someone has invented a thing called "Buz-Boy" for absent-minded motorists. It's a small attachment mounted on the dash that starts buzzing when the ignition is turned off. To stop the buzzing the key must be removed. Sounds like an insurance company thought up that one. And there's a railroad safety guard. Described as a "magnetic eye," it can be installed on any car, truck or bus. If a train is near when you approach a railroad crossing, it will register the approach of the train, bring the vehicle to a halt and turn off the motor. Honest. And you can't start the motor again until the train passes.

Other new things on the motorist's immediate horizon are these. An electric alarm that sounds a warning when the hydraulic fluid in the brake system is low. When the brake fluid drops below the safety level, an attached battery lights an alarm lamp and sounds a buzzer. And a new electric throttle that permits a motorist to maintain a constant speed without keeping his foot on the accelerator. It consists of a solenoid and a toe switch connected with the brake. The toe switch holds the accelerator in position and releases it. Depressing the brake pedal will also release the accelerator position, automatically.

Now that flat tires are the exception rather than the rule, someone has invented a new fastening device that simplifies the job of changing a tire. The wheel

fits onto five threadless bolts which protrude from the brake drum. These bolts are then grasped securely by five plier-like levers that are closed by pushing the hub cap into place over them. When the car is in motion, the turning of the wheels is said to increase the gripping action, thus assuring complete safety. The report doesn't say what happens when you lose a hub cap.

In Britain, a tire concern has developed a non-skid tire with steel coil springs in place of the usual tread. The springs are imbedded in the tire during the vulcanizing process and are supposed to disperse the film of water on wet roads.

A Roumanian scientist claims to have perfected a solidified fuel for automobiles. It will burn without odor or smoke, will cost one-third less than gasoline and eliminates the need for a carburetor. Reports indicate that a motorist using this fuel simply carries a box of "Solidified Petrol" capsules which are converted into liquid fuel simply and easily as needed.

Not yet on the horizon, but within the realm of future posibility, is the prediction that we will some day have electronically operated passenger cars. The motorist need only pilot these cars to the highway and then let his electronic controls take over the steering, speed and braking. In effect, he will set his controls and then "ride the beam" to his destination. By that time, cars should also be powered by atomic energy instead of that old-fashioned gasoline. Only you and I probably won't be around to witness it. Which might be just as well.

The electric car may stage a comeback, according

to an M. I. T. professor. If it does, it will be a far different vehicle than its predecessors of forty years ago. The professor reports on a chemical crystal the size of an overnight case which can be used to store up to 100,000 volts of electricity—ample to power an automobile.

A gas turbine engine has been invented for automobiles. If proven practical it will be a long step toward a car without gears, clutch or radiator. It may very well be a major link between internal combustion and practical propulsion by atomic power. The engine weighs 250 pounds and develops 35 horsepower. While its natural fuel is diesel oil, the scientists who developed it, report that it will run on anything that burns readily, from kerosene to candles. They expect it to be ready for quantity production in two or three years. And a Buffalo scientist predicts that jet-propulsion automobiles will ultimately replace the reciprocating engine type now in use.

Construction and limited sale of the first flying car was approved recently. It will have wings that can be folded together and taken along on the road. It is named the Aerocar and reputedly can be changed from an airplane to an automobile in two minutes. Upon landing, the pilot (who then presumably becomes a motorist) folds the wings, unhooks the propellor shaft, backs the car around and hooks onto the other end of the assembly. Then it's an automobile, ready for the road.

Future roads will be different, too. A method has been devised for surfacing sections of road so that they "speak" to the driver passing over them. They are

constructed with a wavy upper surface conforming to the shape of a predetermined sound wave. Cars passing over these sections of the road pick up an audible sound. Placed before a dangerous intersection or on the approach to a railway crossing, they would warn motorists to proceed with caution. So far, the only words contemplated are "danger" and "crossing," both of which come through pretty clear. And will serve a good purpose. But I shudder to think of what will happen to motoring if an advertising man ever gets control of this device.

Motordom could do with some new ideas in the matter of license plates. A national condition exists which is a constant plague to automobile manufacturers. This country has 57 different sizes of license plates! They range from 4¾ to 6½ inches high and 6¾ to 14 inches long. If the states and possessions were to get together and adopt a uniform shape and size for license plates, manufacturers could improve automobile body designs at the point where this "universal automobile accessory" is attached.

As in any other industry involving a product of such popular appeal, all sorts of suggestions are made by John Q. Motorist. They range all the way from transparent gasoline tanks to built-in kitchenettes; from keeping children in their seats to reducing wind resistance. One suggestion comes from a motorist who is both safety conscious and law abiding. He would like to see the development of a speedometer with a built-in bell. The bell would ring lightly whenever the speed of the car reached the speed limit of the state in which

he was driving. It would have an adjusting device like that on an alarm clock so that it could be set to ring at any speed.

A chap in Ohio actually invented and built a gadget to keep sleepy drivers awake. When the sleepy driver's head dropped forward, his chin touched a lever attached to his collar which sounded an alarm and awakened him. Someone else suggested a new instrument panel device. It would consist of a gloved fist hidden behind a trap door in front of the driver's seat. When the speedometer indicated an excessive rate of speed, the fist would emerge and punch the driver on the jaw. And a fellow in Kansas City developed a gadget that squirts water in the eye of a filling station attendant when he smears the windshield with a greasy rag.

More serious researchers are grappling with the problem of noise control. Automobile horns are to be less raucous, yet just as loud. High, strident notes will be eliminated by using only the frequencies below 1200 cycles per second. Trouble is that the worst thing about automobile horns cannot be solved in a laboratory. That thing is the way people use them.

Other noises within the car and from highway traffic are coming in for serious attention by factories, universities and municipal authorities. Before long we may have noise limits as well as speed limits. Acoustics experts point out that because traffic is usually a city's worst noise problem, noise standards may have to be set for each type of vehicle that travels on city streets.

Development moves forward. Everything from gadgets to flying automobiles continue to be invented—and

patented. We might some day see an automobile that runs, swims and flies besides generating household heat and acting as baby sitter between trips.

Some 800,000 automotive patents have been issued during the fifty-odd years that comprise the history of the automobile. Which in its cumulative effect should give us a perfect automobile. Perfect or not, new developments come on apace. Detroit engineers are currently experimenting with sliding car doors. If found practical, a lot of parking damage would be eliminated to say nothing of all the other advantages.

About 85 per cent of the 7000-odd automotive patents currently being granted each year, go to individual inventors. The rest are to automotive corporations, whose researchers work year in and year out to develop their 15 per cent. Most of the 800,000 patents granted are free for anyone to use. Patents expire after seventeen years. But my bet is that future automotive inventions will continue to exceed patent expirations.

Will the motorist of tomorrow buy a new automobile or just buy miles of transportation? The trend seems to be toward the latter. Thousands of automobiles now traveling on the highway aren't owned by their operators. They're rented. Automobile renting has become big business.

Rental rates are sometimes lower than the individual cost of owning and operating a car. And the operator of a rented car receives a new model each year. This rental of automobiles has mushroomed during the last ten years and now has a permanent place on the American business scene.

There are fleet rental companies who rent fleets of twenty or more (cars *and* trucks) to large industrial concerns on an annual basis. Many business concerns operate as many as 500 vehicles without actually owning any of them. The rental company supplies the car, equipment, license tags, maintenance, repairs, lubrication, insurance, and in fact, everything except gasoline, for a flat annual sum payable monthly. Large fleet users find this method of securing their equipment less bothersome and less expensive than owning their own fleet.

Many taxicab companies no longer own their cars. They rent them because they find it more economical. And individual motorists may well turn to renting their cars for the same reason.

What will the car of tomorrow be like? And the car of day after tomorrow? It probably will be a revelation by present-day standards. But it will *seem* less of a revelation because we'll get it a little at a time—not in one big change.

The much touted high-compression engines in their highest state of development will effect a saving of 40 per cent to 50 per cent in gasoline consumption. However, it will be ten years before this engine is developed to maximum efficiency. Meanwhile it's possible that we may see cars without carburetor, radiator cap or valves. Fuel injection would eliminate carburetors; a sealed cooling system is in the experimental stage and two-cycle engines don't need valves.

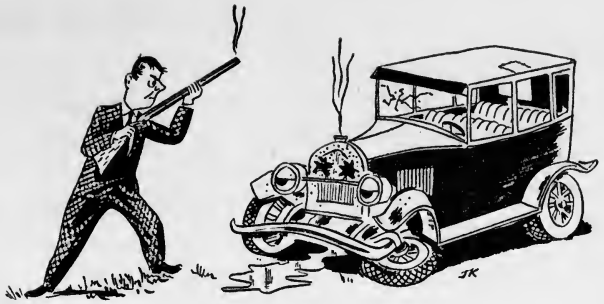
Self-defrosting glass is figuratively just around the corner. There is a new type of laminated glass called Electropane that can carry electric current in car win-

dow installations by means of a transparent oxide film only twenty millionths of an inch thick. The film heats quickly by electrical resistance and is as durable as the glass itself. The factories are experimenting intensively with superchargers to secure greater performance from low octane gasoline.

Transmissions will be automatic, of course. Gear-shifting will become a thing of the past . . . Cars will be much lighter through the use of aluminum and other light metals. More than 200 parts used in the assembly of standard cars have recently been changed over to light metals. Telephones in automobiles will be common. Refrigerated air-conditioning will be equally common, but expensive . . . Swivel seats—as in Pullman cars—won't be uncommon. Many designers are already striving for a living-room effect. And there'll probably be less chrome, less dazzle, more emphasis on safety and better motoring and luxurious dignity.

Vision will be much greater through increased glass areas and the use of curved glass. Door posts will be reduced in size or eliminated. Blind spots will disappear. New "one-way" glass will reduce glare. Special roof glass will transform sunlight into health-giving rays. Tear-drop exterior contours will become more pronounced. One set of tires will last the lifetime of the car and be puncture-proof.

Utopia? No, we'll still have accidents, time payments, trade-in arguments, unethical repair shops, crowded highways, traffic-violation tickets and back-seat drivers. But then, we wouldn't really be happy if we didn't have something to grouse about.



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Tales — Some Tall, Some True

MOTORISTS have all sorts of experiences, real and imaginary. Many name their cars and treat them almost as human members of the family. One of these cars, an old Oldsmobile named Nellie, reportedly waves its windshield wipers as it leaves the house each morning, in a farewell to the family's ten-month-old son, who waves back from a window of the house. Another family has named each of its successive cars with a feminine surname starting with the letter "A"—Anna, Annabelle, Anastasia, etc. Like ships and boats, they seldom have male names.

Sometimes the master of the household finds it necessary to chastise the motorized member of the family and even on occasion to destroy it. In Kingston, North Carolina, one of the residents of that town was cranking a car of ancient vintage. The motor started, the gears slipped into place, and the car ran over him. He re-

trieved the car and cranked it again. Although he was more nimble this time, the same thing happened. In disgust, he threw the crank at the car. It hit a tire, bounced back and struck his ankle.

Another motorist in Farndale, Maryland, was exasperated with his car. First the fan belt broke, then the generator stopped functioning and finally the lights went out. Then the brakes failed. As he tried to correct the various failures, his "slow-burn" developed into something pretty hot. He decided to put a match to the car and burn it, instead. Just as the fire was making good progress, a couple of officers came along and arrested him on a charge of arson.

In Kansas City, a motorist, whose going hadn't been too smooth that day, was stopped by an officer because of a dirty rear window that obscured his view. He evaded a traffic-violation ticket by breaking the offending window with a wrench. Surprised, the officer didn't realize until too late that there were also laws about littering the street with broken glass.

Then there was the motorist who was arrested because his license plate was the wrong color. He explained, naively, that he had repainted it to match the color of his car.

A motorist in California became irritated when, after repeated tries, his car wouldn't start. He had been having trouble with it for a month or more. Finally, in complete exasperation he seized his shotgun and blasted the helpless vehicle full of holes. Didn't help the car any, but the motorist said it gave him some satisfaction.

In 1916 an embryo motorist in the Midwest purchased

a new Westcott touring car. Returning from his first—and somewhat uncertain—drive, he piloted the car into his garage and right through the back wall. Disgusted, he boarded up the garage and never used the car again. Thirty-four years later, his estate sold the car to a North Dakota dealer. That individual then had another coldition to combat. If the car could be licensed, it was worth more than its original new-car price. But title certificates necessary for licensing were unknown in 1916. And the authorities who worked strictly by the book, were reluctant to issue a new car title for a thirty-four-year-old car.

Meanwhile a fellow in Tacoma had purchased a new truck in 1919 and had driven it for more than thirty years before he put it up for sale. Said it was a fine truck and was good for thirty years more. Then why did he wish to sell it? Well the fact was that he had reached the age of eighty-six and the State of Washington didn't think they should renew his operator's license.

Although only nineteen American automobiles are built today, more than two hundred makes are still in regular service. These include prized antiques like that 1916 Westcott, which frequently command fabulous prices. In fact, prices for very old cars became so high that sales and purchases of them were paralyzed when the Office of Price Stabilization placed price ceilings on all cars during World War II. After many letters of protest from all over the country, OPS finally relented in 1951 and thereby established, for the first time, an authoritative definition of just what comprises an antique car. Their directive stated that henceforth any

car twenty-five years old or older would be considered an antique, and as such would not be subject to price regulations.

Old cars become old for curious reasons. Most cars are worn out by a succession of owners and reach the junk yard in about twelve years—which is not considered "old" in the antique sense of the word. Those that exceed twelve years of age usually do so as the result of some unusual circumstance.

Years ago a couple of Texas motorists decided to go fishing somewhere on the vast King Ranch near Corpus Christi. Arriving there, they parked their eight-year-old coupé near a clump of live oak brush and proceeded on foot. Returning late that day they were unable to locate the place where they had parked it. After a futile search, they returned home. Later the owner of the car reported it lost and collected an insurance settlement for his claim.

Subsequent cattle roundups, twice each year by cowhands in the area, failed to disclose any trace of the car. Twelve years later, a bulldozer nosed into a ten-foot clump of oak and brush, revealing the car somewhat the worse for weather but with its chrome still gleaming.

In the Carolinas, a farmer plowing his fields struck something metallic. Investigation revealed a complete automobile carefully sealed at all body edges and as carefully buried in a deep pit. Further investigation disclosed that it had been buried by an irate motorist who did so to defeat the efforts of a finance company to locate it.

It isn't surprising that finance companies have their

greatest collection problems in heavily populated areas, rather than in sections of the country that are remote from finance company offices. New York City has a quarter of a million more cars than the entire African continent. Someone has expounded the theory that New York City motorists consume more gasoline waiting for traffic lights to change than they consume while moving. But aside from that, New York, along with other big cities, has the largest percentage of finance payment delinquencies. It also places somewhere near the top in traffic violations. In the process of performing their duties traffic policemen encounter some unusual situations. And usually take these situations in their stride.

Once in a while their aplomb is shaken though, as it was in the case of the owl. A road block had been set up at one point to stop reported thieves. In one car police found a live owl sitting on the front seat next to the driver. The motorist, surprised but relatively unconcerned, said he hadn't the foggiest notion how the bird got there.

In Detroit, a motorist found a traffic-violation ticket attached to his car. Which in itself wasn't unusual. But this particular ticket was blank. The officer had failed to fill in *any* of the spaces defining the offense. The motorist, not to be outdone, sent the police a blank unsigned check with the ticket. But the police didn't think it was funny.

Another motorist in another large city received a traffic summons for parking double—abreast of another car at the curb. Dutifully, he went to the desig-

nated address to pay his fine, but was unable to park there. A double row of parked cars flanked the front of the building—and most of them were police cars.

By and large, the police have their own troubles. They are buffeted between orders from headquarters on one side and motorists' whims on the other. Not the least of their troubles are abandoned cars. Many thousands of automobiles are abandoned by their owners each year. They simply park them somewhere, frequently on heavily traveled city streets, and walk away. Detroit reports that more than five thousand cars are abandoned each year in that city alone. What becomes of them?

Surveys reveal that only 16 per cent are returned to their owners. Eighty per cent are sold by the police to used-parts dealers and 4 per cent are hauled away to junk yards. This disposition is made, however, only after compliance with various legal requirements. Sometimes an abandoned or wrecked car will remain in an unrestricted area for weeks before authorization to move it is finally approved. Meanwhile it constitutes a traffic hazard. Moreover, highway traffic safety demands that police then dispose of their foundlings in such a manner that will prevent the return of these cars to the highways.

Not infrequently, a motorist receives a traffic-violation summons for an offense of which he isn't guilty. But since this is a common plea of guilty motorists, magistrates are not easily convinced. Nevertheless, such cases are carefully investigated. Often, the investigation reveals a more serious situation.

Here is what happened in Detroit on one such occasion. Gaspar Cucinella, a butcher of Warren Avenue, went to the police with a sheaf of Traffic Court Warrants. "These," he said, "came to me in the mail. They bear my name and address, but they're not mine." "Oh yeah," said the police, "then how do you account for them?" That went on for a while, but the motorist's statement could not be shaken. A subsequent investigation revealed that there was another Gaspar Cucinella, a railroad fireman, of Freud Avenue. And the second Gaspar's license carried the first Gaspar's address.

The second Gaspar, upon originally applying for a license, received a letter from the Secretary of State saying a license had already been issued to him, so they were sending him a duplicate. And who was *he* to argue with the Secretary of State?

But the judge didn't see it that way. He fined the second Gaspar $53 on the traffic violations and then sentenced him to seven days in jail for driving on another persons' license. As an added fillip, the judge then revoked his driving license.

Motordom and its many ramifications has evoked strange mental reactions. Like that of a mild-mannered man who was driving along the highway in heavy traffic. Whenever congestion ahead slowed or stopped him, the driver of the car behind sounded his horn impatiently. Not unlike the average driver, the mild-mannered man finally lost his patience. When next he stopped his car, he got out and walked to the car behind. Looking directly at the driver, he reached into the car, removed the keys from the ignition switch and

threw them over the car into the field beyond. Then with an air of supreme detachment he returned to his car and drove away.

Just as some motorists are horn-happy, others are car-happy. Almost every dealer has one or more customers who are never satisfied for very long with any one car. They buy from two to five new cars each year, yet never own more than one at a time. The record appears to have been clinched by a fellow in Memphis. Not long after inheriting a considerable legacy, he purchased a Cadillac. Then within five weeks he purchased a total of seven cars, always trading his previous car. Shortly after he acquired the Cadillac, he decided it was too large, so he traded it on an Oldsmobile. A week later he felt the same way about the Oldsmobile so he traded that on a Pontiac. Subsequently he traded the Pontiac for a Chevrolet. Apparently the Chevrolet was too small, because he traded that for a Mercury, then a second Mercury and finally a third Mercury.

For all that, he probably had more sense than a chap who called himself Leon Burns, from Georgia. At thirty-eight, Burns was making a living eating automobile parts. Well, sort of a living, anyhow. He toured garages and service stations claiming that his stomach would digest anything. To prove it, he swallowed keys, wheel balance weights, bolts, washers and other such indigestible items. While his audience was still gasping, Burns passed his hat for contributions. By the time he had reached Raleigh, North Carolina, on a rambling trip north, something went wrong with his digestive powers and he was taken to a hospital. Doc-

tors removed from his stomach a spark plug, a knife blade, an unfired bullet and miscellaneous lesser metal articles.

One man who collects assorted items in another manner is superintendent of a bridge over the Potomac River between Newburg, Maryland, and Dahlgren, Virginia. It's a toll bridge and a surprising number of motorists without cash want to cross it. So, they pay in gadgets and such. The superintendent has collected jacks, hand pumps, flashlights, spare tires, chains, heaters and assorted automobile accessories. His storage room often looks like a country store.

Other pledges include fountain pens, rings, jewelry, etc. Each is tagged with the motorist's name and address and held to be redeemed on payment of the toll charge. If not called for within a year, the articles are sold so that the state eventually receives its fee. Sometimes when a driver proffers a large bill or offers to write a check (which cannot be accepted), he leaves his wife as collateral while he goes for cash. At last reports all wives had been redeemed.

Wives are reputed to be excellent motorists when their husbands aren't present. True or false, their judgment is never to be spurned. On one occasion a Pennsylvania motorist drove to the railroad station to meet his wife. En route, he detected a new and different squeak in his car, but couldn't locate it or define it. Returning from the station, his wife listened intently and then said, "Edgar, you've got a cat in this car." To which he replied, "Nonsense." The lady insisted it was a cat.

Finally, and perhaps to prove his superiority, he drove into a service station where his wife said to the attendant, "I've got a cat in this car, somewhere."

"You mean a 'canary,' " replied the attendant knowingly.

"No, I mean a *cat,*" she insisted.

So, they lifted the hood, and there, sure enough, was a cat—a small one, to be sure, but a cat, nevertheless. It was nestling somewhat uncomfortably on the motor side pan.

Why the cat climbed in there is as inexplicable as the presence of a small mouse which we once found in a carburetor. Several years ago, a motorist drove into our service station and complained that he couldn't throttle his motor down to idling speed without stalling it. Said he'd been to several repair shops to have his carburetor adjusted but the adjustments hadn't helped.

We removed the carburetor and took it apart. In the carburetor we found a diminutive mouse. Very dead. Probably gassed to death. How did it get there? Well, the factory repair manuals don't explain such a condition—and we haven't been able to figure it out.

To get back to the ladies, there is a well authenticated story about one of them who lives in Ottawa. Driving along one day, she heard a strange clanging noise under her new car. She stopped and found a large steel disk lying on the road. She tried the car, which was apparently still running all right without the disk. Nevertheless, afraid that she had damaged it she lugged the disk into the trunk so that Hubby could have the necessary repairs made. That gentleman examined the disk

and then returned the manhole cover to the city's works department.

Younger ladies were probably the inspiration for "Seven Rules for Social Success" which were published in *The High School Herald* in San Jose, California. The rules:

1. Have a car.
2. Be a pleasant conversationalist.
3. Have a car.
4. Be congenial.
5. Have a car.
6. Be a good listener.
7. Have a car.

Note: If the car is a red convertible, numbers 2, 4, and 6 may be omitted.

Some other youngsters who were fighting a war in Europe had a typically G.I. description of the Army Jeep: "If lightning strikes a Jeep, the lightning will have to be towed away."

Former G.I.'s will appreciate this one, too. On one occasion the Army scheduled some winter-training maneuvers at Camp Drum, New York. Only there wasn't any snow. It had melted. And the Army wanted to train southern troops to drive in the snow. So the officers in charge—bless their souls—put a lot of trucks into service to haul snow from nearby mountains to the location of the maneuvers.

It may be just as well that the horse is no longer needed for transportation. In 1909, accidents involving

horses and horse-drawn vehicles were responsible for the death of 3,850 persons. That's about 30 fatalities for each million horse-traveled miles. The nation's current motor vehicle fatality rate is only seven deaths for each one hundred million vehicle miles of travel.

The horse had advantages though. I remember wishing for one once. It was about thirty years ago. In the vicinity of Fort Washington. The hour was roughly midnight and snow was falling. I was lost but didn't realize it until I drove into Fort Washington for the third time. And some time thereafter I ran out of gas. A horse couldn't run out of gasoline, and left alone would find his way home. Which was more than I could do.

It isn't surprising that horses frequently figure in automotive stories, even at this late date. The transposition of the horse and the motorcar was inevitable. As motorcar production increased and the horse lost ground, the promotional efforts of livery-stable owners were sometimes tinged with desperation. One livery-stable advertisement inserted in a 1916 publication almost entirely devoted to things automotive, claimed that its horse-drawn carriages were "so clean they smelled as sweet as roses."

One horse, for reasons best known to himself, approached the situation on his own. He may or may not have resented the fact that his master purchased a custom-built Biddle touring car in 1919 which, among other things, had leather fenders. The horse was a family pet who was permitted to roam his master's estate at will. One day he wandered into the garage

end of the barn and ate most of the left front fender. Cost his master $273 to replace it.

During the metal shortages of World War II, the State of Illinois had a vaguely similar experience. They created and used composition license tags made of soy beans and other ingredients. Not long after the introduction of these tags, motorists complained that they were mysteriously disappearing. A bit of sleuthing on the part of Illinois police revealed the culprits. In the residential sections, dogs were eating the tags from the parked cars.

A friend of mine told me this interesting little story. He was in one of three cars traveling caravan fashion from Philadelphia to Pittsburgh. All three were models of the same year: a Cadillac, a Packard and a Buick.

The Cadillac made the entire trip at high speed. The Buick traveled at medium speed. And the Packard, which was new, traveled somewhat slower.

Whether speed had anything to do with it is an unanswered question but the total mileage on the three speedometers varied as much as 30 miles. Yet each car traversed exactly the same distance. The Packard speedometer indicated 10 miles less than the stated distance from Philadelphia to Pittsburgh. The Buick speedometer indicated four and a half miles more and the Cadillac speedometer registered almost 21 miles more than the stated distance.

How come? There could be a number of reasons, not the least of which is the possible inaccuracy of the instruments themselves. Some years ago I was traveling on the Merritt Parkway between New York and New

Haven. And I noticed a police car following me. I looked at my speedometer. Exactly 45. Since that was the speed limit, I maintained it. After about five miles the officer pulled alongside and waved me down.

That officer insisted that according to *his* speedometer, I was doing 50. And I'm sure he was sincere. Apparently, he was convinced of my sincerity, too, because he finally decided against writing a ticket. Incidentally, on that occasion I was driving a Chrysler and he was driving a Ford.

In co-operation with the Automobile Club of Philadelphia we once presented a new automobile to the City of Philadelphia. It was to be used to teach highway safety to pedestrians and school children as well as to motorists. Resplendent in gleaming white paint, it was equipped with a public address system, consisting of twin speakers on the roof and a microphone next to the driver's seat. The entire system was connected to the car battery.

After appropriate presentation ceremonies the car started the rounds of its duties in the downtown area. At the wheel was a man provided by AAA. Alongside him was a police officer who manned the microphone. And a heavy rain began to fall.

Within a half hour the car was back at our service station. Water was leaking through the roof where the speakers had been installed. We fixed that. An hour later the car was back again. This time the battery was run down by the extra electrical load of the public address system. We put in a new heavy duty battery,

but in our haste failed to properly reconnect the address system. But *that* wasn't discovered until the car was two miles away.

Back it came again. Finally, everything was adjusted, and considerably behind schedule, the car went to one of the city's busiest intersections, and there began a series of warnings and cautions over the loud speakers. And the rain continued.

The officer spoke into his microphone, "Careful there lady, you're walking against a red light." . . . "Look out for that truck, son."

Just then, the windshield wipers stopped working. And over the loud speakers in a tone of utter disgust came these words: "Now the goddam windshield wipers won't work."

One winter morning a gentleman with too much antifreeze inside him and with a considerably overcharged battery was ambling up our street. He may have been seething with frustration or some other emotion that only psychiatrists know about.

Anyway, as he came abreast of our new-car showroom, he hauled off and punched the show window. Beyond the spine-tingling reverberations of a giant windowpane, nothing happened. He kept on moving, punching each successive window with the same result. Several of our salesmen remonstrated from inside with sign language.

Whereupon he stopped punching the windows—and started kicking them. Then one of our men went after him, took him by the arm and told him to cut it out or he'd call the police. No good. The inebriated gentleman, who had reached the last window, swung a power-

ful foot at it and the glass crashed. Only God knows why some of the larger pieces of the broken glass didn't hit him as they fell. But they didn't. And, shortly the police took over, the insurance company replaced the glass and order was restored.

Reminded me of the time, years ago, when one of our customers leaving the showroom in a hurry walked right through a plate-glass window next to the front door.

Automobile dealers' customers frequently have complaints. It's a natural condition in this business. But sometimes the shoe is on the other foot. One Saturday afternoon we delivered a new car to a new customer. It was a normal, routine transaction, and we thought no more about it.

That is, we thought no more about it until shortly after midnight that night. About then, the telephone at my home jangled an insistent summons from slumber. Our new customer was at the other end—about fifty miles away. He was irate. His motor had sputtered out and nothing he could do would get it started. In fact, said he, the battery was pretty weak from trying.

I still wasn't fully awake but I pacified him and assured him that I'd get someone there, somehow, to fix him up. Followed some hasty telephoning on my part which resulted in routing one of our best mechanics out of bed. He gathered some tools together, got himself a can of gasoline for priming, headed for the location given and arrived there between two and three o'clock in the morning. There was the car, and there were its owner and a companion—both of them a little gay from

the effects of overindulgence. And the car was out of gas!

Now and then a truck driver honks his horn as he passes the hundred-year-old Younker house on Route 18 just outside the small town of Medina, Ohio. It is just his way of saying "thanks again" as he remembers the November night when a raging blizzard stalled his rig on that same highway. Mr. and Mrs. John Younker took 40 stranded travelers into their home that night. Altogether, people in and near Medina fed and sheltered nearly 2,000 people over a period of five days.

During the same storm, the town of Irwin, Pennsylvania, western terminus of the Pennsylvania Turnpike, harbored some 3,500 refugees. Truck drivers who benefitted from this hospitality talked about it at roadside restaurants and wondered how they could express their gratitude. Within a month, a testimonial fund was started. Eventually, contributions from drivers and companies totaled more than $4,000.

Each town was then presented its share of the fund in testimonial ceremonies. Irwin used the money to buy new books for its library. Medina spent its funds to build a new stone shelter in its park.

Had a mystery reported to me that same year. Probably stay a mystery, too. After one of the upstate snowstorms a Pennsylvania truck driver discovered tire tracks in the snow *on top* of his trailer truck. Could have been a low-flying airplane that touched it during the storm, which seems incredible even though the driver remembered a "bump" while traveling along.

But there was no doubt about the tire tracks. And no explanation for them either.

In one of my columns I mentioned seeing a station wagon with the words "Operation Offspring" on the door, and wondered what it implied. The next day we had a telephone call informing us that the car belonged to a young naval officer who has four young children. Our informant said the naval officer just thought the name was appropriate.

New-car purchasers sometimes like to take delivery of their vehicles at the factory. One company reported 17,700 such deliveries in a single year. All of which would be routine, but for one little incident. The group waiting for delivery one day included a man and a woman who were strangers to each other and from completely different sections of the country. And, as is natural, they became acquainted. Two weeks later, the head of the company's customer drive-away department received a card from them saying they were on their honeymoon.

Romance frequently derives from and sometimes affects the motorcar. On one occasion we had a customer with an unusual but not unreasonable request. He wanted us to drain the oil out of his radiator and replace it with water. Thought he was pulling our leg for a minute. But when we inspected his radiator, sure enough there it was. Oil. Seems he had gone to some gasoline filling station to have oil put into the crankcase and water added to the contents of the radiator. After an interval of leg-stretching and such, he looked toward his car and was startled to see the dreamy-eyed

attendant humming a little love tune while calmly pouring a can of oil into the radiator.

Another emotion, akin to romance with a fiesta atmosphere, pervades the automobile world at the time of new-car introductions. It reaches a peak on announcement day. Showrooms are spruced and painted and decorated. Personnel is usually as anticipatory as actors on opening night.

Early on the morning of one such occasion we found that our choicest car—strictly a window piece with plenty of selling appeal—was missing. Found out later that one of our workers had taken it to do a short errand. Said he couldn't resist the urge to drive it. But twelve men who were arranging the showroom stood idly by until the car returned.

That afternoon the new cars were flanked with baskets of flowers. They were beautifully arranged. And I guess they were properly appreciated, too, by a four-year-old girl who visited the showroom with her parents. I found her squatting in front of one of the baskets, humming softly while she gaily picked herself a bouquet.

The unusual tales that concern motorists and motoring would not be complete without the story of the policeman of Mayfield, Kentucky. He decided to parlay a ten-cent pocketknife into a good used car through a series of trades. He traded well, but he always traded even—there was never any side consideration. Ten weeks and about one hundred swaps later he owned a fairly good used car.

Another of these tales concerns the traffic control of Burke, Idaho. Burke is a busy little mining town,

located at the bottom of a narrow canyon. Motorists who park their cars on its narrow main street always leave their keys in the car. Then, when a Union Pacific freight train makes one of its irregular trips through town, trainmen run ahead and drive the cars off the track.

The Yankees rate in this group, too. A road sign at the top of a steep hill in northern New Hampshire, reads,

YOU'RE NEXT
SMITH AND SONS
UNDERTAKERS

Motorists reaching the bottom of the hill, find another sign,

YOU FOOLED US
NOW YOU CAN STOP AT SMITH AND SONS
GENERAL STORE
FOR
SUPPLIES OF ALL KINDS

Another sign in an upstate Pennsylvania-Dutch garage reads,

We Grow Too Soon Old
And Too Late Smart.

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How Many Can You Remember?

THROUGH the years since Selden first applied for his automobile patent in 1879, many cars have been created, but not many have survived. During the early part of this century more than three hundred different makes of automobiles were being built at one time.

Listings of all known makes vary, depending upon the historians' approach. Some lists cover only those passenger cars built and commercially sold in America. Others include all cars built in America, even though there may have been only one of a kind. Still others cover all passenger vehicles registered, including foreign cars, taxicabs, hearses and buses, as well as name duplications.

Duplications fall into two classifications: those of different cars bearing the same name and those with different names for the same car. The former classification includes such names as Pontiac, which was built from

1902 to 1908 by one firm and from 1926 to the present time by another firm. There was a Plymouth in 1910 and a different Plymouth from 1928 to the present time. Mercury, too, was the name of a car built from 1904 to 1918 and later was the name chosen by Ford Motor Company for their new car in 1939.

Examples of single-make cars with different names are Lincoln and Lincoln Zephyr, Essex and Essex Terraplane, Rambler and Nash Rambler.

As indicated, the same name was sometimes used by different manufacturers at different times. In other cases, the same manufacturer used the same name for a new car after a lapse of anywhere from one to fourteen years.

Many automobiles were manufactured but never reached the market. The ill-fated Tucker is a recent example. And in some cases only one car of a given name was built for a specific order. Yet that car, while hardly deserving to be included in any commercial listing, was nevertheless registered for use.

The most complete list ever to be compiled contained 2,726 names of passenger vehicles registered in America —including all classifications. It included hearses, taxicabs and buses, however. The most conservative listing covered only passenger cars built and commercially sold in quantity. It totaled 1,689 names.

The following list covers a grand total of 2,681 private passenger vehicles registered in America, regardless of type, origin or quantity built. And it covers all duplications. To reach an intelligent figure, however, it must be kept in mind that the total list includes:

59 foreign makes
118 names representing cars of which less than three were actually built
243 duplications in one form or another

Deducting these 420 names from the listing indicates an actual total of 2,261 different name-makes of American passenger automobiles produced in quantities of three or more and registered for use. Of this total only nineteen are still being produced as this is written.

A. B. C.—1901
A. B. C.—1908
A. B. C.—1922
A. B. C. Electric—1912
Abenaque—1900
Abendroth & Root—1907
Abbott—1909-1916
Abbott-Cleveland—1917
Abbott-Detroit—1909
Abbott-Downing—1919
A. C.—1938
Acadia—1904
Acason—1915
Ace—1920-1922
A. C. F.—1926
Acme—1903-1911
Acorn—1925
Adams—1911
Adams—1924
Adams Express—1901
Adams-Farwell—1904-1913
Adelphia—1921
Adette—1947
Adler
Adria—1921-1922
Adrian—1902
Advance—1909
A. E. C.
Aero—1921
Aerocar—1905-1906
Aerocar—1948
Aero-Morgan—1930
Aerotype—1921
Ahrens-Fox—1927
A. I. C.—1913
Air Scout—1947
Airway—1949
Ajax Electric—1901-1903
Ajax—1914
Ajax—1923-1925
Akron—1901
Alamobile—1902
Aland—1917
Albany—1907
Alco—1909-1912
Aldo—1910
Alden-Sampson—1904-1909
Aldrich—1897
Alfa Romeo—1947
All American—1919
Allard—1948
Allegheny—1908
Allen—1900
Allen—1914-1922

Allen & Clark—1908
Allen Cyclecar
Allen-Kingston—1907-1909
Alliance—1917
Allith—1908
Allis-Chalmers
All Steel—1915-1916
Alma—1908
Alpena—1910-1914
Alsaca—1920-1921
Allstate—1951
Alter—1916-1917
Altha—1905
Altham—1897
Altman—1898
Alvis—1929
Alxo
Amalgamated
Ambassador—1921-1922
Amco—1920
American—1901
American—1905-1914
American—1911
American—1912
American—1916-1925
American—1918
American—1922
American—1937
American Austin—1930
American-Bantam—1937
American Beauty—1916
American Benham—1917
American Berliet—1909
American Brass—1907
American Chocolate—1903
American Coulthard—1907
American Darracq—1902
American Electric—1899-1900
American Fiat—1921
American Gas—1902-1903
American LaFrance—1917
American Mercedes—1903
American Mors—1909
American Motor—1900
American Napier—1904
American Populaire—1904
American Power Carriage—1900
American Rolls Royce—1921-1924
American Scout—1913
American Simplex—1908
American Sports Car—1948
American Steam Car—1935
American Steamer—1903
American Steamer—1922-1923
American Three Wheel
American Traveler
American Tri-Car—1912
American Underslung—1908
American Voiturette—1900
American Wheeled—1904
Americar (Willys)—1941
Ames—1895
Ames—1898
Ames—1912-1915
Amesbury
Amex—1895
Amox—1913
Amphibian—1947
Amplex—1908-1915
Amoshead-Propelles—1867
Ams-Sterling—1917
Anchor—1909
Anderson—1908
Anderson—1916-1926
Anger—1913
Anglia—1949
Angus—1908
Annheuser-Busch—1905

Anglanda—1914
Anhut—1909
Anthony—1897-1906
Apell—1911
Apex—1920
Appel—1915
Apperson—1920-1926
Apperson Jack Rabbit—1908-1909
Apple—1917
Appleton—1922
Apollo—1906
A & R—1913
Arandsee—1920
Arbenz—1911-1919
Arcadia
Ardsley—1905
Argo Electric—1912-1917
Argo-Broland—1914
Argo-Case—1916
Argo-Gas—1914
Argonne—1920
Argonne-Four—1919
Argus—1907
Argyle
Ariel—1906
Aristos—1913
Ariston—1906
Armlader—1914
Arnold Electric—1895
Arrow—1903-1914
Arrow Cyclecar—1914
Artzberger Steamer
Ashton-Martin—1939
Aster—1906
Astor—1925
Astra
Atlantic—1915
Atlantic Electric—1909
Atlas—1907-1913
Atlas-Knight—1911
Atterbury
Auburn—1900-1936
Aude—1932
Auglaize—1911
Aultman—1901
Aurora—1907
Austenius Steam—1864
Austin—1903-1922
Austin Bantam—1930-1935
Austin Steam—1863
Austro-Daimler—1913
Auto-Acetylene—1899
Autobain—1900
Auto Bug—1910
Autobuggy—1907
Autocar—1899-1911
Autocrat—1899
Auto Cycle—1913
Auto Dynamic—1901
Autoett—1946
Auto Fore Carriage—1900-1901
Auto-Go—1900
Auto-Loco-Steam
Automatic—1908
Automatic—1921
Automote—1900
Automotor—1901-1904
Autoplane—1947
Auto-Tricar—1914
Auto Two—1900
Auto Vehicle—1903
Available—1910
Avery—1921

Babcock—1909-1913
Babcock Electric—1906-1911
Bachelles—1901
Backhus—1925
Bacon—1905
Badger—1911-1912

Bailey—1907-1916
Bailey Electric—1907-1909
Baker Electric—1899-1917
Baker Steam—1917-1921
Baker & Elberg—1894
Balboa
Baldner—1902-1903
Baldwin—1896-1900
Ball—1902
Ball Steam—1900
Ballard—1895
Balzer—1900
Banker—1905
Barker—1912
Bantam—1914
Barbarino—1923
Barley—1922-1924
Barlow—1922
Barnes—1906-1912
Barnhart—1905
Barrett & Perret—1895
Barrow 1895
Barrows Motor Vehicle
Bartholomew—1901-1903
Barver—1925
Bateman—1917
Bates—1903
Bauer—1914
Bauroth—1899
Bayard—1903
Bay State—1906-1907
Bay State—1922-1926
Beach
Beacon Flyer—1908
Beardsley—1901
Beardsley—1914-1917
Beau-Chamberlain—1905
Beaver—1920
Beck—1947
Bee
Beach Creek
Beggs—1918-1922
B. E. L.
Belden—1907-1911
Bellfontaine—1904
Belknap
Bell—1907
Bell—1915-1922
Bellmay—1904
Belmont—1904
Belmont—1908
Belmont—1910
Belmont—1916
Bemis—1908
Bemmel & Burnham—1898
Bendix—1907
Bendix-Ames—1911
Benham—1914
Ben-Hur—1908-1909
Bentley—1947
Benner—1908-1909
Benson
Benton Harbor Motor—1896
Benz—1898
Berg—1902-1903
Berg—1910
Bergdoll—1908-1911
Berkshire—1904-1911
Bertolet—1908-1912
Berwick Electric
Bessemer—1904
Bessemer—1922
Best—1900
Bethlehem—1904-1908
Betz—1919
Beverly—1904
Bewis—1915
Bewman
Beyster
Beyster Bi-Autogo—2 Wheel
Beyster-Detroit
B. F. S.—1908

Biddle—1916-1922
Biddle-Murray—1906
Bierderman—1915
Billings & Spencer—1902
Bimel—1917
Binford—1905
Binney-Burnham—1888-1902
Birch—1916-1923
Bird—1911
Birmingham—1921-1922
Birnel—1911
Black—1899
Black—1908
Black Crow—1905
Black Crow—1909-1910
Black Diamond—1904
Blackhawk—1928-1929
Blair—1915
Blaisdell
Blakeslee—1906
Blanchard
Bliss—1900
B. L. M.—1907-1909
Block Bros.—1905
Blomstrom—1904-1908
Blood—1903
Blood—1914
Bluebird—1910
Blumberg
B. M. W.—1943
B. N. C.
Bobbi-Car—1945
Bob Cat—1923
Boggs
Boisselot—1901-1906
Bollee—1904
Bolte—1901
Booth—1896
Borbein—1905
Borland—1913-1914
Borland-Grannis—1913
Bortz—1904
Boss—1903
Boss Steam—1902
Boston—1900
Boston—1903
Boston & Amesbury—1902
Boston Haynes Apperson—1898
Boston High Wheel—1908
Bour-Davis—1916-1922
Bournonville—1914
Bowman—1921-1922
Boynton
Bouton & Bateman—1899
Bradfield—1929
Bradley—1920
Bramwell—1900-1902
Bramwell-Robinson—1899
Brasie—1915
Brayton—1872
Brazier—1902-1904
Brecht—1902-1903
Breer—1900
Breeze & Lawrence—1905
Breman—1908
Brennan—1908
Brennon—1900
Brew & Hatcher—1904-1905
Brewster—1915-1937
Brewster-Knight—1916
Bridgeport—1922
Briggs—1914
Briggs-Detroiter—1912
Briggs & Stratton—1920-1923
Brighton—1896
Brighton—1914
Brightwood—1912
Brintel
Brinton
Briscoe—1913-1921
Bristol—1903

Bristol—1950
Broc—1909-1917
Brock—1920
Brockville-Atlas
Brockway—1912
Brodesser
Brogan—1948
Bromfield—1930
Brook—1920-1921
Brooks—1908
Brooks—1925
Brower—1890
Brown—1898
Brown—1914
Brown—1916
Brown-Burtt—1904
Brownell—1910
Brownie—1915-1916
Browniekar—1908-1910
Brown-Luverne
Brunn—1906
Brunner—1910
Brunswick
Brush—1907-1911
Bruns—1910
Bruss—1907
B. S. A.—1936
Buck—1925
Buckeye—1901
Buckeye—1906-1912
Buckeye Gas Buggy—1895
Buckles—1914
Buckmobile—1903-1907
Buffalo—1900-1907
Buffalo Electric—1901-1907
Buffington
Buffum—1901-1909
Buffman—1900
Buford—1915
Bugatti—1947
Buggyaut—1895
Buggyaut—1908
Buggycar—1908-1909
Bugmobile—1907
Buick—1903-
Burdick—1909-1910
Bundy—1895
Burg—1912
Burlingame—1896
Burns—1910
Burroughs—1914-1916
Burrowes—1908
Bush—1909
Bush—1917
Bus—1917-1924
Busser
Buzmobile
Byrider—1908-1909
Byron—1933

Cadillac—1902
California—1902
California—1912
California—1914
California Cyclecar
Californian—1916
Calvert—1927
Cameron—1905-1907
Cameron—1909-1921
Campbell—1916-1921
Canda—1901
Cannon—1904
Cannon—1951
Canton—1906
Capital—1902
Capital—1919
Capps—1908
Carbon
Carcovan—1948
Car Deluxe
Cardway—1923
Carhart—1871

Carhartt—1911
Carlisle—1900
Carlson—1904-1911
Car Nation—1913
Carpenter—1895
Carqueville-MacDonald—1930
Carrison—1908
Carroll—1908
Carroll—1912-1920
Carroll—1920-1922
Carter—1901
Carter—1903
Carter Twin Engine—1909
Cartercar—1907-1911
Cartermobile—1924
Carthage
Cartone—1905
Casco—1926
Case—1909-1927
Caseler—1901
Casey—1914
Cass
Cato—1907
Cavac
Cavalier—1927
Caward-Dart—1924
C. B.—1917
Ceco
Celt
Centaur—1902
Central—1905
Century—1901
Century—1901-1903
Century—1911-1912
Century Tourist—1901
C. F.—1908
C. G. Gay—1915
C. G. P.—1915
C. G. V.—1902
Chadwick—1905-1912
Chalfant—1906-1912
Chalmers—1908-1923
Chalmers-Detroit—1907
Champion—1902
Champion—1909-1910
Champion—1919-1926
Champion Electric—1899-1901
Chandler—1913
Chapman—1899
Chapman—1901
Charron
Charter Car—1904
Charter Oak—1917
Chase—1910
Chatham—1906
Chelsea—1901-1904
Chevrolet—1912-
Chicago—1898
Chicago—1906
Chicago—1914-1916
Chicago Commercial—1905
Chicago Electric—1914-1917
Chicago Motor Buggy—1908
Chicago Steam—1906
Chief—1908
Chief—1947
Christie—1904-1906
Christman
Christopher—1908
Chrysler—1923-
Church—1903
Church—1913
Churchfield—1911-1913
Cincinnati—1903
Cinco
Cino—1909-1911
Cistalia—1948
Citroen—1948
Clapps Motor Carriage—1898

Clark—1901-1912
Clarke Carter—1900-1908
Clark Electric—1906-1910
Clark Hatfield—1908-1909
Clarkmobile—1903-1906
Clarkspeed—1928
Clark Steamer—1900-1909
Classic
Clear & Durham—1905
Cleburne—1912
Clegg—1885
Clement-Bayard—1903
Clendon—1908
Clermont—1903
Clermont—1922
Cleveland—1902-1906
Cleveland—1908
Cleveland—1919-1926
Climber—1919-1923
Clinton—1923
Cloughly—1902-1903
Club Car—1911
Clyde—1919
Clymer—1908
Coates—1921-1922
Coates-Geshen—1908-1910
Coey—1911
Coffin—1898
Cogswell—1912
Colburn—1906-1911
Colby—1911-1914
Cole—1910-1925
Collier
Collinet
Collins—1901
Collins—1920
Colly—1900
Colonial—1917-1921
Colonial—1921-1922
Colonial Electric—1912
Colt—1908
Columbia—1898-1913
Columbia—1916-1925
Columbia-Dauman—1900
Columbia Electric—1898-1906
Columbia-Knight—1916
Columbia Motor Carriage—1897
Columbian Electric—1915
Columbus—1903-1906
Columbus—1906-1909
Comet—1907
Comet—1914
Comet—1917-1925
Comet (3-Wheel)—1947
Comet Cyclecar
Commander—1921
Commander—1922
Commerce—1916
Commercial—1903
Commodore—1921
Commonwealth—1903
Commonwealth—1917-1922
Compound—1904-1906
Concord—1916
Conda
Conklin Electric—1895
Connersville
Conover—1907
Conrad Steam—1900
Consolidated—1904
Continental—1907-1908
Continental—1909-1912
Continental—1914
Continental—1933-1934
Convair—1950
Cook—1908
Cooley—1900
Cooper—1951
Coopers—1901
Coppack—1907

Copley Minor
Corbin—1903-1912
Corbitt—1907-1916
Cord—1929-1937
Coressus Jr.
Corinthian—1922
Corl—1911
Cornelian—1913-1915
Cornish-Friedberg—1917-1919
Correja—1911-1914
Cort—1914
Cortez—1947
Corweg—1905
Corwin
Coscob—1900
Cosmopolitan—1907-1910
Cotay—1921
Cotta—1901
Country Club—1903
Couple-Gear—1908
Courier—1904-1912
Courier—1919-1924
Covert—1902-1907
Covert Motorette—1902
Coyote—1909
C. P.—1908
Craig-Hunt—1920
Craig-Toledo—1906-1907
Crane—1912-1914
Crane & Breed—1912-1917
Crane Simplex—1916
Crawford—1902-1924
Crescent—1905-1908
Crescent—1914-1915
Crest—1902
Crestmobile—1902-1904
C. R. G.—1908
Cricket—1913-1915
Criterion—1912
Crock—1909
Crockett
Croesus Jr.
Crompton—1903-1905
Crosley—1939
Cross Steam Carriage—1897
Crouch—1899-1900
Crough Steamer—1900
Crow—1915
Crowdus—1901-1903
Crow-Elkhart—1914-1925
Crown—1907
Crown—1915
Crown High Wheel—1897
Crown Magnetic—1907
Crowther-Duryea—1915-1917
Croxton—1911-1914
Croxton-Keeton—1909-1912
Crusader—1923
Cruiser—1918
C. T.
Cucmobile—1907
Cull—1901
Culver—1905
Cummings—1900
Cummins—1930
Cunningham Steamer—1900-1907
Cunningham—1911
Cunningham—1951
Curtis—1866
Curtis—1921
Custer
Cutting—1910-1912
C. V. I.—1907
C. W. B.—1927
Cyclecar—1901
Cyclemobile—1920
Cycleplane—1914-1915

D. A. C.—1923
Dagmar—1922-1927

Daimler—1895
Dairy Express—1920
Daley—1893
Dalton—1911
Daniels—1912
Daniels—1916-1924
Dan Patch—1911
Darby—1909
Darling—1901-1902
Darling—1917
Darrin—1947
Darrow—1903
Dart—1922
Dartmobile—1922
Davenport—1902-1903
Davids
Davis—1914
Davis—1909-1928
Davis—1947
Davis-Decauville—1909
Dawson—1904
Day—1911-1914
Day-Elder—1919
Dayton—1904
Dayton—1909-1911
Dayton Electric—1911
Dayton Steam—1900
Day Utility—1911
D. E.—1917
Deal—1908
Decauville—1909
Decker—1902-1903
De Cross—1914
Deemotor—1923
Deemaster—1923
Dear—1937
De Dietrich—1905
De Dion Bouton
Deere—1906-1909
Deere-Clark—1906
Deering
Deering Magnetic—1918-1919
Defiance—1919
Deibel—1899
Dekalb—1919
Delahaye—1905
Delahaye—1948
Delage—1922
DeLaVergne—1896
Delaynay-Belleville—1911
Delcar—1949
Delling Steamer—1924-1927
Delmare—1923
Deltal—1914
De-Luxe—1906-1909
DelMar—1949
DeMars Electric—1905
DeMartini—1919
Demob—1910
DeMotcar—1905
DeMotcar—1909-1911
De Motte—1904
Denby—1922
Deneen—1916
De Rain—1911
Desberon Steam—1901-1902
DeShaum—1908
Deshaw—1906
DeSoto—1913
DeSoto—1928-
De Tamble—1909-1912
Detroit—1900
Detroit—1905
Detroit—1916
Detroit—1922
Detroit Air Cooled—1923
Detroit-Chatham—1912
Detroit-Dearborn—1912
Detroit Electric—1907-1938
Detroit Speedster—1914
Detroiter—1912
Detroit Steamer—1901

Detroit Steamer—1922
DeVaux—1931-1932
Dewabout—1899
Dey Electric—1894
Dial
Diamond—1907
Diamond-Arrow—1909
Diamond T—1905-1911
Diana—1924-1928
Diehl—1923
Diexel
Differential—1921
Dile—1914-1916
Direct Drive
Disbrow—1917-1918
Dispatch—1912-1922
Divco Twin—1946
Divoo—1924-1927
Dixie—1912
Dixie—1917
Dixie Flyer—1915-1924
Dixie Tourist—1908-1909
Dixon—1922
D. K. W.—1937
D. L. G.—1906
Doane—1929
Doble-Detroit Steam Car—1918
Doble Steam Car—1922-1928
Dodge—1914-
Dodge-Graham—1923
Dodge Steam Car—1913-1914
Dodgeson & Empire—1914
Dodgeson—1926
Dodo—1909
Dolfini—1900
Dolson—1904-1907
Dorris—1897
Dorris—1906-1926
Dort—1915-1925
Douglas—1918-1922
Dover—1929
Dowagiac—1908
Downing—1914
Downing-Detroit—1913
Dragon—1921
Dragon Steam—1906-1908
Drake—1921-1922
Drednot
Drexel—1916-1917
Driggs—1921-1923
Driggs-Seabury—1926
Drummond—1915-1916
Duck—1913
Dudgeon Steam—1868
Dudley—1914
Duebon
Duer—1907-1909
Duesenberg—1921-1934
Dumont—1902-1904
Dunn—1914-1917
Duplex—1909
DuPont—1915-1923
Duquesne—1903-1906
Durable—1902
Durant—1921-1932
Durocar—1908-1910
Duryea—1892-1914
Duryea Gem—1902
Dusseau—1912
Dyke—1903
Dymaxion—1933

Eagle—1905-1906
Eagle—1908
Eagle—1909
Eagle—1914
Eagle—1924
Eagle Cyclecar
Eagle Electric—1915-1917
Eagle Macomber—1917
Eagle Rotary—1917

Earl—1907-1909
Earl—1916-1924
Eastern—1896
Eastern Dairies—1925
Eastman—1897
Eastman Steam—1900
Easton—1907
Easton Electric—1898
Eaton Electric—1898
Eaton
Eck—1903-1909
Eclipse—1901-1902
Economy—1906
Economy—1917-1919
Economy Car—1914
Eddy Electric—1902
Edwards-Knight—1912-1914
E. H. V.—1903
Eichstaedt—1902
E. I. M.—1916
Eisenhuth—1896
Eisenhuth-Compound—1903
Elberon Steam—1903
Elbert—1915
Elcar—1908-1930
Elco—1915-1916
Eldridge—1906
Electra—1913
Electric Wagon—1895
Electrobat—1895
Electrocar—1922
Electromobile—1899
Electronomic—1901
Elgin—1916-1924
Elinor—1903
Elite—1909-1919
Elite Steamer—1901
Elk—1912
Elkhart—1908-1911
Elkhart—1922
Elliott—1899-1902
Ellis Electric—1901
Ellsworth—
Elmore—1900-1911
Elrick—1896
Elston—1895
Elwell-Parker—1909
Elysee—1926
Emancipator—1909
Emden—1915
Emerson—1907
Emerson—1916-1917
Emerson & Fisher Motor Wagon—1896
E. M. F.—1909-1912
Empire—1898-1901
Empire—1910-1919
Empire State—1901
Empress
Endurance Steamer—1922-1923
Energetic—1909
Engelhardt—1901
Enger—1909
Enger—1910-1917
Engler—1914
Enterprize—1901
Entiro
Entyre—1911
Entz—1914
Erie—1897
Erie—1916-1921
Erskine—1927-1939
Ernst—1896
Essex Steam Car—1906-1908
Essex—1917-1932
Euclid—1907
Euclid—1950
Eureka—1908
Eureka—1909-1914
Evans Steam
Evans—1904

Evansville—1907-1909
Everitt—1909-1911
Everybody's—1908-1909
Ewing—1908
Exeter—1909

Facto—1920
Fageol—1917-1918
Fairbanks-Morse—1909
Fairmount—1906
F. A. L.—1909
Falcar—1908-1922
Falcon-Knight—1927-1928
Falcon—1909-1911
Falcon—1922
Famous—1909
Fanning Electric—1902-1903
Fargo—1929
Farmack—1916
Farmobile—1906-1907
Farner—1922-1924
Fauber—1900
Fauber—1914
Fay—1912
Fedelia—1913
Federal—1907-1909
Federal Steamer—1915
Fee—1908
Fenton—1914
Fergus—1907
Fergus—1920-1923
Ferrari—1948
Ferris—1920-1923
Fiat Simca—1950
Field Steam—1887
Findley
Firestone-Columbus—1906-1911
Fischer—1902-1904
Fischer—1914
Fish—1908
Fisher—1914
Fitzjohn—1947
Flagler—1914
Flanders—1911-1912
Flanders Electric—1914
Flexbi—1904
Flexible—1935
Flint—1902-1904
Flint—1913-1914
Flint—1924-1927
Flyer—1913-1914
Foos—1910
Ford Steam—1893
Ford—1903-
Forest—1908
Forest City—1906
Forster Six—1920
Fort Pitt—1908-1909
Foster Steam—1898-1905
Fostoria—1906-1907
Fournier—1902
Four Traction—1907
Four-Wheel-Drive—1902
Fox—1921-1925
Frankfort
Franklin—1902-1934
Frayer-Miller—1905-1909
Frazer—1945-1951
Frazie—1914
Frazier—1946
Fredonia—1902-1904
Fredrickson—1914
Freeman—1906
Fremont—1922-1923
French—1913
Friedman—1900-1903
Friend—1921
Frisby—1901
Fritchie Electric—1907-1917
Frontenac—1909-1911
Frontenac—1917

Frontenac—1922
Front Drive
Frontmobile—1917
F. R. P.—1915-1917
F. S.—1912
Fuller—1907-1911
Fulton—1908
F. W. D.—1911
Fwick—1912

Gabriel—1912
Gadabout—1914-1915
Gaeth—1902-1906
Gaethmobile—1902
Gale—1906
Galt—1914
Gardner—1919-1931
Gardner-Serpolet—1901
Garford—1907-1913
Garvin—1900
Gary
Gas-Au-Lec—1905-1906
Gas Engine—1905
Gasmobile—1900
Gasoline Motor Carriage—1897
Gatts—1905
Gawley—1895
Gaylord—1911-1912
Gearless—1908
Gearless—1920
Geer Steam—1900
Gem—1917
General—1903
General Electric—1899
General Vehicle—1906
Genesee—1911-1912
Geneva—1901-1909
Geneva—1917
Georges Richard Brazier—1902-1904
German-American—1902
Geronimo—1917-1921
Gersix—1921
Ghent—1918
Gibbs Electric—1903
Gibson—1899
Gifford-Pettitt—1907
Gillette—1916
G. J. G.—1909
Gleason—1910-1914
Gleason—1914
Glide—1902-1919
Globe—1921-1922
Glover—1921
G. M. C.—1911
Goethe—1900
Goethemobile—1902
Goldeneagle—1906
Golden State—1928
Gooden—1897
Goodspeed—1922
Goodyear—1926
Gorson—1907
Gotfredson—1921
Grabowsky—1908
Graham—1899
Graham—1903
Graham—1930
Graham-Fox—1903
Graham-Paige—1927-1930
Gramm—1901
Gramm-Bernstein—1918
Gramm-Logan—1908
Grand—1912
Granite Falls—1912
Grant—1914-1923
Grant-Ferris—1901
Grass-Bremier—1923
Graves-Gordon—1899-1903
Gray—1916
Gray—1922-1925

Gray-Dort
Great Arrow—1903
Great Eagle—1911-1914
Great Smith—1911
Great Southern—1910-1914
Great Western—1909-1916
Greeley—1903
Green Bay—1887
Green-Renault—1948
Gregory Front Drive—1922
Gregory—1948
Grensfelder—1901
Greuter—1899-1903
Greyhound—1914
Greyhound—1929
Gride—1903
Grinnel Electric—1910-1915
Griswold—1907
Grout Steamer—1899-1906
Guaranty—1917
Guilder—1922
Gurley—1901
Gyroscope—1914

Hackett—1916-1921
H. A. L.—1918
Hahn—1914
Hale—1917
Hal-Fur—1919
Hall Gasoline Trap—1895
Hall—1903
Halladay—1908-1912
Halladay—1919-1921
Halladay—1920
Halsey—1901
Halton
Hambrick—1908
Hamilton—1917
Hamlin-Holmes—1920-1921
Hammer—1903
Hammer-Sommer—1905
Handley—1923
Handley-Knight—1921-1922
Hanger—1916
Haniah
Hanover—1922-1924
Hansen—1902
Hanson—1917-1923
Harding—1916
Hardy—1904
Hare—1918
Harper—1907
Harrie—1925
Harrigan—1922
Harris—1890
Harris—1923
Harrison—1904-1907
Harrisburg—1922
Harris Six—1923
Harroun—1917-1922
Hartford-Apperson—1916
Hart Kraft—1908
Hartley—1895
Hartley Steamer—1898
Hartmen
Harvard—1916
Harvey—1914
Hasbrouck—1900
Haseltine—1916
Hatfield—1906-1908
Hathaway—1924
Haupt—1909
Havers—1912-1914
Haviland—1895
Havoc (Rochester)—1914
Hawkeye—1923
Hawley—1907
Hay-Berg—1907-1908
Haydock—1907
Haynes—1900-1925
Haynes-Apperson—1895-1900
Haynes-Apperson—1928

Hayward—1913
Hazard—1914-1915
H. Brothers—1908
H. C. S.—1920-1926
Healy—1911
Healey—1949
Hebb—1918
Heifner—1921-1922
Heilman—1908
Heine-Velox—1907
Hendel—1904
Henderson—1913
Hendrickson—1916
Henley Steam—1899
Henney—1922-1930
Henrietta—1901
Henry—1911
Henry J.—1950-
Hercules—1914
Hercules Electric—1902
Herff-Brooks—1915
Hermes
Herreshoff-Detroit—1909
Herreshoff-Troy—1914
Hershell-Spilman
Herchmann—1906
Hertel—1895-1898
Hertz—1925
Hess Steam—1902
Hewitt—1905-1910
Hewitt-Lindstrom—1900
Hewitt-Ludlow
Heymann—1898-1899
Hicks—1900
Hidgon & Hidgon Horseless —1896
Highlander—1922
Hill—1907-1908
Hill Locomotor—1895
Hillman—1948
Hillman Minx—1949
Hillsdale—1908
Hilton
Hinde & Dauch—1906
Hines—1908
Hispano Suiza—1906
Hobbie—1909
Hockenhull—1904
Hoffman Steam—1902
Hoffman—1902-1904
Holden—1915
Holland Steam—1905
Holley—1900-1903
Hollier—1915
Holly—1900
Holly—1916-1917
Holmes—1908
Holmes—1919
Holmes Gastricycle—1895
Holsman—1902-1906
Hol-Tan—1906-1908
Holton—1905
Holtzer-Cabot—1895
Holyoke—1917-1923
Holyoke Steam—1898-1903
Homer—1908
Homer-Laughlin—1917-1918
Hoover
Hopkins—1902
Hoppenstand—1948
Horc
Horner
Hosemer—1903
Hossier Scout—1914
Hotchkiss—1905
Houghton—1905
Houghton Steamer—1900
Houpt—1909-1910
Houpt-Rockwell—1910-1912
House—1866
House Steamer—1901-1910
Howard—1901

Howard—1903-1905
Howard—1914
Howard Gasoline Wagon—1895
Howey—1903
H. R. G.—1947
Hud—1906
Hudson—1909
Hudson Franklin
Hudson Steam Car—1901
Huffman Steam—1920-1925
Hughes—1899
Hulburt—1922
Humber Hawk—1949
Hunt—1938
Hunter—1921
Huntington—1907
Hupmobile—1908
Hupp-Yeats Electric—1914
Hurlburt—1922
Hurryton
Hustler Power Car
Hydrometer—1917
Hydro-Carton
Hylander

Ideal—1902
Ideal—1903
Ideal—1905
Ideal—1914
Ideal-Electric—1909
I. H. C.—1904
Illinois Electric—1901
Illinois Electric—1909-1914
Imhoff—1900
Imp—1914-1915
Imp—1949
Imperial—1900
Imperial—1903-1909
Imperial—1907
Imperial—1928
Independence—1912
Independent—1927
Indianapolis
Indian—1908
Indiana—1921
Ingrame-Hatch—1917
Innes—1921-1922
International—1901
International—1915
International Buggy—1899
International Car—1900
International Harvester—1907
Interstate—1908-1910
Intrepid—1904
Invicta—1934
Iowa—1908
Iroquois—1906-1908
Iroquois-Buffalo—1903
Iroquois-Seneca Falls—1903
Isotta-Fraschini—1908
Iverson—1908
Izzer—1910

Jackson—1899
Jackson—1902-1920
Jacks Runabout—1900
Jacquet Flyer—1921
Jaguar—1947
James—1911
Janney—1906-1908
Jarrett
Jarvis-Huntington—1921
Javelin Jupiter—1950
Jaxon-Steam—1903
Jay—1907
Jay-Eye-See
Jeannin—1908
Jeep—1941
Jeffery—1899
Jeffery—1902-1916

Jem Special—1922
Jenkins—1908-1911
Jewel—1906-1909
Jewett—1923-1927
Johnson—1905-1912
Johnson Steamer—1905-1908
Joly & Lambert—1916
Jones—1914-1920
Jones-Corbin—1902-1907
Jones Steam Car—1898
Jonz-Kansas City—1911
Jonz-New Albany
Jordan—1918-1930
Joy—1899
J. P. L.—1914
Julian—1925
Julian-Brown—1925
Junior—1925
Junz—1902
Juvenile

Kaiser—1945-
Kalamazoo—1922
Kane-Pennington—1894-1900
Kankakee—1919
Kansas City—1909
Karns Kar
Karbach—1908
Kato
Kauffman—1909-1912
Kavin—1905
K. D.—1914
Kearns—1908-1916
Keasler—1916
Keating—1899
Keene Electric—1900-1901
Keene Steam—1948
Keeton—1908-1914
Keller Chief—1947
Keller Kar—1914
Keller Kar—1947
Kelley Springfield—1919
Kellogg—1903
Kelly
Kelsey—1902-1924
Kenmore—1912
Kennedy—1898-1903
Kennedy—1915-1918
Kensington Electric—1899-1903
Kennsington Steam—1908
Kent—1917
Kenworthy—1921-1922
Kermath—1907
Kermet
Kerns—1914
Kerosene Surrey—1900
Kessler—1921
Keystone—1895
Keystone—1911
Keystone Steamer—1909
Kiblinger—1907-1909
Kidder—1901
Kimball—1922
Kimball Electric—1896
Kimball Electric—1912
King—1896
King—1905-1922
King-Midget—1948
King-Remick—1909
Kingston—1907
King Zeitler—1919
Kinnear—1913
Kinney—1922
Kinsley—1897
Kirk—1903
Kissel Kar—1906-1931
Kline—1911
Kline Kar—1916
Kling—1907
Klink—1907-1909
Klock—1900

Knickerbocker—1901-1903
Knight & Kilbourne—1906
Knight Special—1917
Know—1900
Knox—1900-1913
Knox-Landsen—1904
Kobusch—1906
Koehler—1911-1914
Komet
Konigslow—1903
Konollman—1900
Kopp
Koppin—1914
Kraft Steam—1901
Krall
Krastin—1902
Krebs—1922
Kreuger—1908
KRIT—1909-1916
Kron
Kunz—1902-1906
Kurtis—1948
Kurtis-Kraft—1949
Kurtz—1921-1923

Laconia—1900-1907
Lad's Car—1914
Lafayette—1920-1923
LaFayette—1934
LaFrance-Republic—1925
Lagonda—1950
LaMarne—1919-1920
LaMarne Junior—1921
Lambert—1905-1917
Lamphen
Lampher—1909
Lamson
Lancamobile—1899-1901
Lancaster—1900
Lancia—1913
Lane Steamer—1899
Lang—1921
Langan—1899-1905
Lanpher—1909-1912
Lansden Electric—1900-1908
Larchmont Steam—1900
Larrabee—1920
Larre-Bee-Deyo—1920
Larson—1910
LaSalle—1927
LaSalle-Niagara—1906
Lasky
Laughlin—1917-1919
Laurel—1916
Lauth-Jergens—1914
Lavigne—1914
Law—1902
Lawler Steam—1948
Lawrence & Hollister—1902
Lawter—1909
L. C. Erbes—1914
L & E—1922-1931
Leach—1899
Leach—1920
Leach-Biltwell—1920-1922
Leader—1911
Lea-Francis—1948
Lear—1903
Lebanon—1906
Lehigh—1926
Lehr—1908-1909
Leland
Leighton—1910
LeMoon—1917
Lende—1909
Lennon
Lenox Electric—1909
Lenox—1916
Leon Bollee—1905
Leon Robay—1923
LePetite—1905
Lescina—1916

Leslie
Lewis—1899-1901
Lewis—1914-1915
Lewis— 1937
Lewis Six—1913
Lexington—1908-1928
Lexington—1914
Liberty—1916-1925
Liberty-Brush
Lima—1915
Limited
Lincoln—1908
Lincoln—1920-
Lincoln Zephyr—1935
Linn—1948
Linsay—1900
Linsley
Lion—1907
Lion—1914
Lippard-Stewart
Little—1911
Little—1913
Little Gran—1910
Little Kar—1921
Littlemac—1930
L. M. C.—1919
Locke Steamer
Locomobile—1902
Locomobile Steamer—1899
Locomobile Junior—1925
Locomotor—1895
Locopurrey—1903
Logan—1904
Logan—1906-1909
Lomax—1913-1914
London
Lone Star—1920
Long—1923
Long Distance—1902
Longest
Lomis—1896
Loomis—1900-1904
Lorraine—1907
Lorraine—1919-1921
Los Angeles—1913-1914
Louisiana—1900
Lovejoy—1895
Lowell
Lowell-American
Lozier—1901
Lozier—1924
Lozier-Steamer—1901-1916
L. P. C.
Luedinghand-Espenchied—1919
Lugo—1891
Lutz Steam—1898
Lutz Steam—1917
Luverne—1906-1914
Luxer Cab—1920
Lyman—1904
Lyman—1909
Lyman & Burnham—1903
Lyon Steam—1911
Lyons-Atlas—1914
Lyons-Knight—1914

Maccar—1906-1909
MacDonald—1923
Mack—1900
Mack—1911
Mackle-Thompson—1903
MacNaughton—1907
Macomber—1917
Macon—1915-1917
Macy-Rober—1895
Madison—1916-1918
Magic—1914
Magic—1922
Magnolia
Mahoning—1905
Maibohm—1916

Mais
Maje—1909
Majestic—1925
Malbomb—1900
Malcolm—1915
Malcolm-Jones—1914
Malden—1914
Maltby—1901
Malverun—1905
Manexall—1921
Manhattan—1905
Manistee—1912
Mann—1895
Mansor—1914
Maplebay—1908
Marathon—1908-1913
Marble-Swift—1902-1905
Marelock
Marion—1904
Marion—1910-1914
Marion-Handley—1916-1917
Marlboro Steam—1900-1902
Marmon—1904-1933
Marmon-Herrington—1932
Marquette—1912
Marquette—1930
Marr—1903-1914
Marron—1902
Marsh—1898-1899
Marsh—1905
Marsh—1920
Marshall—1920
Marshall Steam—1920
Martin—1920
Martin—1926-1931
Martin—1931
Martini—1905
Martin-Wasp—1920
Marvel—1907
Maryland—1900
Mascotte
Maserati—1948
Mason—1906
Mason—1909
Mason Steamer—1898
Massachusetts Steam—1901
Massilon
Master—1918
Mather
Matheson—1903-1913
Mathews—1907-1908
Mathewson—1904
Mathis—1930
Maunee—1906
Maxim—1928
Maxim-Goodridge Electric—1909
Maxim Tri-Car—1912
Maximtricycle—1895
Maxwell—1910-1925
Maxwell-Briscoe—1904
Maxwell-Briscoe—1910
Mayer—1899
Mayes—1948
Mayfair—1925
Maytag—1910
McCarron—1929
McCrea—1906
McCue—1909
McCullough—1899
McCurdy—1919
McDonald
McFarlan—1912-1927
McGill—1922
McIntyre—1904-1915
McKay Steam—1900-1902
McLaughlin—1916
McLean
Mead—1912
Mearo—1909
Mecca—1916

Mechaley Bros.—1903
Med-Bow—1907-1908
Medcraft—1907
Media—1900-1907
Meech-Stoddard—1924
Meiselbach—1904
Melbourne—1922
Mel Special—1923
Manard
Menges—1908
Menominne—1905
Mercedes—1904
Mercer—1910-1925
Mercer—1931
Merchant
Mercury—1904
Mercury—1918
Mercury—1939-
Merit—1920
Merkel—1905-1906
Merz—1914
Meiserve—1902
Messerer—1901
Metcar
Meteor—1902-1903
Meteor—1903-1908
Meteor—1914-1921
Metropol—1914
Metropolitan—1922
Metz—1909-1921
Metzger—1912
M. H. C.
M. G.—1948
M. G. Morris—1948
Michigan—1909
Michigan Electric—1903
Middleby—1909-1913
Middleby—1920
Midgley—1905
Midland—1908-1909
Midwest
Mier—1908
Mighty Michigan—1913-1914
Milac—1916
Milburn Steam—1903
Milburn Electric—1914-1922
Militaire—1916
Miller—1903
Miller—1912-1913
Miller—1936
Miller Special—1907
Miller Steam—1896
Mills Milwaukee—1900
Milwaukee Steam—1900-1902
Minerva—1908
Minneapolis—1915
Mino—1914
Mission
Mitchell—1903-1922
Mitchell-Lewis
Mobile—1897
Mobile Steam—1899-1902
Mock—1906
Model—1903-1906
Modern—1907
Modilette
Modoc—1911
Moehn—1895
Moeller—1911
Mogul
Mohawk—1903-1904
Mohler—1901
Moline—1903-1904
Moline—1908
Moline-Knight—1914-1920
Moller—1921
Monarch—1908
Monarch—1917
Monarch—1945
Moncrief—1901
Mondex-Magic—1914

Monitor—1916
Monroe—1916
Montgomery Ward—1898
Moddy—1900-1903
Mooers—1900
Moon—1905-1930
Moore—1906-1907
Moore—1916-1921
Moorespring Vehicle Steam —1888
Moorespring Vehicle—1890
Mora—1906
More
Moreland—1911
Morgan—1897
Morgan—1914
Morgan—1947
Morlock—1903
Morris-London—1922
Morris—1948
Morrison Electric—1891
Morris Salon Electrobat—1895-1897
Morrissey—1925
Mors—1901-1906
Morse—1904-1909
Morse—1914-1917
Morse Steam Car—1904
Morse Steam Car—1914
Mort—1913
Moto-Bloc—1908
Morton
Motorcar—1906
Motor-Drag—1896
Motorette—1906
Motorette—1911
Motorette—1946
Moyea—1903-1904
Moyer—1902
Moyer—1911-1915
M. P. M.—1915-1916
Mt. Pleasant—1914
Mueller—1896
Mueller Benz—1895
Mueller-Trap—1901
Muir Steam—1903
Mulford—1922
Multiplex—1913-1914
Muncie—1906
Murdough—1905
Munson—1900
Muntz—1950
Murray—1902-1903
Murray—1916
Murray-Mac-Six—1921
Mustang—1948
Mutual
Myer, B & F—1921

Nadig—1903
Nagaut-Liege—1908
Nance—1912-1913
Napier—1909
Napoleon—1916
Napoleon—1923
Nardi—1950
Nash—1917
National—1900-1924
National Electric—1900
National Four—1924
National Sextet—1920
N. E.—1910
Nebraska—1926
Necto—1916
Neilson—1907
Nelson—1905
Nelson—1918-1921
Nelson-Lemoon
Nester Electric—1912
Neuman Electric—1922
Neustadt-Perry Steam—1903
Neville—1910

Nevin—1927
Newark—1903
Newark—1911
New Bristol—1916
Newcomb—1921
New England Steam—1899-1900
New England Electric—1901
New Era—1911
New Era—1916-1917
New Era—1930
New Erie—1916
New Haven—1904
New Home—1901
New Perry—1910
New Pittsburgh—1915
New York—1900
New York—1903
New York—1905
New York—1926
New York & Ohio—1900
Niagara—1903-1905
Niagara—1915-1916
Niagara—1919
Nichols Sheppard—1910
Nichols—1908
Niles—1916
Nippy—1940
Noble—1902
Noma—1919-1924
Norma
Northern—1903-1906
Northway—1921
Northwestern—1904
Northwestern—1914
Norton—1902
Norwalk Underslung—1911-1922
Novara—1917
NRG—1950
Nyberg—1912-1914
Oakland—1907
Oakland—1917-1932
Oakman—1898
Oakman-Hertel—1902
Obertine—1915
O'Connell—1928
Odelot—1916
Offenhauser
Ogren—1907
Ogren—1916-1922
Ohio—1914
Ohio—1915
Ohio Electric—1900
Ohio Electric—1909-1915
Ohio Electric—1917-1921
Ohio Falls—1911-1913
Ohio Gas—1911-1913
Ohio Packard—1899
Okey—1902-1908
Oldfield—1917-1922
Old Reliable—1926
Oldsmobile—1897-
Olds Electric—1900
Olds Steam Car—1896
Oliver—1917
Olympian—1917-1918
Olympic—1922
Omaha—1913
Omort—1927
O'Neil—1907
Oneida—1917
Onlicar—1910
Only—1909-1915
Oregon—1916
Orient—1901
Orient-AutoGo—1900
Orient Buckboard—1905
Orion
Ormond—1904-1905
Orson—1911-1914
Oshkesch—1926

Otto—1911
Ottokar—1903-1904
Ottomobile—1911-1912
Overden—1897
Overland—1903-1905
Overland—1906-1930
Overhold Steam—1899
Overholt—1912
Overman Steam—1899-1900
O-We-Go—1914-1915
Owen—1899
Owen—1910-1914
Owens-Corning—1945
Owen Magnetic—1915-1921
Owen-Shoeneck—1915-1916
Owen Thomas—1908
Oxford Steam—1905

Pacific—1914
Pacific Special
Packard—1899-
Packers
Page—1907
Page—1923
Page-Toledo—1910
Paige—1909-1927
Paige-Detroit—1909-1927
Pak-Age-Car
Palmer—1906
Palmer-Moore—1905
Palmer-Singer—1907-1914
Pan—1918-1922
Pan-American—1902
Pan-American—1917-1922
Panhard-Levassor
Panther—1909
Paragon—1905-1907
Paragon—1922
Parenth—1921
Parenti—1920-1922
Parker—1919
Parkin—1903
Parry—1909-1911
Parsons Electric—1905
Partin—1912
Partin-Palmer—1914-1917
Pastoria
Pathfinder—1913-1917
Patriot Revere—1920
Patterson—1908-1924
Patterson-Greenfield
Patton Gas-Electric—1890
Pawtucket Steamer—1901-1902
Paxon—1911
Payne-Modern—1906-1909
Peabody
Peck
Peep—1942
Peerless—1902-1932
Peerless Steam
Pellitier—1906
Penninsular
Penn—1911-1913
Penn Thirty
Pennington—1894
Pennsy—1916-1919
Pennsylvania—1907-1911
People's—1901
Perfect—1948
Perfection—1906-1908
Perfex—1913
Perry—1896
Perry—1901
Peru
P. E. T.—1913
Peterbilt—1949
Peter Pan—1914-1916
Peters—1921
Petrel—1908-1911
Penest—1948
Phelps—1903

Phianna—1917-1919
Philbrin—1909
Philion—1893
Phipps—1911-1913
Phoenix—1900
P. H. P.—1912
Pickard—1908-1912
Piedmont—1917-1922
Pierce—1903
Pierce-Arrow—1901-1938
Pierce-Motorette—1899
Pierce-Racine—1906
Pierson—1912
Piggins
Pilgrim—1916
Pilliod—1916
Pilot—1909-1924
Pioneer—1909-1914
Piscorski—1901
Pitcher
Pittsburg—1896-1899
Pittsburg—1909-1912
Planche—1906-1909
Plass Motor Sleigh—1895
Playboy—1947
Plymouth—1910
Plymouth—1928-
P. M. C.—1908
Pneumobile—1914
Polo
Pomeroy—1902
Pomeroy—1922-1926
Ponder—1916-1923
Pontiac—1902-1908
Pontiac—1926-
Pope-Hartford—1895-1912
Pope-Robinson—1902-1904
Pope-Toledo—1903-1909
Pope Tribune—1904-1906
Pope Waverly—1903-1907
Poppy Car—1917
Porkoney—1905
Porter Steam—1900
Porter—1921-1922
Port Huron—1922
Portland—1914
Poss
Postal—1907-1908
Powercar—1909-1912
Prado—1920-1922
Pratt—1911
Pratt-Elkhart—1912-1914
Praul—1895
Preferred
Prefex—1912
Premier—1903-1927
Premocar—1922
Prescott Steam—1900-1905
Preston—1922
Pridemore—1914
Primo—1906-1915
Prince
Princess—1905
Princess—1914
Princess—1917
Princeton—1923
Prodal—1908
Prospect—1902
Protos—1908
Pullman—1907-1925
Publix—1947
Pungs-Finch—1902-1910
Pup—1948
Puritan Steam—1902
Pyramid

Queen—1902-1906
Quick—1899-1900
Quinlin—1904
Quis—1904

Racine—1895

Rae—1909
Rae Electric—1898
R. A. C.
Railback—1914
Rainier—1904-1910
Ralco
Raleigh—1921-1922
Rambler—1900-1914
Rambler—1950
Randall Steam—1905
Rand & Harvey Steam—1899
Randolph Steam—1910
Ranger—1907
Ranger—1920-1922
Raniet—1900
Rapid—1899-1903
Rassler—1907
Rauch & Lang—1905-1917
Rauland Electric—1922-1928
Rayfield—1911-1914
Raymond—1913
R-C-H—1912-1916
Read—1914
Reading—1912
Reading Steamer—1900-1902
Real—1908
Reber—1902-1903
Red Arrow—1915
Red Bug—1928
Red Jacket—1904
Red Wing—1906
Reed
Rees—1921
Reese—1887
Reeves—1897
Reeves (Octo Auto)—1908
Reeves (Sexto Auto)—1911
Regal—1908-1922
Regas—1903-1905
Reid—1903
Reiland & Bree—1928
Reinertsen—1902
Reliable—1906
Reliable-Dayton—1908-1909
Reliance—1905
Remel-Vincent Steam—1923
Remington—1901-1914
Renault—1900
Reno—1908
Reo—1904
Republic—1911
Revere—1919-1926
Rex—1914
Reya
Rhode Island—1899-1904
Rhodes—1908-1909
Richard—1914-1920
Richards—1903
Richelieu—1922
Richmond—1905-1914
Rickenbacker—1922-1927
Ricketts—1909
Riddle—1916
Rider-Lewis—1909-1911
Riess-Royal—1922
Rigs-That-Run—1899
Riker Electric Stanhope—1899
Rikmobile—1947
Riley—1948
Riley & Cowley Steam—1902
Rilsbach—1914
Riper—1917
Ritz—1914
Riveria
R & L Electric—1920
R. M. C.
R. O.—1911
Roach
Road Cart—1896
Road Plane—1945
Roader—1911-1912
Roamer—1916-1920

Robe
Roberts—1904
Robie—1914
Robinson—1900-1902
Robson—1912
Roche
Rochester-Steamer—1901
Rockway—1902
Rocket—1913-1914
Rockette—1948
Rock Falls—1919-1925
Rockiff
Rockne—1931-1933
Rockwell—1908-1912
Rodable
Rodgers—1921
Roebling—1909
Roebling Planche—1908
Roger—1895
Roger—1903
Rogers & Hanford—1902
Rogers—1911-1912
Rogers Steam—1899
Rogers Thatcher
Rogue—1950
Rollin—1923-1925
Rolls Royce—1921
Roman—1909
Romano—1916
Romer—1921
Roosevelt—1928-1929
Roper-Steam Vehicle—1899
Ross Steam—1905-1909
Ross—1905-1917
Rotarian
Rotary—1904-1905
Rotary—1922
Rovena
Rover—1950
Rowena-Front Drive—1926
Rowe
Royal Electric—1904
Royal Tourist—1904-1911
Rubay—1922-1924
Ruggmobile—1922
Ruler
Rumley—1920
Runabout
Rush—1918
Rushmobile—1902
Russell—1902-1923
Russell-Knight—1914
Rutenberg
Ruth
Ruxton—1929-1930
R & V Knight—1920-1925
Ryder

Saginaw—1914-1916
Salisbury—1895
Salter—1912
Salvador—1914
Sampson—1904-1911
Samuels Electric—1900
Sandlow—1915
Sandusky—1903
Santos Dumont—1902-1904
Saoutchik—1948
Saurer—1907
Savage—1912
Sawyer
Saxon—1914-1922
Saxon Duplex
Sayers—1907-1924
Sayers & Scoville—1907
Schacht—1905-1913
Schaum—1901
Schleicher—1895
Schloener—1899
Scarab—1935
Schebler—1908
Schlosser
Schoening—1895
Schnader—1907

Schwartz—1920
Scott—1901
Scott—1921
Scott & Clark—1912
Scott-Newcomb Steam—1921
Scripps
Scripps-Booth—1915-1922
Scootmobile—1947
Seaberry—1948
Seabrook
Seagrave—1921
Searchmont—1901-1903
Sears Motor Buggy—1909-1913
Sebring—1910
Seery—1900
Sekine—1923
Selden—1903-1912
Sellers—1909-1912
Sellew-Royce
Selly Steam—1905
Senator—1906-1910
Seneca—1917-1924
Serpentina—1915
Serrifile—1921
Servitor—1907
Sessions—1904
Seven-Little-Buffaloes—1908-1909
Severin—1920-1922
S. G. Gay—1915
S. G. V.—1912-1916
Sha—1920
Shad-wyck—1917-1919
Shain—1902-1903
Sharon—1915-1916
Sharp-Arrow—1908-1909
Sharp Steam—1901
Shatwell's Steam—1901
Shaver's Steam Buggy—1895
Shaum—1905
Shaw—1914-1921
Shawmut— 1905-1910
Shaw-Wick
Shelby—1902-1903
Sheridan—1921
Shoemaker—1906-1909
Sibley—1911
Sibley-Curtis—1912
Sigma—1914
Signal—1915
Signet—1913
Silent—1912
Silent Knight—1908-1909
Silent Northern—1902
Simca—1948
Simmons—1893
Simms Light Four—1920
Simonds Steam Wagon—1895
Simplex—1905
Simplex-Crane—1915
Simplex Steam—1901
Simplecites—1905
Simplicity—1907-1920
Simplo—1908-1909
Sinclair-Scott—1908
Singer—1915-1920
Singer—1947
Singer Dine—1947
Single Center—1906
Sintz—1900-1904
Sizaire-Naudin—1908
S. J. R.—1915-1916
Skelton—1920-1922
Skene—1900
Slater—1909
S & M—1913-1914
Smisor—1899
Smith—1896
Smith—1905
Smith & Mabley—1904-1907
Smith Motor Buggy—1896
Smith Motor Wheel—1913
Smith Spring Motor—1896
S. N.—1921

Snyder—1906-1908
Sommer—1908-1914
Soules—1905-1908
South Bend—1919
Southern—1921-1922
Southern Six—1921
Sovereign—1907
Spacke—1920
Spartan—1911
Spaulding—1902-1903
Spaulding—1910-1916
Special—1909-1910
Speedway—1905-1906
Speedwell—1907-1909
Spencer—1921-1922
Spencer Steam—1901
Spencer-Stearns
Sperling—1921-1923
Sperry
Sphinx—1914-1917
Spicer—1904
Spiers—1900
Spiller—1900
Spoerer—1908-1916
Sprague—1896
Springer Steam—1904-1906
Springfield Electric—1908
Springfield Gasoline—1908-1811
Springfield Steam—1900
Sprite—1914
Spurr—1901
Squirer Steamer—1899
S. S. E.—1917
Stafford—1912-1914
Stammobile Steam—1905
Standard—1902
Standard—1904-1905
Standard—1909-1910
Standard—1915
Standard—1948
Standard Eight—1916-1922
Standard Electrique—1903
Standard Electric—1911-1916
Standard Steam—1920
Standard Steamer—1900
Standard Steamer—1921
Stanhope—1908
Stanley—1908-1909
Stanley—1912
Stanley Steamer—1896-1925
Stanley-Whitney—1899
Stanton Steam—1901
Stanwood—1921-1922
Staples—1900
Star—1908
Star—1922-1928
Starin—1901
States—1917-1919
Static Super-Cooled—1923
Staver—1907-1914
Staver-Chicago—1908
Steamobile—1901-1902
Steam Vehicle—1900
Stearns—1899-1912
Stearns-Knight—1912-1930
Stearns Steam Car—1898
Steco—1914-1916
Steele—1915
Steel-Swallow—1907-1916
Stegeman—1915
Steinhart-Jensen—1908
Stein-Koenig—1926
Stemmetz
Stephens—1916-1924
Sterling—1900
Sterling—1909-1915
Sterling—1914-1916
Sterling-Knight—1916-1925
Sterling Steam—1900
Sternberg—1909
Stetson—1917
Stevens—1917
Stevens-Duryea—1902-1927

Stewart—1895
Stewart—1915-1916
Stewart-Coates Steam—1922
Stewart Newcomb
Steyi—1919
Stickney Motorette—1913-1914
Stilson—1908-1909
St. Joe—1909
St. John—1903
St. Louis—1899-1901
St. Louis—1907
St. Louis—1922
Stoddard—1911
Stoddard-Dayton—1904-1913
Stoddard-Knight—1911
Storck Steam—1902
Storms Electric—1915
Story—1950
Stoughton—1919
Stout—1946
Stranahan—1906-1910
Strathmore—1899-1901
Stratton—1909
Stratton-Premier—1923
Streater—1908
Stringer Steam—1901
Strobe & Martin Electric—1910
Strong & Rogers—1900
Strouse Steam—1915
Strouss—1897
Studebaker—1912-
Studebaker Electric—1902-1904
Studebaker-E. M. F.—1909
Studebaker-Garford—1905-1910
Sturges Electric—1898
Sturgis—1897
Sturtevant—1904-1907
Stutz—1913-1935
Stutz H. C.—1920
Stuyvesant—1911-1912
S-U—1921
Suburban—1912
Success—1906
Sultan—1906-1911
Summit
Sunbeam Talbot—1950
Sun—1915-1922
Sunset—1906-1909
Superior—1914
Super Chief—1947
Super Kar—1947
Super Steamer
Supreme—1922
Suttle Steam
Sweany Steam Carriage—1895
Syndusky—1903
Synnestvedt Steam—1904-1908
Syracuse Electric—1899

Tait Electric
Talbert—1948
Talbot—1948
Tally-Ho
Tarkington—1922-1923
Tasco—1947
Tatra—1924
Taunton—1901
Taylor
Teel—1913
Templar—1918-1924
Temple—1899
Templeton-Dubrie—1910
Ten Eyck—1903-1909
Terraplane—1932
Terwilliger Steam—1897
Tex—1915
Texan—1919

Texas—1918-1921
Texmobile—1920
Theiss—1900
Thermat Monohan
Thomas—1902-1912
Thomas-Detroit—1906-1908
Thomas Flyer—1902
Thompson—1901-1904
Thomson Electric—1896
Thornycroft—1901
Thorobred—1901
Thresher Electric—1900
Thurston—1898
Tiffany—1913
Tiffin
Tiger—1914
Tillie—1906
Tincher—1904-1909
Tinkham—1899
Tjaarda—1935
Toledo—1902
Toledo Steamer—1900-1903
Tonawanda
Toppolino—1947
Torbensen—1902-1908
Toquet—1905
Touraine—1914-1916
Tourist—1902-1909
Tower—1918
Towne Shopper—1948
Trabold—1921
Tractomobile Steam
Traffic—1914
Transit—1902
Trask-Detroit—1922
Traveler—1906
Traveler—1910-1914
Traveler—1924
Trebert—1907
Triangle—1918
Tribune—1913-1914
Tri-Car—1912
Trimo
Tri Moto—1901
Trinity Steam—1900
Triplex—1907
Triunfo—1904
Triumph—1900-1915
Trumbull—1914
Tucker Torpedo—1946
Tudhope—1913
Tulsa—1918-1922
Turner—1900
Turner-Fritchie—1903
Twincity—1912
Twombly—1911-1915
Twyford—1902

Ullrich—1934
Ulster—1939
Ultimate
Unic
Union—1902-1909
Union—1912
United—1912
United Motor—1902
Unito—1908
Universal—1917
University—1907
Unwin
Upton—1903-1905
U. S.—1899
U. S.—1908
U. S. Electric—1899-1901
U. S. Long Distance—1900-1904
U. S. Motor Vehicle—1899

Valey
Valley Dispatch—1927
Van—1909
Van Dyke—1912
Van L—1911
Vandergrift—1907

Vanell Steam Carriage—1895
Vanette—1946
Vaughan—1905
Vaughan—1914
Vaughan—1923
Van Wagoner—1900
Vauxhall—1907
V. E. Electric—1903-1904
Veerac
Velie—1908-1928
Vernon—1916-1922
Verrett—1896
Vestal—1914
Viall
Victor—1913-1914
Victor Steam—1908-1909
Victor Steamer—1899-1902
Victoria
Victory—1913
Victory—1920-1921
Victory Steam—1900
Viking—1908
Viking—1929-1930
Vim Cyclecar—1925
Virginian—1911
Vixen—1914
Vocur
Vogue—1917-1923
Voisin—1926
Voiturette—1914
Volkswagon—1949
Vulcan—1913-1915

Waco—1915-1917
Wahl—1914
Wagenhals—1913-1915
Walden
Waldron—1909-1910
Walker—1905-1906
Walls—1901-1904
Walter—1906-1909
Waltham—1898
Waltham—1900
Waltham—1920-1922
Waltham Orient—1900-1909
Walther—1903
Walworth—1905
W & R—1910
Wanamaker—1899
Ward Electric—1914
Ward LaFrance—1919
Ward Leonard—1901
Ware—1918
Warren—1909-1914
Warren-Detroit—1909
Warwick—1901
Washburn—1896
Washington—1909-1911
Washington—1919-1925
Wason—1908
Wasp—1919-1925
Watch-City—1900
Waterloo—1904
Waterman & Chamberlain—1900
Waterous—1907
Waters—1903
Watrous—1905
Watt Steam—1910
Waukeshaw—1908
Waverly Electric—1898-1916
Wayne—1904-1909
Webb-Jay Steam
Weidley-Entz
Weidley
Welch—1904-1911
Welch & Lawson—1895
Welch-Detroit—1911
Welch-Marquette
Welch-Pontiac
West Gasoline Vehicle—1895
Westcott—1912-1925
Western—1901
Westfield Steam—1902

Westfield—1913
Westinghouse—1913
Weston—1896
Weston—1906
W. F. S.—1912
Whaley-Henriette—1900
Wharton—1921-1922
Wheel—1902
Whippet—1926-1930
White—1910-1920
White Hall—1911
White Hickory—1906
White Star
White Steamer—1902-1910
Whiting—1905
Whiting—1911-1912
Whitney—1878-1899
Wick—1902
Wilco (Wick)
Wilcox—1907
Wildman—1902
Willard—1905
Williams Electric—1907
Wills St. Claire—1921-1926
Willys—1930-
Willys-Knight—1914-1932
Willys-American—1940
Willys-Six
Willys-Overland—1903
Wilson—1903
Windsor—1928-1930
Windsor White
Wing—1896
Wing—1922
Winner—1907
Winther—1920-1921
Winton—1897-1924
Wisconsin—1899
Witt Will—1916
Wizard—1914
Wizard—1921-1922
Wolf—1907
Wolfe—1902-1907
Wolseley—1912
Wolverine—1896
Wolverine—1904-1906
Wolverine—1917-1918
Wolverine—1927-1928
Wolverine-Detroit—1904
Wonder—1917
Woodruff—1902
Woods—1900-1917
Woods Dual Power—1917
Woods Electric—1898
Woods Electric—1901
Woods Mobilette—1914-1918
Woodworth
Woonsocket—1904
World—1905
Worth—1909-1910
Worthington—1904
Worthley—1897
Wright—1904
Wright—1925

Xenia

Yale—1903-1904
Yale—1917
Yates—1914
York—1905-1908
York-Pullman—1908

Zedal—1909
Zent—1902-1907
Zentmobile—1903
Zephyr—1936
Zimmerman—1903
Zimmerman—1908-1916
Zip—1913-1914
Zust—1908