

***The Big Change: America Transforms Itself: 1900-1950***  
By Allen Frederick Lewis, 1/1/1993

**Chapter 7      The Dynamic Logic of Mass Production**

During the year 1903 a forty-year-old Detroitier named Henry Ford, having left the employ of the little Detroit Automobile Company with the idea of going into the manufacturing business for himself, designed and built a big and powerful racing car. Why did he do this? He had no great interest in speed; his idea was quite different: he wanted to make a small, light, serviceable vehicle. The reason he built a racing car was that he wanted capital, and to attract capital he had to have a reputation, and in those days when automobiles were thought of as expensive playthings in which the rich could tear noisily along the dusty roads, the way to get a reputation was to build a car that could win races.

Having constructed a car of terrifying power, Ford cast about for a racing driver; and since it would require both strength and reckless daring to control his monster at high speeds—strength because it steered with an unwieldy tiller instead of with a wheel—he hired a professional bicycle racer named Barney Oldfield, and spent a week teaching him to drive the car. Said Oldfield as he climbed into the car for his first race at the Grosse Point track late in 1903, "Well, this chariot may kill me, but they will say afterward that I was going like hell when she took me over the bank."

Oldfield did not go over the bank. He won the race by a wide margin. Ford won his reputation. And it got him enough capital-- \$28,000 in cash--to start the Ford Motor Company, of which he became president, general manager, designer, master mechanic, and superintendent.

During the next few years Ford produced, successfully, several varieties of cars and his manufacturing business expanded rapidly. In 1908 he put out what he considered the most satisfactory model to date; he called it Model T. And soon afterward he made a decision that astonished his associates. Let him record it in his own words: ". . . In 1909 I announced one morning, without any previous warning, that in the future we were going to build only one model, that the model was going to be Model T, and that the chassis would be exactly the same for all cars, and I remarked: 'Any customer can have a car painted any color that he wants so long as it is black.'"

This decision grew naturally out of Ford's experience and temperament. He was a Michigan farmer's son, a gadget-loving Yankee with utilitarian and democratic instincts, uninfected by higher education. As a boy he had been so fascinated with machinery that

he had spent endless hours taking watches to pieces and putting them together, and then constructing watches of his own. At the age of sixteen he had seen a "road engine"--a steam engine that could use its steam power to propel itself in an ungainly way from job to job--and had thereupon been fascinated with dreams of horseless carriages, and also of machines that farmers could use to do their hard work for them. Six years later, in 1885, he had seen an Otto gas engine--a European forerunner of the automobile engines of today--and had gone to work on engine design. By the spring of 1893 he had built his first horseless carriage and tried it out on the road. During the next ten years, while he held money-earning jobs, he was forever experimenting in his spare hours, and gradually his ideas developed.

He wanted to build, not a showy car for the well-to-do, but a practical, effort-saving car for ordinary people like himself. He wanted it to be light: few things offended him as did the widespread notion that weight meant strength. He wanted it to be inexpensive; as he said later in his autobiography, "The public should always be wondering how it is possible to give so much for the money." He felt that many manufacturers were mistaken in fixing their attention upon profits, and that bankers had a bad influence upon manufacturers because they thought about improving profits instead of about improving the product. If the product and the price were right, he thought the profits would take care of themselves. And he believed that if he concentrated on a single model, he could cut the cost of manufacture so sharply that masses of ordinary people would flock to buy it.

As his sales of Model T increased, Ford deliberately dropped the price--and they increased still further. In 1913 he put in his first assembly line, and by the beginning of 1914 he was producing the entire car on the assembly-line principle. Each workman performed a single operation; each element of the car went on a power-driven moving conveyor platform past a series of these workmen, each of whom added or fixed in place some part of it; and these various assembly lines converged upon a main conveyor platform on which the chassis moved to completion.

In principle this method of manufacture was far from new. It depended upon Eli Whitney's great discovery of the principle of interchangeable parts. It owed much to the refinement of that principle by such men as Henry M. Leland, who had shown what close machining could do to make these interchangeable parts fit with absolute precision. Moreover, many a manufacturer had used the assembly-line principle to some extent. Cyrus McCormick, for instance, had done so in his reaper works as far back as the eighteen-fifties; and in particular the packers had used an overhead conveyor to carry slaughtered animals past a series of workers. Ford was indebted, too, to Frederick Winslow Taylor for his studies in "scientific management," the careful planning of manufacturing processes so as to save steps and motions. And Ransom Olds had already put a single type of automobile into quantity production--until his financial backers forced him back into the luxury market. Nevertheless the Ford assembly line, with its subassemblies, was unique as a remorselessly complete

application of all these ideas.

When his manufacturing system was complete, in January, 1914, Ford made an announcement that echoed round the world.

At that time the going wage in the automobile industry averaged about \$2.40 per nine-hour day. Ford announced that he would pay his men a minimum of \$5 per eight-hour day.

The explanation was that he had been paying year-end bonuses to the men, and now, as profits expanded, he thought he should put the profit-sharing on a pay-as-you-go basis. The morale in the plant had been unsatisfactory; he thought this might improve it. And he also felt, however vaguely, that if more Americans got high wages, there would be a market for more industrial products, including of course Ford cars. Because he was afraid that the sudden jump in income might demoralize the spending habits in some families, he made the raise conditional upon their demonstrating that they didn't waste the money--a naïvely paternalistic idea that he later had to modify. But before long he was paying nearly all his workmen the astonishing new wages.

The public reaction to the announcement was terrific. Most businessmen were indignant: Ford was ruining the labor market, he was putting crazy ideas into workmen's heads, he would embarrass companies that couldn't possibly distribute such largess, and he was a crude self-advertiser. There was much scoffing of the sort that a Muncie, Indiana, newspaper indulged in many years later: "Henry Ford thinks that wages ought to be higher and goods cheaper. We agree with him, and let us add that it ought to be cooler in the summer and warmer in winter." People with tenderer minds hailed Ford for his generosity and said that he was showing what a noble conscience could achieve in the hitherto unregenerate precincts of industry. Meanwhile applicants for jobs mobbed the Ford plant.

What Ford had actually done--in his manufacturing techniques, his deliberate price cutting, and his deliberate wage raising--was to demonstrate with unprecedented directness one of the great principles of modern industrialism: the dynamic logic of mass production. This is the principle that the more goods you produce, the less it costs to produce them; and that the more people are well off, the more they can buy, thus making this lavish and economical production possible.

Every successful manufacturer had followed this principle up to a point. But few had been able to follow it far; or, if able to, had been able to resist for very long the human temptation to cease expanding their output unduly and then to cash in by charging what the traffic would bear. Very few manufacturers, for that matter, had a single product to sell for which there proved to be an almost inexhaustible market if costs were reduced, or could go on, year after year, turning out this identical product with very little

retooling. With these special advantages, Henry Ford--a cranky and self-willed man, in many respects an ignorant and opinionated man, and a merciless competitor, but in his own special way a man of stubborn democratic faith--followed the dynamic logic of mass production all the way, and the results were uncanny.

In 1909-10 his price per car had been \$950. It went down to \$780, to \$690, to \$600, to \$550, to \$490, to \$440, to \$360; then, after an increase due to the shortages and inflation of World War I, went down again until by 1924 the price of a Ford (without self-starter) was only \$290. Meanwhile production had expanded by slow degrees from 18,664 cars all the way to 1,250,000 in 1920-21.

Ford followed the principle without compromise until 1927, when two facts caught up with him. One was that Americans wanted not only cheaper cars, but better ones; rival manufacturers had discovered that if you put out a new and improved model each year, the older ones would become obsolescent, and thus you could turn old customers into new ones; and these brighter and livelier new models had succeeded in making the gaunt and tinny Model T obsolescent indeed. The other fact was that the thirst for new and up-to-date vehicles was automatically producing a flourishing market in second- and third- and fourth-hand cars, at dwindling prices, so that Model T no longer had a monopoly of the bargain hunters' market.

In the meantime, however, Ford's experiment had had what Paul Hoffman has called "multiplier value." For he had advertised a principle which, though more often honored in the breach than in the observance, has a place of some sort in the thinking of every industrial manager today. The continuing discovery and demonstration of this principle has been one of the most powerful forces in the making of twentieth-century America. For it has had its corollaries: that a nation of men and women secure against exploitation and acute poverty is a nation of delighted buyers of goods, to everybody's profit; that it pays better to produce the same sort of food, clothing, and equipment for people of all income levels, than to produce luxury goods for a few; and that therefore one can make money by lowering class barriers. Thus is Marxism confounded--not by dogma, but by the logic of advanced industrialism itself; or, to put it another way, by capitalism turned to democratic ends.

## II

The great Ford experiment was only one element in the lively industrial development of the United States during the first two decades of the twentieth century. For industry and business in general were expanding and changing as the nation gradually came of age.

It was the golden heyday of railroading. The great network of railroad lines, which linked the country together from sea to sea, was now virtually complete, and the amount of business that the railroads did swelled hugely. By 1920, for example, they were not only carrying vastly more freight, but were carrying more than twice as many

passengers as in 1900, and carrying them longer distances than before, so that the figures for "passenger miles" almost tripled. Shares in the big railroad corporations--New York Central, Pennsylvania, Union Pacific, Northern Pacific, and so on-- were the pride, and sometimes the undoing, of investors; rare was the man of means who did not have railroad bonds in his portfolio--while bigger and more powerful locomotives hauled longer and heavier freight and passenger trains from city to city, hooting disdainfully as they crossed dirt roads as yet unpaved for automobile traffic.

It was the heyday of the electric trolley lines, too. Who remembers, now, such bright flowers of the streetcar era as the "Berkshire Hills," the extra-fare interurban trolley car that ran between Great Barrington, Massachusetts, and Bennington, Vermont, for several years after 1908--an elegant white car with buff trim and gold-leaf lettering, with wicker seats inside, and red brocaded curtains, and a Wilton carpet, all at the traveler's disposal for an extra fare of fifty cents? And who knows whether any of its proud passengers had any notion that the trolley era was to be short-lived, and that the "Berkshire Hills," like many another relic of that era, would ultimately become a roadside diner?

It was the morning of the electrical age. In 1900 Henry Adams had stood transfixed at the sight of a dynamo at the Paris Exposition, and had seen in it a "symbol of infinity"; during the years thereafter, more and more dynamos--and turbines--were being built, and transmission lines were carrying the magic power far and wide. In 1889, less than 2 per cent of the power used in industry had been electric; by 1919, over 31 per cent of it was. The steel industry grew mightily too as the open-hearth process of steel making supplanted the Bessemer process. By 1920 the output of iron and steel per capita had almost tripled since that memorable day in 1900 when Andrew Carnegie, returning home from a game of golf with Charlie Schwab, had scribbled down on a sheet of paper his terms for the sale of Carnegie Steel to Morgan to form the United States Steel Corporation. Skyscrapers were shooting up in the cities; and although most of the people who craned their necks at the 41-story Singer Building, built in New York in 1908, or the 50-story Metropolitan Tower which closely followed it, or the 60-story Woolworth Building, completed in 1913, probably thought of them as splendid symbols of the American zest for doing bigger and bigger things, they were more especially triumphs of the steel industry that had made their strength and grace possible, and of the electric industry that had made their vital elevator service possible.

If the skyscrapers looked like cathedral towers, the new department stores looked like palaces. And another sort of rival to the old-time individually owned store was multiplying. The chain stores were on their way, paced by the Woolworth five-and-tens and by the A & P, which was operating 200 stores by 1900, 400 by 1912 (when it opened in Newark its first cash-and-carry store), and then--after a terrific spurt of expansion--as many as 11,413 stores by 1924. Here again, at the distribution end of the industrial process, the dynamic logic of mass production was being demonstrated. For if you could build enough red-fronted stores, with standardized methods and low selling

costs, you could attract millions of shoppers, and cut your prices way down by placing huge bulk orders for goods--and still make money.

Meanwhile the automobile industry was going through the first and second phases of an evolution that seems to be standard in the industrial world. First was the phase of numerous competition. During these first two decades of the century automobile manufacturers were legion. Hundreds of mechanically-minded men scrabbled for capital and set up their little factories to produce cars: bicycle makers like Pope and Alexander Winton, electric-company employees like Ford, plumbers' supply men like David Dunbar Buick, wagon builders like the associates of Clement Studebaker, axle manufacturers like Harry C. Stutz. Innumerable makes were put on the market, with names that now have nostalgic overtones for people with long memories--Apperson, Briscoe, Stevens-Duryea, Franklin, Chandler, Scripps-Booth, Peerless, Pierce Arrow, Locomobile, Owen Magnetic, and so on endlessly.

And while this proliferation was still going on, the second phase began. Promoters with capital at their disposal--or with a smooth gift for selling stock--went shopping for promising automobile companies in order to merge them into combinations. At the very moment in 1908 when Ford was first putting Model T into production, William C. Durant--a promoter who, unlike Ford, fixed his vaulting mind upon properties and profits rather than upon machines--put together the Buick company and the Olds company and a few others under the management of a New Jersey holding company which he called General Motors, and which--after extreme vicissitudes, during which Durant lost control of it, recaptured it, and then lost control once more, this time to the du Ponts and their allies-- was to become one of the giants of the third phase of the industry. This third phase was that in which competition pushed to the wall, one by one, all but a few monster concerns and a few minor rivals.

Meanwhile, too, this same motor industry was beginning to bring out two other products, which were to affect the working lives of millions of people--the motor truck, which was destined to be the deadly rival of the railroads, and the tractor. The first crude

tractors had been built about 1902. By 1910, production had reached 4,000 a year; by 1920 it had passed 200,000 a year. The mechanization of the American farm and the planting of the grasslands to wheat were getting under way fast.

All this growth and change, so various and so exciting, was accelerated by the development of a rising idea--that of the dignity and importance of national advertising. In the nineties Munsey and McClure had discovered that if you could sell a popular magazine to enough people, and thus attract enough advertisers, you could sell it for less than the cost of printing it, and still make money through your advertising revenue. It was during the next two decades that Cyrus H. K. Curtis and his editors George Horace

Lorimer of the Saturday Evening Post and Edward Bok of the Ladies' Home Journal provided spectacular demonstrations of this journalistic version of the dynamic logic of mass production. What they did is summed up in the figures showing the growth of the Saturday Evening Post during those years. In 1902 it sold 314,671 copies per issue, and brought in advertising revenue of \$360,125. By 1922 it was selling 2,187,024 copies per issue—about seven times as many as in 1902--while its advertising revenue had climbed steeply to \$28,278,755--over 78 times as much as in 1902!

What do those figures signify? First, that through this five-cent magazine, and others like it, millions of Americans were getting a weekly or monthly inoculation in ways of living and of thinking that was middle-class, or classless American (as opposed to plutocratic or aristocratic or proletarian); and second, that through the same media they were being introduced to the promised delights of the automobiles, spark plugs, tires, typewriters, talking machines, collars, corsets, and breakfast foods that American industry was producing, not for the few, but for the many. The magazine publisher, the copywriter, the advertising artist, and the advertising agent were all abetting the mass-production principle.

One further word about this principle. It got a tremendous lift from World War I. For during that war--as during World War II-- manufacturers suddenly found themselves faced with one overwhelming demand: to make as many guns or shells or ships as possible, and as fast as possible. No need to worry about glutting the market. No need to worry unduly about price. Just concentrate on quantity and speed. The result took people's breath away: the volume of production was terrific. (And incidentally, it brought such fantastic profits, in the absence of any machinery for the renegotiation of contracts, that when the figures were paraded before the public during the nineteen-thirties, many people arrived at the interesting notion that there would be no more wars if it were not for profit-hungry munitions makers.)

Between 1914 and 1918 many a man who had only half believed that bigger production brought sharply reduced costs began to dream dreams of an exciting future when he saw what mechanization, unleashed, could accomplish.

### III

During those same years the seeds of future industries were being sown.

On January 10, 1901, Spindletop blew in: Anthony F. Lucas struck oil at Spindletop near Beaumont, Texas. Thus began a new era for the Southwest--and a guarantee that the automobile business, then in its feeble infancy, would have as it grew to maturity an abundant source of power.

On December 17, 1903, on the sands of Kittyhawk on the North Carolina coast, Orville Wright made a twelve-second flight—and then his brother Wilbur made a fifty-nine-second flight--in an airplane they had painstakingly built. Several years went by before the public grasped what the Wrights were doing; people were so convinced that flying was impossible that most of those who saw them flying about Dayton in 1905 decided that what they had seen must be some trick without significance--somewhat as most people today would regard a demonstration of, let us say, telepathy. Never before or since, in all probability, have the newshawks of America taken longer to apprehend a momentous story. It was not until May, 1908--NEARLY FOUR AND A HALF YEARS AFTER THE WRIGHTS' FIRST FLIGHT--that experienced reporters were sent to observe what they were doing, experienced editors gave full credence to these reporters' excited dispatches, and the world at last woke up to the fact that human flight had been successfully accomplished—though in the interval the Wrights had flown repeatedly and their longest flight had lasted a full thirty-eight minutes! The seed of the great aviation industry had been sown in 1903; it began to sprout, very belatedly, in 1908.

Wireless telegraphy had been discovered in 1895 by an Italian, Guglielmo Marconi--but its future possibilities were not comprehended in 1900, when Reginald A. Fessenden first transmitted speech by wireless; or in 1904, when Sir John Ambrose Fleming produced the radio detector or Fleming valve; or in 1907, when Dr. Lee De Forest produced the audion; or in 1912, when Edwin H. Armstrong discovered the electric generator circuit by means of which the feeble impulses received by radio could be "fed back" and multiplied many times. For that matter, as late as 1915, when David Sarnoff, assistant traffic manager of the Marconi Wireless Telegraph Company, proposed a "radio music box" and suggested the future possibilities of public broadcasting, he spoke to deaf ears. But the seeds of the radio and television industries had been sown.

In 1903 was produced the first moving picture which told a connected story, The Great Train Robbery. About 1905 the first nickelodeons appeared--crude motion-picture theaters, often improvised in vacant stores. And the movies began their slow march to importance as a vehicle of popular entertainment and as an inculcator of the assumptions of the classless American life.

In 1909 Leo H. Baekeland first put on the market a chemically-made substance that he called bakelite. It was not the first plastic--that honor had gone to celluloid, much earlier--but it may justly be called the seed from which the plastics industry grew. And along with the material which, when first clumsily produced before 1920, was known as "artificial silk," and which later came to be known as rayon, it helped to beget one of the most important concepts of twentieth-century invention: the idea that man could produce materials to order--not simply synthetic imitations of nature, but often materials superior to what nature could produce. Witness the subsequent miracle of nylon.



One might add that in 1911 Willis H. Carrier read a paper on what he called "Rational Psychometric Formulae," which presented the theory and the practical data on which the air-conditioning industry was later based. And that at the St. Louis Exposition in 1904 there was exhibited an oil engine built in Providence, Rhode Island, after the plans of the great German inventor, Rudolf Diesel. Few people at the time seemed unduly excited by the fact that they had met it at St. Louis, but the Diesel engine, too, had a future.

To understand the America of today one must not only realize how vital to its development was the revolt of the American conscience, which implanted in Americans the idea that you could repair the economic and political machinery of the country, so as to make it work better for the majority, without stopping the machine; one must also realize that the revolt of the American conscience might have caused a mere redistribution of wealth rather than a multiplication of wealth unless the machine had kept on running and a host of men had been tinkering with it, revealing how it could follow the dynamic logic of mass production, and also discovering and inventing new things for it to do in the long and hopeful future.

## **Chapter 8 The Automobile Revolution**

In the year 1906 Woodrow Wilson, who was then president of Princeton University, said, "Nothing has spread socialistic feeling in this country more than the automobile," and added that it offered "a picture of the arrogance of wealth." Less than twenty years later, two women of Muncie, Indiana, both of whom were managing on small incomes, spoke their minds to investigators gathering facts for that admirable sociological study of an American community, Middletown. Said one, who was the mother of nine children, "We'd rather do without clothes than give up the car." Said the other, "I'll go without food before I'll see us give up the car." And elsewhere another housewife, in answer to a comment on the fact that her family owned a car but no bathtub, uttered a fitting theme song for the automobile revolution. "Why," said she, "you can't go to town in a bathtub!"

This change in the status of the automobile from a luxury for the few to a necessity for the many--a change which, as we shall see, progressively transformed American communities and daily living habits and ideas throughout the half century--did not come about abruptly. It could not. For it depended upon three things. First, a reliable, manageable, and not too expensive car. Second, good roads. And third, garages and filling stations in profusion. And all these three requirements had to come slowly, by degrees, each reinforcing the others; a man who had tried to operate a filling station beside a dusty rural road in 1906 would have speedily gone bankrupt. But it was during the 1920s that the impact of the change was felt most sharply from year to year.

When Woodrow Wilson spoke in 1906, and for years thereafter, the automobile had been a high-hung, noisy vehicle, which couldn't quite make up its mind that it was not

an obstreperous variety of carriage. It was so unreliable in its performance, so likely to be beset by tire blowouts, spark-plug trouble, carburetor trouble, defects in the transmission, and other assorted ailments, that a justly popular song of the time celebrated the troubles of the owner who "had to get under, get out and get under." The country doctors who in increasing numbers were coming to use the little brass-nosed Fords of the day had to be students of mechanical as well as human pathology. Each car had a toolbox on the running board, and tourists were accustomed to carrying with them blowout patches, French chalk, and a variety of tire irons against that awful moment when a tire would pop, miles from any help. One had to crank the engine by hand--a difficult and sometimes dangerous business. All cars except the limousines of the wealthy were open, with vertical windshields that gave so little protection against wind and dust to those in the back seat that dusters and even goggles were widely worn; and a gust of rain would necessitate a frantic raising of the folding top and a vexatious fitting and buttoning of the side curtains.

Roads were mostly dusty or muddy, with no through routes. Even as late as 1921 there was no such thing as an officially numbered highway. In that year the Automobile Blue Book warned those who proposed to drive from Richford, Vermont, to Montreal: "Chains on all four wheels absolutely essential in wet weather." And it advised tourists in general that "where mountain roads, sandy stretches, and muddy places are to be met with, a shovel with a collapsible handle" might prove very useful. At the time when Wilson spoke, panicky horses were still a hazard for the driver in remote districts, and speed limits set by farmer-minded local officials were sometimes low indeed: my personal memory tells me-- unbelievably but I think reliably--that in tranquil Holderness, New Hampshire, the original legal limit was six miles an hour.

Ford's energetic driving down of prices helped to make the automobile more popular, but equally responsible were a series of vital improvements: the invention of an effective self-starter, first designed by Charles F. Kettering and installed in the Cadillac in 1912; the coming, within the next two or three years, of the demountable rim and the cord tire; but above all, the introduction of the closed car. As late as 1916 only 2 per cent of the cars manufactured in the United States were closed; by 1926, 72 per cent of them were.

What had happened was that manufacturers had learned to build closed cars that were not hideously expensive, that did not rattle themselves to pieces, and that could be painted with a fast-drying but durable paint; and that meanwhile the car-buying public had discovered with delight that a closed car was something quite different from the old "horseless carriage." It was a power-driven room on wheels--storm-proof, lockable, parkable all day and all night in all weathers. In it you could succumb to speed fever without being battered by the wind. You could close its windows against dust or rain. You could use it to fetch home the groceries, to drive to the golf club or the railroad station, to cool off on hot evenings, to reach a job many miles distant and otherwise inaccessible, to take the family out for a day's drive or a week-end excursion, to pay an

impromptu visit to friends forty or fifty miles away, or, as innumerable young couples were not slow to learn, to engage in private intimacies. One of the cornerstones of American morality had been the difficulty of finding a suitable locale for misconduct; now this cornerstone was crumbling. And if the car was also a frequent source of family friction ("No, Junior, you are NOT taking it tonight"), as well as a destroyer of pedestrianism, a weakener of the churchgoing habit, a promoter of envy, a lethal weapon when driven by heedless, drunken, or irresponsible people, and a formidable convenience for criminals seeking a safe getaway, it was nonetheless indispensable.

Furthermore, a car was now less expensive to maintain than in the days when the cost of successive repairs might mount up to a formidable sum each year. And it could be bought on easy payments. The installment selling of cars, virtually unknown before World War I, spread so rapidly that by 1925 over three-quarters of all cars, new and old, were being sold this way.

Over these same years more and more roads had been paved, as public officials discovered that appropriations for highway surfacing were no longer considered mere favors to the rich; and garages and filling stations had multiplied.

The result of all these developments was a headlong rush to buy cars on the part of innumerable people to whom the idea of becoming automobile owners would have seemed fantastic only a few years before. In 1915 there were less than 2 1/2 million cars registered in the United States. By 1920 there were over 9 million; by 1925, nearly 20 million; by 1930, over 26 1/2 million.

So it was that the years between 1918 and 1930 introduced to America a long series of novelties which are now such familiar features of the American scene that one might think we had always had them: automatic traffic lights, concrete roads with banked curves, six-lane boulevards, one-way streets, officially numbered highways, tourist homes, and tourist cabins; and lined the edges of the major thoroughfares with that garish jumble of roadside services and businesses that Benton Mackaye and Lewis Mumford called "road town"--roadside diners, hot-dog stands, peanut stands, fruit and vegetable stalls, filling station after filling station, and used-car lots.

Meanwhile an antidote to the increasing snarl and confusion and frustration of traffic through the built-up areas of the East was already in preparation. For a generation the officials of Westchester County, New York, had been disturbed by the polluted condition of the little Bronx River and by its tendency to flood, and had been planning to restrict and control its flow while making it the chief attraction of a long strip of parkway--which almost incidentally would contain a through automobile road. When this road was opened to the public in 1925, motorists and traffic commissions and regional planners happily saw in it the answer to their prayers: an ample highway, with traffic lanes separated at intervals, uncluttered by local traffic, winding through a

landscape undefaced by commerce. On such a highway one could make time most agreeably. Other parkways, wider and straighter, were thereupon built, both in Westchester County and elsewhere; existing through highways were rebuilt to by-pass towns along their way; so that by August, 1931, Mackaye and Mumford, writing in Harper's, could announce that it had at last been recognized that the automobile was less like a family carriage than like a family locomotive, and also could look forward prophetically to a now-familiar scene. The time would come, they predicted, when a motorist with a long drive before him would ease into the fast traffic on a "townless highway" and presently would be spinning along "with less anxiety and more safety at 60 miles an hour than he used to have in the old road-town confusion at 25." When that day came, they said, the automobile would have become "an honor to our mechanical civilization and not a reproach to it."

In 1931 those days had not yet arrived. There was still no Merritt Parkway, no Pennsylvania Turnpike; there were no butterfly intersections; there was no such majestic combination of separate lanes of traffic as would be seen by the mid-century at Cahuenga Pass in Los Angeles, where no less than fourteen lanes were to run side by side. Already motor busses had arrived in quantity, but the progressive ripping up of trolley tracks had only begun. Already motor trucks were taking freight business away from the railroads, but there was still no such vast and humming all-night traffic of trucks, truck tractors, and semi-trailers between our great cities as later years were to bring. And that perfect symbol of our national mobility, the residential trailer, was only just appearing: the first trailer had been built in 1929 by a bacteriologist, for vacation use, but these houses on wheels were not to arrive in force until the mid-thirties. Yet already the pattern of the automobile age had been set.

## II

No such startling change in the habits of a people could have taken place without having far-reaching social effects. Let us glance at a few of them.

1. It developed the motorized suburb. Where a suburb had previously been accessible by railroad, but had been limited in size because of the difficulty of reaching the station from any place more than a mile or so away from it, it grew with startling speed, as real-estate subdividers bought up big tracts of property and laid out Woodmere Road and Edgemont Drive and Lakeside Terrace, suitable for English-cottage-type or Spanish-villa-type or New-England-salt-box-type (or, later, ranch-type) houses with attached garages; where the children would have the benefit of light and air and play space, and their parents would have the benefit of constant battles over the policies of the local school board; where the wife would gulp down her coffee at 7:52 to drive her husband to the 8:03 train before driving her children to school and doing the family errands.

In a suburb which had previously been inaccessible by railroad the same phenomenon took place with only a slight variation: the earner of the family drove all the way from

his almost-rural cottage to his place of work--and worried about the parking problem in the city. The number of Americans whose heart and treasure were twenty miles apart, as Agnes Rogers has put it, was vastly increased. And as more and more people whose living was dependent upon work at the center of the city fled to the leafy outskirts, urban planners began to be concerned about the blighted areas around the center of the city, where land values were falling and a general deterioration was manifest.

2. The coming of the automobile age brought other changes too. It caused a widespread shift of business, and of economic and social importance, from the railroad town to the off-the-railroad one; from the farm that was four miles from a railroad station but had poor soil to the fertile farm that was twenty or fifty miles from rail; and from the center of the small city to its outskirts.

The hotel on Main Street, that had formerly been the one and only place for the traveling salesman to stop, lost business to the tourist camp on Highway 84. In due course this tourist camp was transformed into a new kind of roadside hotel, which offered overnight privacy--and sometimes luxury--without having to carry the economic load of high land value and of maintaining a restaurant and other public rooms. The shops along Main Street lost business to the new Sears Roebuck store at the edge of town, with its ample parking lot. City department stores, becoming painfully aware of their dwindling appeal to commuters, opened suburban branches to catch the out-of-town trade. And by the mid-century, shopping centers were beginning to be developed out in the open countryside, where the prime essential of parking space would be abundant.

The big summer hotel lost business, as the automobile opened up to a vast number of people the opportunity either to range from motel to motel or to have their own summer cottages, to which they could travel not only for the summer, but even for occasional week ends at other times in the year, by wedging the family into a car that bulged with people, suitcases, and assorted duffle. In resort after resort a pattern of change was repeated: the big hotel on the point, or at the beach, or on the hilltop was torn down, while the number of cottages in the neighborhood of its site doubled, tripled, quadrupled; and meanwhile the Friday afternoon traffic out of the city to various points, beaches, and hilltops became denser and denser. The trunk manufacturers lost business to the suitcase manufacturers, and the express companies languished.

During the single decade of the nineteen-twenties, railroad passenger traffic was almost cut in half; only commuter traffic held up. (In the outskirts of New York, the next two decades were to witness a decline even in railroad commuter traffic, as the new parkways, bridges, and tunnels into Manhattan swelled the number of commuters by bus and by private car.)

3. The automobile age brought a parking problem that was forever being solved and then unsolving itself again. During the early nineteen-twenties the commuters who left their cars at the suburban railroad station at first parked them at the edge of the station drive; then they needed a special parking lot, and pretty soon an extended parking lot, and in due course a still bigger one--and the larger the lot grew, the more people wanted to use it. New boulevards, widened roads, and parkways relieved the bottlenecks at the approaches to the big cities--and invited more and more cars to enter. At the end of the half century the question, "Where do I park?" was as annoyingly insistent as it had been at any time since the arrival of the automobile.

4. The new dispensation brought sudden death. During the nineteen-twenties the number of people slaughtered annually by cars in the United States climbed from a little less than 15,000 in 1922 to over 32,000 in 1930; eighteen years later, in 1948, it stood at almost exactly the 1930 figure. As cars had become more powerful, and roads had become more persuasively straight and smooth, and speeds had increased, the shocking death toll each week end had led to the more cautious licensing of drivers and inspection of cars, to the multiplication of warning signs along the roadsides, and to the study of the causes and cures of death on the highway by such organizations as the National Safety Council and the Automotive Safety Council. But meanwhile youngsters had learned to play "chicken," and hot-rod enthusiasts had taken to the road; and many older drivers, after a few drinks, found it easy to persuade themselves that they should overtake and pass that damned old creeping car at the crest of a hill, and even the most sedate motorist sometimes fell asleep at the wheel--and now the accidents that took place, while less frequent, were more lethal. So that at the turn of the half century one could still predict with reasonable certainty that a holiday week end would bring several hundred men, women, and children to an abrupt and gory end.

5. Along with the telephone, the radio, and the other agencies of communication, the automobile revolution ended the isolation of the farmer. In 1900 Ray Stannard Baker, describing a wave of prosperity among the farmers of the Midwest, had said that when a farmer did well, the first thing he did was to paint the barn; the second was to add a porch to his house; the third was to buy a piano; and the fourth was to send his children to college. By the mid-twenties the purchase of a car was likely to come even before the painting of the barn--and a new piano was a rarity. The widening use of the tractor was enlarging farms; and with the aid of the profusion of scientific information which was made available through the publications and county agents of the Department of Agriculture, the farmer was becoming less and less a laborer by hand, using rule-of-thumb methods, and more and more a businessman of the soil, an operator of machines, and a technologist. No longer, now, when he visited town, was he a rube, a hayseed, whose wife and daughters looked hick in calico. By 1939 the Sears Roebuck catalogue was listing dresses "inspired by Schiaparelli," and in 1940 it solemnly announced that "The traditional lapse between the acceptance of new fashions . . . in metropolitan centers and on farms apparently no longer exists."

6. The automobile broadened geographical horizons, especially for people who had hitherto considered themselves too poor to travel. One could still find, here and there, men and women who had never ventured farther from home than the county seat, but their number was dwindling fast. For now the family who had always stayed at home on their day off could drive to the lakes or the shore, and on their vacation could range widely over the land, see new things, engage in new sports, meet new people. Even their daily radius of activity lengthened startlingly: by the nineteen-forties it might be a matter of routine for a rural family to drive ten or fifteen miles to do their shopping, twenty or thirty to see the movies, fifty to visit a doctor or dentist.

Furthermore, the automobile weakened the roots which held a family to one spot. Always a mobile people by comparison with the peoples of Europe, now Americans followed the economic tides more readily than ever before, moving by automobile--and before long by trailer--wherever there might be a call for construction workers, or fruit pickers, or airplane mechanics. Sober intellectuals were wont to deplore the growing American restlessness and to praise the man who was rooted to the land where he and his forefathers had been born and bred; but the automobile suited the American genius. For that genius was not static but venturesome; Americans felt that a rolling stone gathers experience, adventure, sophistication, and--with luck--new and possibly fruitful opportunities.

7. The automobile revolution engendered personal pride. When I say this I am not thinking of the envy-in-reverse of the man or woman who revels in having a finer model of car than the neighbors can afford, but of something less readily defined but no less real. Someone has said that the Asiatic, long accustomed to humiliation at the hands of the lordly white European, will endure it no longer after he has once sat at the controls of a tractor or a bulldozer. Similarly the American who has been humbled by poverty, or by his insignificance in the business order, or by his racial status, or by any other circumstance that might demean him in his own eyes, gains a sense of authority when he slides behind the wheel of an automobile and it leaps forward at his bidding, ready to take him wherever he may personally please. If he drives a bus or a huge truck trailer his state is all the more kingly, for he feels himself responsible for the wielding of a sizable concentration of force.

In 1950 the civilian labor force of the United States was estimated to number a little less than 59 million men and women; in the same year the number of drivers in the United States was estimated to be a little larger: 59,300,000. More than one driver for every jobholder! Never before in human history, perhaps, had any such proportion of the nationals of any land known the lifting of the spirit that the free exercise of power can bring.

**Questions (answers must be typed and completed in FULL for extra credit)**

1. How did Henry Ford acquire the capital (Money\$) to start the Ford motor company?
2. Why did Ford concentrate on a single model?
3. Explain the dynamic logic of mass production.
4. Explain capitalism turned toward democratic ends.
5. What was necessary for the transformation of America by automobile?
6. How does the author suggest America changed as a result of mass produced automobiles.

Your responses to the questions should be very complete in order to obtain extra credit.

**(12 homework / classwork points)**