The Rise of the Giants

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Closure of entry into automobile manufacturing did not occur in the United States until the market for new cars reached saturation in the late 1920s. But by 1910 it was evident to perceptive entrepreneurs that the era of artisanal production and freewheeling competition among many small producers was about over. Considerably heavier outlays of capital were becoming necessary to ensure success. With a view to reducing unit costs of production, improving the quality of the product, and ensuring the supply of components, the industry leaders early turned toward a policy of reinvesting their high profits in the expansion of plant facilities, both to increase the output of completed cars and to undertake the manufacture of many components formerly jobbed out. The nature of this trend was evident by 1910 to Walter E. Flanders, the Ford production manager from August 1906 until April 1908, when he left to go into business for himself with the EMF car. Flanders knew that "to equal in quality cars now selling at $700 to $900, it is not only necessary to build them in tremendous quantities, but to build and equip factories for the economical manufacture of every part." The formation of General Motors and the opening of the Ford Highland Park plant gave substance to Flanders's assertion that "henceforth the history of this industry will be the story of a conflict among giants." [1]

As the large-volume producers turned to integrated manufacturing operations, the automobile industry, both in the United States and in Europe, became capital intensive. As early as 1903 Renault made its own engines, and by 1905 it had its own foundry and body shop. Laux notes that Renault's "policy of vertical integration, by which he made more and more of his components himself, a policy that between the wars even led him to make his own steel, rubber tires, and electricity, was followed not

for economic motives but because it freed him from dependence on others and gave him a greater sway for his authority." As for the Austin Motor Company in England, although it was still buying some cylinder blocks, wheels, and frames from outside suppliers as late as 1914, from the firm's inception in 1905 its Longbridge factory was in essence a conglomeration of small specialist component manufacturing shops, which turned out all parts except electrical ones for Austin cars, plus assembly facilities. Saul describes the Austin operation as "conventional" in the British industry. Morris Motors, on the other hand, was an apparent anomaly. For its first production model, the 1913 Oxford, "Morris went to great lengths to buy out everything including engine and body—not in itself a new idea but unique for the scale on which it was conceived."[2] William Morris increasingly was forced to invest in his suppliers' businesses and to oversee their operations. However, Morris Motors remained basically an assembler of jobbed-out components until Morris acquired control of his British suppliers of bodies, engines, and radiators in 1923. Like Louis Renault in France and Henry Ford in the United States, Herbert Austin and William Morris still remained in personal control of their enterprises as late as the outbreak of World War II, long after such control was outmoded.

Vertical Integration at Ford

The Ford Motor Company began to move toward both vertical integration and one-man rule in mid-1906 with Henry Ford's buying control from Alexander Y. Malcolmson, his principal backer, and with the initiation of Model N production. A system of branch sales houses and agencies in major cities, situated at strategic points where freight rates changed, had started to replace dependence upon wholesale distributors in 1905. These branch houses carried complete inventories of Ford parts and accessories and closely supervised the prices and standards of service among franchised dealerships in their territories. By 1913 Ford had established branch houses in thirty-one cities in the United States, in nine cities in Canada, and in England, France, Germany, and Austria. "By the end of 1912 the company's sales organization [of some 7,000 dealers] covered practically every town in the United States of 2,000 or more," write Nevins and Hill. "Ford franchises for agencies were by this time regarded as highly valuable and were much sought after, and because of the heavy demand for the car, the company could obtain the best dealers in America and in foreign countries.... By the end of 1912, the company had more agents, more dealers, more salesmen employed by the agents ... than any other automobile company or almost any other manufacturing company which

might be named; it had probably more agencies than the rest of the automobile industry put together." [3]

Because cars could be shipped cheaper by rail in knocked-down form, Ford branch assembly plants were built, beginning in 1909 at Kansas City, Missouri. By American entry into World War I, branch assembly plants had been set up at freight-rate breaking points in twenty-eight cities under the supervision of William Knudsen. Outside the United States, assembly plants were built in Canada in 1904 and in England in 1911.

In 1911 Ford purchased the John R. Keim Mills of Buffalo, New York, a leading maker of pressed- and drawn-steel components. The plant's modern machinery and technical experts were moved to Highland Park, giving Ford the capacity to make its own crankcases, axles, housings, and bodies. With the inauguration of mass production at Highland Park in 1913 came complete independence from the Dodge Brothers, Ford's early supplier of both engines and complete chassis.

In the spring of 1915 Henry Ford began buying up huge tracts of land along the River Rouge southwest of Detroit and announced plans for developing a great industrial complex there. John and Horace Dodge were still minority Ford stockholders, despite having formed a rival company in 1912 to build their own car. They brought a lawsuit against Ford to stop his diverting Ford Motor Company profits into expansion of the Rouge plant instead of distributing them as dividends, which the Dodge brothers were counting on to finance expansion at Dodge. On January 6, 1917, the lifting of a restraining order by the court permitted Ford to go ahead with developing the Rouge facilities on the condition that he post a $10-million bond to safeguard the interests of his minority stockholders. A decision handed down on February 7, 1919, forced the Ford Motor Company to declare a special dividend of $19.275 million plus interest. Although, as the principal Ford stockholder, Henry Ford himself received the bulk of this special dividend, the experience left him determined to rid himself of his minority stockholders.

Ford "danced a jig all around the room" when he managed to buy up the options of his minority stockholders for the bargain price of $105.8 million on July 11, 1919. Financing the transaction required a $75-million loan from a financial syndicate composed of the Chase Securities Corporation, the Old Colony Trust Company, and Bond and Goodwin. The reorganized Ford Motor Company's shares were distributed 55.2 percent to Henry Ford, 41.7 percent to Edsel Ford, Henry's only progeny and heir apparent to the throne, and 3.1 percent to Clara Ford, Henry's wife. Edsel became titular president of the reorganized company, a position he held until his untimely death from cancer on May 26, 1943. No one, however, least of all Edsel, doubted that the Ford Motor Com-

pany after its reorganization was an autocracy subject to the whims of its aging, egocentric founder.

Turning the gigantic Ford Motor Company into a family-owned and family-managed business defied precedent, business trends, rational canons of business administration, and simple common sense. Henry Ford "wielded industrial power such as no man had ever possessed before," write Nevins and Hill; they point out that John D. Rockefeller never held more than two-sevenths of the Standard Oil Company shares, and J. P. Morgan owned a far smaller portion of U.S. Steel.[4] The trends in American industry were toward wider dispersal of ownership among many small stockholders, the separation of ownership from management, the rise of professional managers and salaried experts within the firm, and democratic decision making by committees of executives. At the Ford Motor Company, in sharp contrast, the champion of small business against the forces of monopoly in the Selden patent suit now fastened onto his mammoth corporation the family ownership and one-man rule fit for a mom-and-pop market. In addition to its main Highland Park and River Rouge plants, by the late 1920s the company had branch plants and agencies scattered across the globe, and had acquired rubber plantations in Brazil, iron mines and lumber mills in Michigan, coal mines in Kentucky and West Virginia, glass plants in Pennsylvania and Minnesota, a railroad, and a fleet of ships.

Durant Builds Up Buick

William C. Durant had much in common with Henry Ford. Both men were egocentric individualists, given to one-man rule and motivated by the risk-taking capitalist's cardinal values of power, prestige, and profits. Both were what Alfred P. Sloan, Jr., called "personal types of industrialists; that is they injected their personalities, their 'genius,' so to speak, as a subjective factor into their operations without the discipline of management by method and objective facts. Their organizational methods, however, were at opposite poles, Mr. Ford being an extreme centralizer, Mr. Durant an extreme decentralizer. And they differed as to products and approach to the market."[5] The mechanically minded Ford, as we have seen, approached the market from the perspective of improving production technology so as to sell the Model T at ever lower prices. In contrast, Durant was a flamboyant supersalesman, stock promotor, and stock manipulator, almost totally devoid of acumen in automotive technology.

Durant came out of semiretirement in 1904 to enter the automobile business as the head of Buick, at the behest of a group of Flint, Michigan

investors who were his close personal friends. He had made his fortune in the carriage industry, after buying the patent rights to a two-wheeled cart for $50 and going into business to produce it with $2,000 borrowed money and J. Dallas Dort, a Flint hardware merchant, as his partner. At first, production of the cart was farmed out to a local carriage manufacturer, who provided completed carts for $8 that Durant and Dort sold for $12.50. But as sales outstripped production, the partners undertook to manufacture the carts themselves; and, fearful that the growth of horizontal trusts in ancillary industries would make components and raw materials hard to get at reasonable prices, the Durant-Dort Carriage Company purchased hardwood forests and set up specialized subsidiary companies to manufacture bodies, wheels, axles, upholstery, springs, varnish, and whip sockets. By the turn of the century Durant-Dort had fourteen branch plants, hundreds of sales agencies, and annual sales of over 150,000 carriages. In a day when its competitors were mere order-taking assemblers of components, the company's emphasis upon aggressive sales techniques and its integrated manufacturing operations were major innovations in the carriage industry, as were Durant-Dort's bold conception of a mass market for low-priced carriages and its attempt to blanket the market with a complete line of carriages. Durant would carry these ideas with him into automobile manufacturing.

One of the many Michiganders who attempted to enter the automobile business was David Dunbar Buick, a Detroit manufacturer of plumbers' supplies and an eccentric inventor. He was soon deeply in debt to Benjamin and Frank Briscoe, whose sheet metal firm was his major components supplier. The Buick operation passed through the Briscoe brothers to James M. Whiting, a Flint carriage and wagon manufacturer, who had become alarmed about the potential inroads of the motor vehicle on the carriage and wagon industry. Whiting moved the Buick plant to Flint but was unable to get the floundering company off the ground. Only six Buicks were sold in 1903, sixteen in 1904. The company's principal asset was an intangible one—the patent on the valve-in-head engine, developed by Walter Marr and Eugene Richard, which gave better combustion of the fuel-air mixture and more power. Whiting was under pressure from the Flint banking community, which had supported his venture, to find someone who could put Buick in the black. After putting the two-cylinder Buick car through its paces over the worst terrain he could find, Billy Durant, already a millionaire, whose chief occupation at this time was playing the stock market in New York City, agreed to undertake the management of the Buick Motor Company. He assumed his new duties on November 1, 1904. One of Durant's stipulations was that he exercise "absolute control." Bernard Weisberger has observed that seven

of the nine Buick directors were Flint men and that "it was almost a family firm, if the elite of the town, with a total 1900 population of about 13,000, was considered as a form of extended clan, comprising thirty or forty families laced together by shared interests, ancestry, trust, and marriage."[6]

Once in control at Buick, Durant moved with boldness and speed into the volume production of a reliable car in the intermediate price range. Buick's capital stock was increased from $75,000 to $300,000 the day he took over, and it increased again to $1.5 million on September 11, 1905. Durant is said to have sold nearly half a million dollars' worth of the new stock to his Flint neighbors in a single day. The Durant-Dort Carriage Company became a major source of capital for Buick, and Buick cars were exhibited in its showrooms. Companies that had supplied Durant's carriage enterprise were shifted to automobile work. A national network of franchised dealers was established. Large assembly plants were built at Flint and at Jackson, Michigan, turning those cities into boom towns reminiscent of western mining camps.

In just a few years, Buick cars were substantially improved in quality for the price asked. The four-cylinder, 18-horsepower "Nifty" Model 10 was introduced in 1907 as, in Weisberger's words, "Buick's entering wedge into that beckoning low-priced field."[7] Like the Ford Model T, the more rakishly styled, $1,000 Model 10 was equipped with a simple two-speed planetary transmission operated by foot pedals, and it too was an easy car to drive and to maintain.

In 1908 the Buick Motor Company built 8,487 cars, had a net worth of $3.5 million, and occupied the largest automobile factory in the world at Flint. Buick ranked second only to Ford worldwide in production from 1907 through 1910. Nevertheless, Durant was worried in early 1908 about the immediate future. So was Benjamin Briscoe, who had become president of the Maxwell-Briscoe Motor Company of Tarrytown, New York, one of Buick's chief competitors.

Consolidation Attempts

Whereas Henry Ford was confident by 1908 that his Model T was the "car for the great multitude" and concentrated henceforth on lowering its price through standardization and improved production, Billy Durant was more uncertain than ever about the best bet in automotive technology. Rather than put all his eggs in the Model 10 basket, he continued at Buick to make several models in different price ranges. He further decided to adopt the marketing strategy of forming an industrial combination of firms making a wide variety of types of cars. Durant later lamented: "They say I

shouldn't have bought Cartercar. Well, how was anyone to know that Cartercar wasn't going to be the thing? It had the friction drive and no other car had it. How could I tell what these engineers would say next? Maybe friction drive would be the thing. And then there's Elmore with its two-cycle engine. That's the kind they were using on motorboats; maybe two-cycle was going to be the thing for automobiles. I was for getting every kind of car in sight, playing it safe all along the line." [8]

Benjamin Briscoe also found conditions in the spring of 1908 "somewhat ominous, especially for such concerns as had large fixed investments in plants, machinery, tools, etc." Briscoe was worried about the "menace to the industry" posed by "concerns which did not have a worthy car or any manufacturing ability, but with large stock issues to sell, and [which] by ingenious exploitation would succeed in stirring up the trade and the public, creating the impression that ... they, through some newly discovered combination of geniuses, were enabled to sell gold dollars for fifty cents in automobiles." He blamed the parts makers for threatening "demoralization by encouraging into the business undercapitalized concerns and inexperienced makers" that in the aggregate did a large business. But the main problem was that many companies were outright "manufacturing gamblers," driving the others to risk unduly large amounts of capital, given the existing technological uncertainties. The bolder companies were forcing "even the sanest among the manufacturers ... into business risks which they would not have entered had they not been fearful that some other concern would gain a few points on them." [9]

Briscoe and Durant conceived that the answer to these problems was a horizontal and vertical trust. They decided to team up to try "to form a combination of the principal concerns in the industry ... for the purpose of having one big concern of such dominating influence in the automobile industry, as, for instance, the United States Steel Corporation exercises in the steel industry, so that its very influence would prevent many of the abuses that we believed existed." [10] The easiest way was to merge their own firms, Buick and Maxwell-Briscoe, with several other leading producers of gasoline automobiles. But the merger plan failed when Henry Ford and Ransom E. Olds at REO each demanded $3 million in cash to sell out, instead of accepting the securities offered in exchange for their companies by Briscoe and Durant.

A second plan was to form an "International Motors Company" around the nucleus of Buick, Maxwell-Briscoe, and Oldsmobile. That fell through, too, when J. P. Morgan and Company, Briscoe's backer in earlier automotive ventures, refused to underwrite the stock issue. During the negotiations with the House of Morgan, Durant correctly prophesied that half a million automobiles would soon be sold annually in the United

States. George W. Perkins, who represented the Morgan interests, thought he was dealing with an unbalanced mind and curtly suggested that Durant, when he wanted to borrow money, had better keep such crazy notions to himself.

Ed Cray provides even more substantial reasons for the collapse of the negotiations with the House of Morgan. Upon learning that Buick stock was changing hands during the course of the discussions, Francis Stetson, the Morgan attorney, became suspicious that Durant intended to enlarge his personal Buick holdings at the expense of other stockholders by neglecting to inform them of the terms of the anticipated merger, which would greatly increase the value of Buick stock. When questioned, Durant confirmed that the Buick stockholders did not know the terms of the proposed merger but had deposited their stock with him on the basis of trust. Stetson then insisted that those who had sold stock to Durant in ignorance be permitted to buy back their shares. Durant refused. More important, undoubtedly, the bankers were cooled by Durant's casual offer of $1.8 million for Oldsmobile, without even examining the company's books, on the basis of Frederick Smith's verbal estimate of its worth. The straw that broke the camel's back was Durant's insistence that he, rather than the bankers, would control the combination's finances, while Briscoe would manage its manufacturing operations.[11]

Briscoe and Durant went their separate ways. Briscoe formed the ill-fated United States Motor Company, which in its brief existence came to involve some 130 affiliated companies and an inflated capitalization of $42.5 million. His principal backer in this venture was the traction magnate Anthony N. Brady, who earlier had been associated with the Whitney and Widener interests in the Electric Vehicle Company debacle. Maxwell-Briscoe was the only manufacturing unit in the combination that made money, and its earnings could not support the heavily watered stock and the heavy investment Briscoe and Brady made in too many weak firms producing unpopular automobiles, such as the Brush Runabout. United States Motor went into receivership in September 1912, with liabilities of $12.3 million versus realizable assets of only $9.3 million.

Its reorganization by the banking firm of Eugene Meyer, Jr., and Company brought in Walter E. Flanders, at the price of purchasing his weak Flanders Motor Company for $1 million cash plus $2.75 million in stock of the reorganized combination. After leaving Ford in 1908, Flanders had joined with Barney Everitt, general manager at the Wayne Automobile Company, and William E. Metzger, an organizer of the Northern Automobile Company, to form the Everitt-Metzger-Flanders Company (EMF) from Wayne, Northern, and three Detroit parts and accessories firms. EMF's operations were integrated organizationally and

centralized geographically in Detroit, where it produced the EMF car and the smaller Flanders. Wags of the day joked that EMF stood for Every Mechanical Fault.

As a means of expanding its business into gasoline automobiles, the Studebaker Brothers Manufacturing Company of South Bend, Indiana, bought a one-third interest in EMF in 1909. Studebaker was the world's largest manufacturer of carriages and wagons and a maker of electric cars. The new combination, Studebaker-EMF, ranked fourth among American automobile producers in 1909 and 1910, and second only to Ford in 1911. Then, with the help of financing by J. P. Morgan and Company, Studebaker bought complete control of EMF for $5 million, reorganized as the Studebaker Corporation, and dropped the use of the EMF name on its cars. From 1912 through 1914 Studebaker ranked third in the American industry after Ford and Willys-Overland; it dropped to sixth place in 1915 but remained among the top ten American producers through the 1920s and was one of the few independents to weather the Great Depression and survive into the post–World War II period.

Flanders remained with Studebaker as general manager only until 1912, when he rejoined Everitt and Metzger to organize the ephemeral Flanders Motor Company. The policy he had followed at Studebaker-EMF—that of merger to strengthen a single company's competitive position, rather than a strategy of combination—was continued when he took control of the reorganized United States Motor. Here Flanders instituted a severe program of consolidation and liquidation. Only the Maxwell Motor Company (formerly Maxwell-Briscoe) emerged as a going concern. Although Benjamin Briscoe was to found several more automobile companies, his days of prominence in the industry were over. Flanders resigned from Maxwell in 1914. He was associated with the short-lived Rickenbacker Motor Company briefly before his untimely death in 1923 in an automobile accident.

General Motors

Durant fell harder than Briscoe, but his career as an automotive tycoon was far from over. On September 16, 1908, he formed the General Motors Company as a New Jersey holding company with a nominal capitalization of only $2,000. The holding company structure allowed Durant, who was short of both cash and bank credit, to finance his combination mainly through the exchange of stock. Cadillac, bought dear at $4.75 million, was the most notable of the few companies for which cash had to be paid. But Cadillac proved worth its price: it returned a net profit to General Motors

of $1,909,382 for its operations in the fiscal year ending August 31, 1909, and in addition the Lelands ended up by accepting $75,000 of the purchase price in GM stock. Without much cash changing hands, General Motors soon acquired control of thirteen motor vehicle and ten parts and accessories manufacturers that varied considerably in strength, prominence, and potential. Within a year its capitalization reached an astonishing $60 million. On July 31, 1911, General Motors became the first automobile company to have its stock listed on the New York Stock Exchange.

General Motors under Durant was in trouble from the start. His strategy of "getting every car in sight, playing it safe all along the line," turned out to be disastrous. He bought too many weak units that drained off the profits from a few strong companies. Of the thirteen automobile manufacturers in the combination he threw together, only Buick and Cadillac were making money. As Durant dispersed his energies, Buick too began to lose money, threatening to leave Cadillac alone among the manufacturing units to support the heavily overcapitalized holding company. Durant's minor mistakes included paying $140,000 for the Cartercar Company in order to obtain its patent on a poorly designed friction drive and buying the Elmore Manufacturing Company for $600,000 on the slim chance that its outdated two-cylinder, two-cycle engine might prove popular in the future. His most spectacular error was purchasing the Heany Lamp Company for $7 million in GM stock to obtain a patent on an incandescent lamp that turned out to be fraudulent. Compounding these blunders, Durant was so optimistic about demand that he failed to build up cash reserves, relied on cash from sales to pay his operating expenses, neglected to inform himself about the combination's financial condition, and made no attempt to achieve economies through coordinating and integrating the constituent units of General Motors.

The crunch came when sales unexpectedly dropped as a result of a slight business recession in 1910. Durant was unable to meet his payroll and pay his bills from suppliers. General Motors was saved by a $12.75-million cash loan fully secured by its tangible assets from a banking syndicate composed of Lee, Higginson and Company of Boston and J. and W. Seligman and the Central Trust Company of New York City. The loan was proffered only after the bankers had been given assurances of GM's fundamental soundness by Wilfred C. Leland of Cadillac at a private meeting. The stiff price the bankers demanded for the rescue was $6 million in GM stock plus $15 million in five-year, 6-percent notes. Durant was forced to retire from active management, and the banking syndicate gained control of the combination through a five-year voting trust. Durant was named one of the trustees, but the other four represented the bankers: James J. Storrow of Lee, Higginson; Albert Strauss of J. and

W. Seligman; James N. Wallace of the Central Trust Company; and the seemingly ever-present Anthony N. Brady. Storrow, a senior partner at Lee, Higginson, first took over as the temporary president of General Motors, then directed operations as chairman of the finance committee. Charles W. Nash, who had worked his way up from a day laborer at Durant-Dort to succeed Durant as head of Buick in 1910, was moved to the presidency of General Motors in 1912.

Banker control of GM was a mixed blessing. On the positive side, the Storrow-Nash regime followed a conservative policy of retrenchment that liquidated all manufacturing units except Buick, Cadillac, General Motors Truck, Oakland (which would become Pontiac), and Oldsmobile. The product was improved, and a program of systematic research and testing was instituted. Great strides were made in attracting top-flight administrative talent and in improving communication and cooperation within the combination. By wringing out the heavily watered assets, in a few years banker control restored GM to solvency.

These pluses were offset, however, by the failure of the banker-dominated management to move ahead aggressively in the low-priced market being developed by Ford. Cray points out that "in their five-year reign ... [the bankers] spent as little as possible modifying the production lines to emulate Ford's moving assembly lines. They had not kept pace with the industry's growth, and were the company not to be overwhelmed, it had to be expanded." [12] Indeed, production costs at Cadillac increased, as Henry M. Leland, obsessed with mechanical precision, refused to adopt faster assembly-line techniques that would make the Cadillac car more competitive in price. Similarly, in a move to raise unit profits, Charles Nash at Buick in 1910 ended production of the Model 10, which was competitive with the Ford Model T and had accounted for about half of Buick's sales since 1907. Buick sales as a result plunged from 30,525 units in 1910 to only 13,389 in 1911. Under Walter P. Chrysler's aggressive leadership they recovered to 32,889 by 1914. Nevertheless, during the five-year period of banker control, GM's share of the automobile market skidded from 21 percent to only 8.5 percent.

The Chevrolet Takeover

As well as being a trustee and a member of the board of directors, Durant was still a substantial stockholder in General Motors. From this strong position he began to make his comeback shortly after the bankers had taken control. In 1911 he formed the Mason Motor Company and the Little Motor Car Company in Flint and the Chevrolet Motor Car Com-

pany in Detroit. Then he bought the Republic Motor Car Company of Tarrytown, New York, and converted it into a holding company capitalized at $65 million. The Mason, Little, and Republic cars were soon discontiued to allow Durant to concentrate on the Chevrolet. Designed by the Swiss-born Frenchman Louis Chevrolet, who had gained fame shattering speed records in the Buick "Bug" as a member of the Buick racing team, the Chevrolet Classic Six was a powerful six-cylinder car selling for $2,150. "The car was a market disaster," writes Weisberger. "Louis Chevrolet, oddly for a racing man, had produced something ponderous rather than whippet-like ... the Six had only a scattering of sales after its introduction at the 1912 auto show."[13] Like David Dunbar Buick before him, Louis Chevrolet slipped into personal obscurity while his name became a household word.

In 1913 Chevrolet was reorganized. Its manufacturing operations were moved to the former Little factory at Flint, its business headquarters to New York City. To impress eastern financiers, an assembly plant was located in Manhattan at Twelfth Avenue and Fifty-sixth Street. From there components made in Flint were shipped back to midwestern customers as Chevrolets. The Chevrolet advertising people called this economic illogic "stagecraft."

Two new four-cyclinder models were introduced in 1914, the $875 Bady Grand touring car and the $750 Royal Mail roadster. Over the two years ending on August 14, 1915, Durant sold nearly 16,000 Chevrolets, at a net profit of over $1.3 million. He announced that he would bring out a new $490 model to compete with the Model T, which was selling at that price.

On September 23, 1915, Durant organized the Chevrolet Motor Company of Delaware as a holding company for all Chevrolet activities. Raising its capitalization to $80 million, all in common stock, Durant offered to trade five shares of Chevrolet for one share of General Motors. There were so many takers that the offer was closed on January 26, 1916. It is estimated that by the end of 1915 Durant personally owned about 90,000 of Chevrolet's 200,000 shares of common stock and over 71,000—44 percent—of the 165,000 General Motors common shares outstanding. With his associates, he controlled by then the voting rights of some 100,000 shares of GM common.

A takeover was imminent when the General Motors voting trust expired on October 1, 1915. Earlier that year Durant and the du Pont interests had begun buying up General Motors stock in the open market with the aid of Louis G. Kaufman, president of the Chatham and Phoenix Bank of New York City. Whether and to what extent Durant and the du Ponts acted in collusion remains clouded. Durant claimed Pierre S. du

Pont as an ally, while du Pont maintained that he was acting independently and as a neutral in Durant's battle with the GM bankers. The key figure in alerting the du Ponts to the GM stock opportunity was John J. Raskob, treasurer of E. I. du Pont de Nemours and Company, who saw General Motors as a large potential customer for du Pont products and as an ideal place to reinvest mounting profits from World War I munitions sales. Raskob himself invested liberally in GM. Some $27 million of du Pont money helped push General Motors common stock from a quotation of $82 per share on January 2, 1915, to a high of $558 for the year. Five shares of Chevrolet at this time were worth at least $700, making Durant's offer of a five-for-one trade a profitable proposition for GM stockholders. Additionally, the Storrow-Nash regime had sown the seeds of its own destruction by withholding common stock dividends. This made GM stockholders anxious to sell out to Durant and the du Ponts.

At a meeting of the directors and large stockholders of General Motors on September 16, 1915, Kaufman and Pierre du Pont were elected to the board of directors, with du Pont as its chairman. A belated attempt by the bankers to mobilize stockholder support for a three-year continuation of the voting trust failed. Durant called a meeting of the board of directors in May 1916 to announce that he once again controlled the company. On the first of June he took over again as GM president with the resignation of Charles Nash. Durant reincorporated the General Motors Company, a New Jersey holding company, as the General Motors Corporation of Delaware, an operating company, on October 13, 1916.

Out of General Motors, Nash with Storrow's backing remained in automobile manufacturing. He became president of the Nash Motor Car Company, formed from the bankrupt Thomas B. Jeffery Company of Kenosha, Wisconsin, after its purchase by Storrow for $5 million. Nash was never to be an industry leader, but the firm managed to hang on through the next four decades; in 1954 it merged with Hudson to become the American Motors Corporation.

Walter P. Chrysler had replaced Nash as head of Buick when Nash moved to the GM presidency in 1912. Storrow invited him to join in the Kenosha venture, but Chrysler declined after Durant offered him $500,000 a year, ten times what he had been getting, to stay at GM as president of Buick and GM vice-president in charge of operations.

By 1919 Buick was making about half the money that GM earned. But GM was spending money at a much faster rate than Chrysler could earn it at Buick, and Durant's erratic decision making and arbitrary interference in Buick's operations made Chrysler's job impossible. Chrysler knew that they could never work together when Durant told him, "Walt, I believe in changing the policies just as often as my office door opens and

closes." Without consulting Chrysler, Durant sold the lucrative Detroit Buick branch house to one of his cronies. The last straw for Chrysler occurred when a telegram from Durant was read at a booster luncheon of the Flint Chamber of Commerce promising the city a $6-million frame plant that would cost more in five years than GM would pay for frames from other sources in ten. Chrysler told Alfred Sloan, who tried to talk him into staying, "No, I'm washed up. I just can't stand the way the thing is being run. All I'm anxious about now is to sell my stock." [14]

The Rise of Chrysler

Walter P. Chrysler has been called the last great individual constructive force in the American automobile industry. After Chrysler, automotive entrepreneurs were anonymous organization men, team players who were not personally identified in the public mind with the achievements of their companies. Chrysler's particular genius was for incorporating advanced automotive technology in moderately priced production cars.

Chrysler came out of a brief retirement in 1920 to try to rescue Willys-Overland from the brink of bankruptcy as its executive vice-president. The Willys-Overland Company had been formed in 1908 from the small Marion and Overland companies of Indianapolis, Indiana, by John N. Willys, a bicycle and automobile salesman from Elmira, New York. Production was moved to the former Pope-Toledo plant in Toledo, Ohio, and upped from 4,860 cars in 1909 to 15,598 in 1910, making Willys-Overland the third-largest American producer that year, after Ford and Buick. In 1911 Willys-Overland surpassed Buick, and until 1918 it ranked second only to Ford in production. During these years Willys acquired the Deusenberg Motors Company of Elizabeth, New Jersey; two small Ohio producers, the Garford Automobile Company and the Gramm Motor Truck Company; and several parts and accessories firms. Willys-Overland produced several models that used a sleeve-valve engine designed in 1905 by Charles Y. Knight. This engine, quieter but more complicated than those using poppet valves, was much more popular in Europe than in the United States. Willys models varied greatly in power and in price. One of its best-selling cars was the four-cylinder Overland 79, priced at $950 in 1914. The four-cylinder Willys-Knight sold for $1,4000 in 1919, and the classic L-head Overland, introduced that year to compete with the Model T, was priced at a moderate $495.

After trying unsuccessfully to merge Willys-Overland with Hudson and Chalmers, John Willys created the Willys Corporation in 1917 as a holding company owning the stock of his various operating companies.

These companies, which came to include the Curtis Aeroplane and Motor Company during World War I, were never integrated organizationally. Capitalization of the Willys Corporation was raised to $50 million with ill-timed expansion plans that were shattered in the brief but severe recession that followed World War I.

Chrysler bought time for the Willys Corporation but failed to save it. It was liquidated in 1921. Willys-Overland, however, was salvaged and survived until 1933, when it again went into receivership in the midst of the Depression. Resurrected during World War II, the firm became important as a producer of general-purpose military vehicles, nicknamed jeeps. It was absorbed by the Kaiser Motor Company, created from Kaiser-Frazer in 1953, and continued to manufacture four-wheel-drive vehicles for the commercial market after Kaiser withdrew from other motor vehicle production in 1957. The Willys jeep business was sold to American Motors in 1970.

Chrysler moved from Willys to another victim of the 1920 recession, Maxwell, which had merged with Chalmers but soon afterward gone into receivership. He supervised its reorganization as the Maxwell Motor Corporation and became president of the new firm, capitalized at $40 million, in 1923. In 1924 Maxwell introduced the stylish Chrysler Six, the first medium-priced car to use a high-compression engine; the company made profits of over $4 million that year.

Chrysler reorganized Maxwell in 1925 as the Chrysler Corporation and discontinued the Maxwell line. By 1928 Chrysler had made some $46 million in profits and held third place in the industry, after General Motors and Ford. The Dodge brothers had died in the 1920 influenza epidemic, and their business was sold in 1925 to the banking house of Dillon, Read, and Company, which in turn sold it to the Chrysler Corporation in 1928 for $170 million in Chrysler stock. The acquisition of Dodge doubled Chrysler's sales outlets and gave the corporation the plant capacity to bring out the Plymouth and compete in the low-priced field with Ford and Chevrolet.

Oligopoly

The number of active automobile manufacturers in the United States dropped from 253 in 1908 to 108 in 1920 and to 44 in 1929, with about 80 percent of the American industry's total output accounted for by Ford, the constituent units of General Motors, and Chrysler. In that short time the large-scale, integrated manufacturing operations of these giants had created competitive conditions that could not be borne by the small firms

and their suppliers of components. While the large producers could count on their own ability to manufacture parts or on concessions in price from independent suppliers, the small automobile makers found it increasingly difficult to obtain components at reasonable prices and lacked the volume of sales to manufacture them for themselves.

The main industrywide effort of the small firms to remain competitive was made through a standards committee of the Society of Automotive Engineers (SAE). The SAE blossomed into an important force in the industry under the leadership of Howard E. Coffin, the vice-president of Hudson, who was elected president of the society in 1910. The standards committee, headed by Henry Souther, a former consulting engineer for the ALAM, was a product of the SAE's takeover of the ALAM Mechanical Branch upon its dissolution in 1909. The committee reflected the interests of the small automobile producers, who made up the bulk of the SAE membership in 1910. These small producers were eager to inaugurate a drive for intercompany standardization of parts, which would enable them to buy readily available standard components at much lower prices than they had been paying for small orders of specially designed parts. The lack of intercompany standardization was, in Coffin's view, "responsible for nine tenths of the production troubles and most of the needless expense entailed in the manufacture of motorcars." [15]

The SAE carried out a vigorous standards program that resulted in the adoption of 224 different sets of standards in the industry by 1921. The program failed miserably, however, in its principal objective of keeping the small producers in a competitive position. Despite intercompany standardization of components and the NACC cross-licensing agreement, mass-production techniques leading to increased standardization of product at lower unit costs could be effectively implemented only by the large, well-financed firm with a car of superior design. *Scientific American* recognized as early as 1909 that "standardization and interchangeability of parts will have the effect of giving us a higher grade of motorcar at a lower price, but this is dependent in considerable degree upon the production of one model in great numbers and the elimination of extensive annual changes in design that necessitate the making of costly jigs, gauges, and special machinery." [16]

Henry Ford grasped this point long before most of his competitors. By the time they had come to understand it sufficiently, he was so far ahead in design and production engineering that most lacked the capital and talent to catch up. With about half the market for new cars at the outbreak of World War I, the Ford Motor Company might well have moved to monopolize automobile manufacturing in the United States. However, in addition to making some grave errors that allowed General

Motors to surpass him in sales by the late 1920s, Henry Ford early recognized that oligopoly was preferable to monopoly. At the pinnacle of the Model T's success, Ford was urged by Charles Sorensen to build a near monopoly by shooting for 75 percent of the market for new cars. Ford responded that he did not want more than 30 percent. Sorensen reflected in 1956 on the wisdom of Ford's position: "How right he was! If Ford Motor Company had seventy-five percent of the auto business today, it would be prosecuted as a monopoly. He actually welcomed the competition that loomed before us, though in later years he had suspicion amounting to hallucination that bankers and General Motors were out to ruin him." [17]

War and Peace

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After the Paris fleet of Renault taxicabs proved indispensable in moving troops to the front to stop the German advance at the Marne in 1914, military experts came to believe that "in this war the exploding of gasoline is playing a more important part than the exploding of gunpowder." An entire army was supplied by motor transport over the road to Verdun. Even Lawrence replaced the camels of his Arab troops with Model Ts to fight the Turks in the desert. Lord Curzon, a member of the British war cabinet, declared in 1919 that the Allied cause had been "floated to victory on a wave of oil." [1]

At the 1897 annual maneuvers of the French army, a technical commission headed by artillery officers was charged with conducting experiments with motor vehicles. The British army early introduced motor vehicles into the colonial service and used them in the 1899–1902 Boer War; then in 1903 the British War Office made extensive tests of military tractors entered in a £1,000 prize competition that it sponsored. By 1908 the military budgets of France, Great Britain, and Germany contained special appropriations for subsidies to be paid out to owners or manufacturers of motor vehicles suitable for military use who agreed to turn them over to the government in the event of a national emergency. These subsidies amounted to as much as $2,250 per vehicle over a five-year period in Germany and averaged about $1,400 in France and $584 in Britain. German buyers of heavy trucks were reimbursed by the government not only for part of the purchase price but for part of their annual maintenance expenses as well. In France several thousand trucks of two-ton or heavier load capacity were purchased under a special military subsidy inaugurated in 1910. The Italian army made its first large order of truck chassis from Fiat in 1909. By the outbreak of World War I, officers