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Rochester and the Automobile Industry

By Joseph W. Barnes

Although few are aware of it, Rochester's relationship with the automobile has been a special one. In the first place, owing to the controversial Selden patent, Rochester has a claim to being the birthplace of the automobile. Secondly, Rochester once contained several automobile manufacturers, one in particular that tended to specialize in costly vehicles for the elite market. Thirdly, Rochester is today a major center for the manufacture of parts, materials, and machinery used in the industry. The two divisions of General Motors here constitute the city's third largest industrial employer, while a number of Rochester's specialized manufacturers (notably Gleason Works, Voplex, and several tool and die concerns) are also important automotive support industries.

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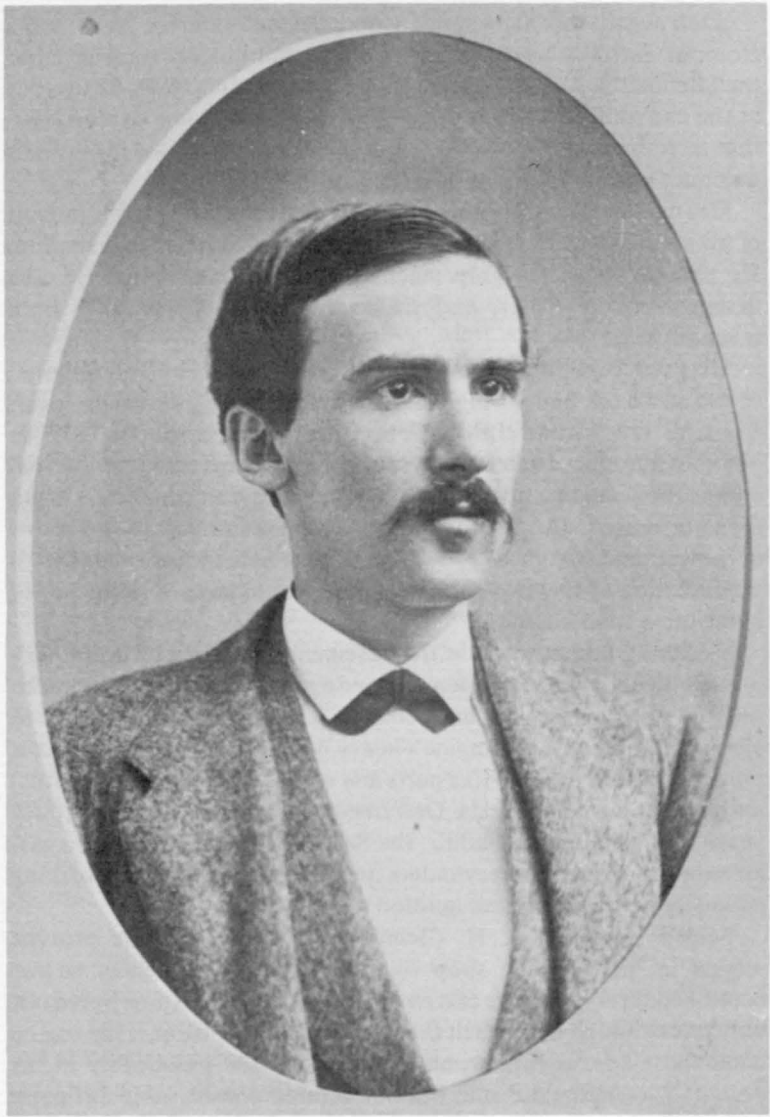
The Selden Patent

The names most often associated with the invention of the automobile are the Germans Daimler and Benz (1880s) and the American Duryea brothers (1893). But many Rochesterians early in this century agreed that priority ought to belong to local attorney George B. Selden, who patented the automobile in 1895. His claim to the exclusive right to the invention was being argued in federal court. The Association of Licensed Automobile Manufacturers (ALAM), powerful upholders of the Selden patent, began lawsuits against the Ford Motor Company and other infringers in 1903. There ensued one of the longest, most costly, and bizarre civil suits in American legal history.

To categorize Selden as a patent attorney prejudices the account, although that was his vocation. In fact as a young man he was also an active inventor. George Baldwin Selden was born in nearby Clarkson in 1846. He was the son of the distinguished Judge Henry R. Selden, later a Lieutenant-Governor of New York. The elder Selden was also once spoken of as possible candidate for Vice-President of the United States in place of Hannibal Hamlin. He may be best remembered locally as defender of Susan B. Anthony at her trial in Canandaigua in 1872. Judge Selden disapproved of George's technical inclinations.

In 1859 the Selden family moved to Rochester, and two years later George enrolled in the University of Rochester. He never completed this (or any subsequent) college course, but left to fight in the Civil War, to his father's distress. According to family tradition, two incidents at this stage of his life left George a marked aversion to horse transportation. While once fording the Genesee River at the future site of the River Campus his mount rolled over on him, ruining his best suit of clothes. And during his brief service with the Sixth United States Cavalry Selden drew a horse which missed no opportunity to injure its rider. This steed ended its own career by running into a tree. Selden suffered a narrow escape.

As he would later recall, Selden's interest in replacing the horse for the purpose of motive power had been piqued even earlier when, as a boy, he overheard a conversation between his father and a law client. Discussing the practicability of mechanically propelled vehicles, both men convinced themselves that such a notion was chimerical. They consigned the idea to the rusty dustbin occupied by the steam omnibus, a machine once widely operated in England but legislated out of existence.



George B. Selden in 1871

Such negativity only whetted young Selden's interest. At the war's close, he enrolled briefly in Yale College, but quickly transferred to the Sheffield Scientific School. Here Selden was no doubt happy, but at the end of the decade Judge Selden called him home to read law--that is, to behave responsibly. George dutifully accepted his father's guidance and in 1871 was admitted to the bar.

George's technical bent was to some degree satisfied in the pursuit of his chosen specialty, patent law, and he also dabbled in invention. He patented a barrel-hoop machine of his own devising. He also designed a typewriter, and realized a small income from both inventions.

His preoccupation was of course the automobile, or "road engine" to use his phrase, and during the 1870s Selden made gradual progress. Visiting the Philadelphia Centennial Exposition in 1876 to demonstrate the barrel-hoop machine, Selden saw an internal combustion engine invented by George Brayton, an Englishman living in Boston. Despite the Brayton engine's limitation--it was low in power and weighed over half a ton--Selden believed that a modification of this two-cycle behemoth could be used as the power plant for a road engine.

Tinkering late at night in the basement workshop of his father's house on Gibbs Street, Selden planned a number of improvements to the Brayton engine. By enclosing its crankshaft he was able to eliminate the stationary engine's heavy bedplate. He also discarded a number of steam-engine-like parts and reduced the weight of his final design to about 370 pounds. Described by one engineer nearly thirty years later as a "fearful" affair, the Selden engine compressed a gas-air mixture in auxiliary cylinders and introduced it in the working cylinders with open flame ignition.

Selden hired Frank H. Clement to manufacture the prototype engine in his machine shop on Mill Street. The Selden engine contained three-cylinders cast *en bloc*. In 1878 the two men bored out only one cylinder. Selden felt that a trial with one piston, if the engine could be made to run, would demonstrate the practicality of his design. The engine did run, but not without considerable difficulty and a great deal of cranking on the part of Selden's machinist assistant, William Gomm. At best the engine operated three to five minutes at a time. Having discarded benzine, kerosene, and exotic mixtures, Selden settled on gasoline for fuel. Despite the one-cylindered engine's feeble performance, Selden was elated at his success.

A year later Selden filed his famous patent application, dated May 8, 1879. One witness to the document was the assistant bookkeeper at Rochester Savings Bank, George Eastman, whose own inventions would soon bear fruit. Selden's patent application described not only the engine, but also a complete automobile incorporating such features as a clutch, compressed air self-starter, and steering system. Selden maintained that the *combination* of such elements, along with his engine, made the road engine patentable.

Selden was not in a hurry to receive his patent, which, once issued by the United States Patent Office, would remain in force for the fixed term of seventeen years. Employing his professional knowledge of the rules and regulations of the Patent Office, Selden was able to delay the issuing of his patent for sixteen and one-half years. During that time he sent repeated amendments of his application to Washington. Existing regulations permitted applicants a two-year period to respond to communications of any kind from the Patent Office. Selden was able to extend his pendency by sending amending material or other communications every two years. A routine matter such as supplying a new oath took Selden 726 days.

That Selden deliberately procrastinated is hardly a matter of question. His motivations are debatable. According to Selden's critics, during and after the great trial, his reason for delay was to allow industry and automotive technology to catch up with his invention. By letting others take on the formidable task of further automotive development, Selden could reap the rewards of his patent without incurring further expense. Selden maintained that during the years his patent was pending he made sincere efforts to enlist manufacturing capital. Be that as it may, during the long pendency from 1879 until 1895, Selden never bothered to produce a prototype or even to finish his three-cylinder engine.

In the late '90s, when automobiles powered by internal combustion has been demonstrated in Europe and in American workshops like that of Henry Ford, the future of the device was still uncertain. Many knowledgeable observers, alarmed at the noise, smell, and danger of gasoline engines, were convinced that automobiles must be powered electrically. One such observer, the millionaire William C. Whitney, organized the Electric Vehicle Company in 1899. The Electric Vehicle Company was an ambitious enterprise devoted to securing a "trust" in the operation of battery powered taxicabs. Facilities for the manufacture of the cabs were secured through a merger with the Pope Manufacturing Company, producers of the Columbia Bicycle. The resulting Columbia

Automobile Company became the Electric Vehicle Company's manufacturing arm. The company was headquartered in Hartford, Connecticut.

How does a company devoted to electric vehicles enter the story of the Selden patent, which described an internal combustion engine? The cautious Whitney and his advisers took pains to search for any patent they thought might be infringed in manufacturing automobiles. The 1895 Selden patent, obscure as it then was, threatened because of its extreme sweeping claim to inventive rights to the automobile. In 1899 the Electric Vehicle Company, also known as the Pope-Whitney combine, entered an agreement with George B. Selden. In exchange for exclusive license, the company agreed to pay Selden \$15 per vehicle manufactured or a minimum of \$5,000 a year.

It is one of the ironies of automotive history that no sooner had the Whitney group secured control of the Selden patent, that their own future as manufacturers of electric cars fell under a pall. In late 1899 the Electric Vehicle Company suspended dividends on its stock. Limitations in the technology of electric power doomed the company's hopeful projections. Its taxicabs carried a lead-acid battery weighing 1,200 pounds, nearly half the vehicle's entire weight, and cruising range was no more than forty miles. The company's plan was to locate numerous recharging stations in the large cities the cabs were intended to serve. Ingenious techniques reduced the time to change a battery, which required eight hours to recharge, to only thirty seconds. But the accompanying labor costs proved prohibitively high. Electric Vehicle Company stock fell; one by one its subsidiary companies were liquidated. As so often is the case in such circumstances, an odor of financial scandal hung over the company's affairs. The electric vehicle plans of the Electric Vehicle Company came to naught.

The new trade journal of the gasoline car manufacturers derisively called Whitney and his associates "the Lead Cab Trust." But if the Electric Vehicle Company did not enjoy the last laugh over the *Horseless Age* and the gasoline car interests, it would certainly enjoy a great many intermediate ones.

In the midst of its distress, the Electric Vehicle Company turned to what was apparently its sole remaining valuable asset, Selden's "paper" patent. In June 1900 it sent infringement notices to the Winton Motor Carriage Company of Cleveland, the most popular automobile manufacturer of the day, and to the Buffalo Gasolene Motor Company, an engine maker. The action against the latter

served notice against parts and components manufacturers. Infringement notices and subsequent lawsuits were the only means by which the Electric Vehicle Company could enforce its legal monopoly. The notices read in part, "...you are manufacturing and advertising for sale vehicles which embody the invention of the Selden patent.... We notify you of this infringement, and request that you desist from the same and make suitable compensation to the owner of the patent therefor."

Three other businesses were singled out for chastisement before the initial suit was over. These were a New York City importer of European cars; the Ranlet Company of St. Johnsbury, Vermont which consisted of two young men building a single automobile; and the obscure Automobile Forecarriage Company. As expected the weaker adversaries quickly threw in the towel. The Electric Vehicle Company publicized its victory, demoralizing the Winton Company and other automobile manufacturers which had pledged to aid Winton in its defense. Seven independent manufacturers in fact applied for licenses under the Selden patent when the Winton Company, in turn, began secret negotiations with the Electric Motor Vehicle Company to settle out of court. George H. Day, president of Electric Vehicle, demanded a five percent royalty of Winton, a figure held far too steep by the latter.

While negotiations dragged on in late 1902 there was a dramatic new development. Leaders of two Detroit firms, Packard Motor Car Company and Olds Motor Works, organized an association of ten major manufacturers. They told Day that they were willing to pay royalties on the Selden patent of one-half of one per cent, and threatened that if this offer were not accepted, to divert the money to Winton, in a renewed legal contest.

At this point Winton had already been soundly beaten in a preliminary court skirmish. Federal Judge Arthur C. Coxe presided over the infringement case against Winton. In overruling a motion for dismissal he upheld the validity of Selden's patent: "Upon the present record he must be regarded as the first to construct a road-locomotive provided with a liquid hydrocarbon gas-engine of the compression type so arranged as to leave the platform of the carriage unobstructed."

Despite this unfavorable circumstance, the newly associated manufacturers were tough negotiators. At last they persuaded Whitney and Day to accept royalty payments on the Selden patent of one and one-quarter per cent, with important provisos. The Winton suit was to be settled out of court, and Winton was to be granted a

Selden license. The new Association of Licensed Automobile Manufacturers--the group consisting of the original licensees--would henceforth determine admittance to the club. The Electric Vehicle Company, then, would be reduced to the role of receiver of funds. Two-fifths of the royalty receipts were to be returned to the ALAM for organizational purposes. The remaining three-fifths were further divided between the owners of Electric Vehicle and George B. Selden. The Company retained two, and was to give Selden the last fifth. Selden would thus enjoy one-fourth of one per cent of the value of all new licensed car sales.

From the beginning the ALAM committed itself to the promotion of quality standards in automobile manufacture. For its own purposes that meant the encouragement of heavy touring cars costing several thousand dollars--machines of the sort that most of the original ALAM members made.

Nearly simultaneous with the formation of the ALAM in early 1903 was the appearance in Detroit of a new enterprise known as the Ford Motor Company. Like dozens of small automobile manufacturers that sprang up overnight in the early days of the industry only to disappear just as suddenly, Henry Ford's new company possessed a few design innovations, the optimism and energy of its founder, and scant capital. Incapable of much true manufacturing, the Ford factory began as an assembly plant with parts supplied on credit by older manufacturers. Even whole chassis assemblies were taken from the established plant of the Dodge brothers (who for many years wisely specialized in the supply of parts to others). The Ford Motor Company's initial product was the primitive Model A (not to be confused with the "A" of the 1920's), a light two-cylinder gas buggy weighing just over one-half ton and rated at eight horsepower. The little cars were full of flaws but nevertheless were sold as rapidly as Ford's assembly crews could make them. At least one analyst has said that the demand for automobiles in 1903 was so great that practically anything with wheels, that moved, could be sold. But Ford had deliberately aimed his sights at the "low-end" of the market, where pent-up demand was the greatest. The Model A was priced at \$850; an improved successor introduced a few years later, the Model N, was only \$600. When the famous four-cylinder Model T was first introduced in 1908, Ford priced its cheapest version at \$825, a figure he steadily reduced in succeeding years as the car was steadily improved.

In 1903 the vast success of the Model T and the Ford Motor Company lay some years in the future. The recent settlement of the

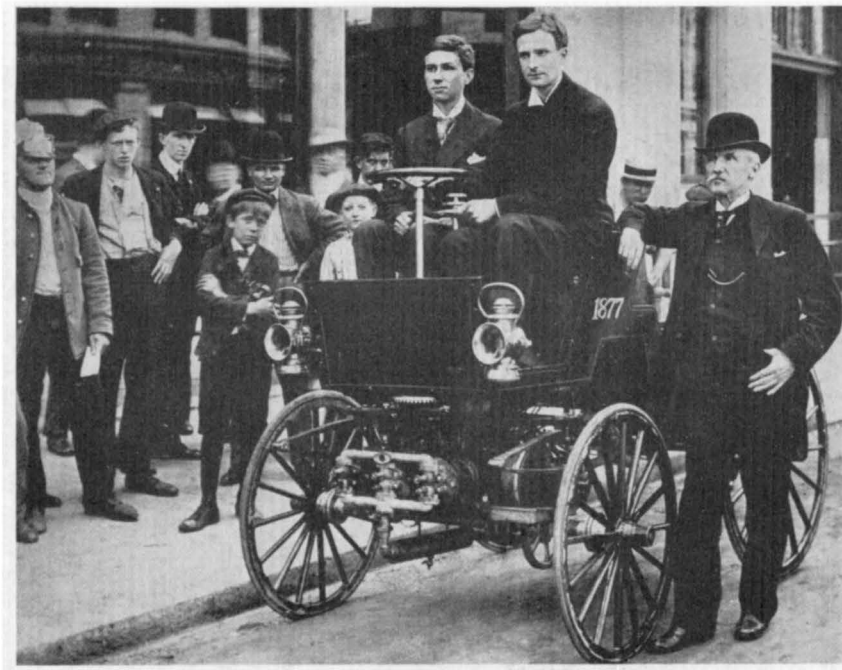
Winton suit and formation of the ALAM gave Ford pause. Fearing the consequences of a patent infringement suit, Ford and his associates held several discussions with leaders of the ALAM. Later reports of these private conversations seem to conflict in detail, but the certain result of them was that the Ford Motor Company was denied membership in the ALAM. The ALAM, its leaders said, was formed in part to discourage "fly-by-night" automobile makers, among them "mere assemblers." An insulted Henry Ford later maintained that the ALAM was prepared to admit him to the club if he sold his cars for no less than \$1,000 and moreover limited annual production.

During its eight-year existence the ALAM was a high-priced preserve. With a few exceptions, its members marketed automobiles chiefly in the \$3,000 to 6,000 range. The exceptions included the Olds Motor Works, the Buick Motor Company, and Hudson Motor Car Company, who offered automobiles at around \$1,000 or less. More typical ALAM members (listed in the official 1910 *Hand Book*) were Pierce-Arrow with its \$7,200 touring car or Studebaker and American Locomotive with limousines costing \$5,000 and \$6,750 respectively. (By contrast, in 1909 American independent makers like Ford offered 26 models at less than \$1,000.)

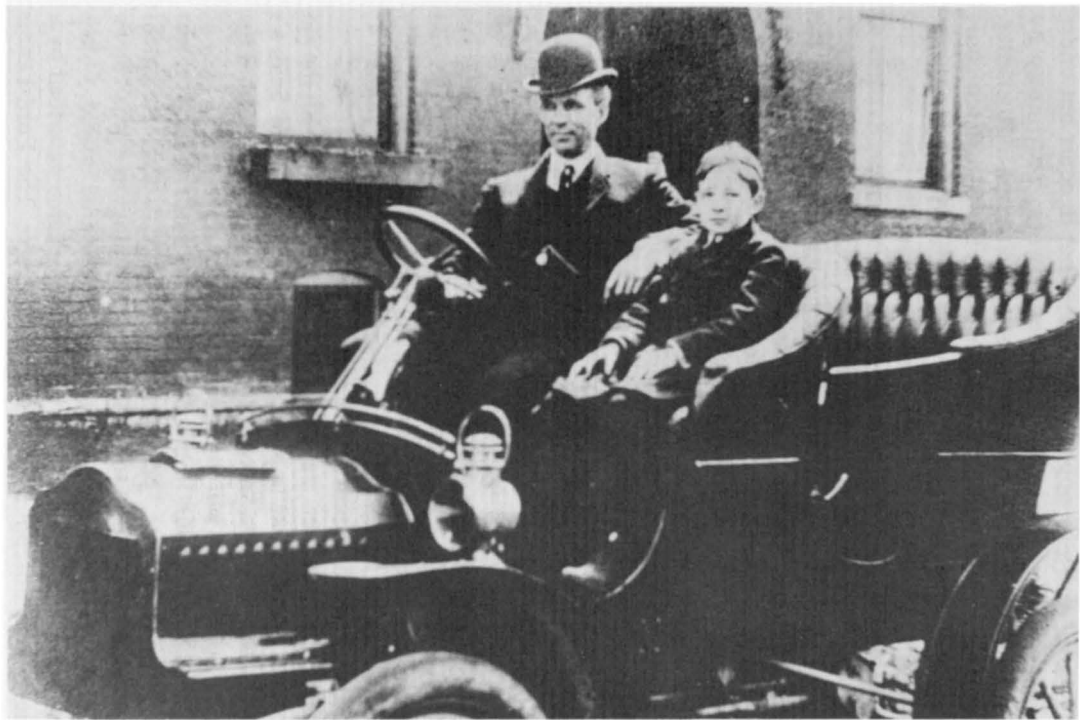
The battle line between the ALAM and Ford and the other independents was well drawn. At its center was the Selden patent, and its visible symbol a small brass plate affixed to the products of the licensed automobile manufacturers. The plate "protected" licensed automobile dealers and owners. Prospective buyers of non-licensed cars received a stern warning in ALAM advertising: "Don't buy a lawsuit with your car." Independents and especially Ford denounced the ALAM as a trust, and the Selden patent as no good. The Ford Motor Company promised to indemnify purchasers and welcomed prosecution.

Ford has not long to wait. At the end of 1903 the Electric Vehicle Company and George B. Selden lodged suit against a list of defendants. These included the Ford Company; its New York City agents Duerr and John Wanamaker; the Gude Company, a hapless Ford purchaser; Panhard et Levassor, a French exporter; and Henry and A.C. Neubauer, foreign car importers. The five suits were eventually consolidated into two, to become known as the "Ford and Panhard" suits. The Ford Company shouldered the bulk of the legal defense costs.

The trial and its appeal dragged on for the next eight years, one of the longest patent litigations in United States history and one which



The Seldens pose with the road engine in 1905. George, Sr., leans on the machine while his sons sit at the wheel.



Henry Ford and his son, Edsel, seated in a Model "F" in 1905

produced one of the greatest quantities of written evidence ever submitted in a case at equity. The Selden case, like other patent suits, was a civil trial; under the law a patent confers nothing more than a "license to sue." Rules and regulations of the day demanded evidence gathering for years by opposing attorneys, not in court but under supervision of referees with limited powers. Testimony by participants in the case and expert witnesses was taken in Rochester, New York, Detroit, and several other cities. The completed court record finally exceeded 14,000 pages and 5,000,000 words.

Bulkier even than the written testimony in the case were the working models of vehicles assembled by the two sides. Records of their performance were submitted in evidence. Of greatest interest was the Selden auto fashioned in Rochester in 1905 under the supervision of the inventor's two sons. It incorporated the actual experimental engine Selden had made almost thirty years earlier; all three cylinders were now placed in working order. Emblazoned on the side of the carriage was the year "1877." That was two years earlier than Selden filed for his patent and eighteen years earlier than its issuance but was meant to correspond with the inventor's first conception. A second Selden auto, which came to be known as the "Hartford Selden" to differentiate it from the "Rochester Selden" was built in secret by the Electric Vehicle Company.

The performance of the Rochester Selden, also known as Exhibit 89, proved extremely disappointing. During trial runs at a test track near Guttenberg, New Jersey, the car was devilishly hard to start and keep running, and it quickly overheated. Its engine developed only two horsepower. (Exhibit 89 is now somewhat ironically housed at the Henry Ford Museum in Dearborn).

The Hartford Selden, developing fifteen horsepower with the aid of a host of technical improvements found nowhere in Selden's patent, was a better performer. It proved unable to start without the aid of a horse-drawn air compressor, however.

A third vehicle, built in the Ford Motor Company factory, was meant to demonstrate "prior state of the art." If Selden's patent contributed nothing new to automobile technology as it was known (or unknown) in 1879, the patent might be declared invalid. Ford's technicians fashioned a vehicle based on an engine described by a Belgian, Jean Joseph Etienne Lenoir, in 1860. The Ford-Lenoir vehicle ran smoothly. But it was of course no more a true antique than was Exhibit 89.

Much of the testimony given in the trial centered on whether Selden's "improved liquid hydrocarbon engine" represented real

invention. From the point of view of the defense, even if the Selden engine could be described as an improvement over devices known prior to 1879, it could not be compared fairly with automobile engines produced in 1903. This argument was based on an important technical matter. The Selden engine, like the Brayton engine that inspired it, was not a true compression engine. In Selden's design the gas-air mixture was compressed outside the working cylinder and then introduced in the combustion chamber where it burned "continuously." By 1903 Ford and all other automobile manufacturers employed the four-cycle Otto engine, in which the gas-air mixture is compressed in the working cylinder and ignited explosively. This remains the working principle of almost all gasoline engines to the present.

Further, the defense argued that it was impermissible for Selden to patent the combination of various elements that made up the automobile. The combination was not "novel" and too badly described.

As the date for the final court hearing approached, Ford's attorney worried aloud about the possibility of drawing a federal judge not versed in patent matters, given the complex technical nature of the case. His fears proved well founded. Judge Charles M. Hough for the Southern District of New York was a well known expert in admiralty law who had sat on the federal bench only a few years. At the outset, when the Selden lawyers began their exposition, Hough interrupted to candidly state: "Someone will have to explain to me what the liquid hydrocarbon gas engine is."

Despite his limitations, Hough also possessed a reputation for enormous energy. He devoted his summer vacation to poring through the voluminous printed submissions. In the end he found himself convinced, mainly point for point, by the arguments set forth in the complainants' brief.

Hough upheld the Selden patent on September 15, 1909. The judge was not inclined to overturn a patent whose validity had been first certified by the Patent Office and later by the ruling of Judge Coxe; *i.e.*, Hough leaned towards a "liberal" construction of the force of the patent. He dismissed the interminable arguments over previous engines of different types, wondering whether the construction of the Ford-Lenoir exhibit "was worth so much trouble." Hough awarded Selden formal recognition as the inventor of the gasoline automobile, and protection in a broad range of "equivalents." In effect, Ford's "A" and "N" models, despite their Otto engines and innumerable other improvements, were not so very

different from the device Selden sketched in 1879, and they infringed the patent.

The ALAM forces were elated. Independents were forced to make peace with the association. William C. Durant, founder of General Motors, reportedly paid a million dollars in back royalties. But Ford posted a \$350,000 bond and took the case to the United States Circuit Court of Appeals.

Walter C. Noyes, rendering a new decision for the three-judge panel in early 1911, was said to be "a patent judge." He was far more impressed with the technical differences among gasoline engines than Judge Hough had been. Noyes again upheld the validity of the Selden patent--but with the fatal qualification that it covered only the type of engine described by Selden in 1879. Noyes felt that modern automobiles with their four-cycle compression Otto engines were exempt from the protection it afforded.

Although the Selden patent had not been nullified, the effect of the decision was a complete victory for Ford and the other independents. There was some talk by Selden of appealing to the Supreme Court, but, as he realized, the patent had less than two years to run and the expense could not be justified. According to Selden, he had gone "into this enterprise hoping to make a little money" and had succeeded much better than anticipated. A generally accepted estimate of Selden's personal profit from the patent is something less than \$200,000.

Ford and Selden were not embittered. While testifying at the trial in New York in 1909 Selden wore a jeweled stickpin with the figure of his "1877" gas buggy emblazoned on it. He sent Ford a duplicate. Ford remarked that Selden "was a decent old fellow." Selden said that "I am on good terms with Mr. Ford, and I rather admire the business skill with which he has managed his enterprise."

Even from the distance of seventy years it is impossible to say which side was "right" in the Selden patent affair. Although in the end his patent had been rendered ineffective on what seemed a technicality, George B. Selden could cling to some satisfaction. He had, after all, been acknowledged as the pioneer inventor of the gasoline automobile by decisions of the Patent Office and by two separate judges who did not invalidate his claim. Henry Ford and others who had ceaselessly denounced the ALAM combination as a trust had legitimate grounds for complaint. But if the Selden patent had been used as an instrument to exclude competition, it seems to have been conspicuously ineffective. During the period of the ALAM's operation Henry Ford himself had managed to lay the

groundwork for an automotive empire, even benefiting from the publicity generated by the legal contest. And hundreds of other independents, inattentive to the Selden patent, had begun operations during the period of the suit. A few were successful, but most, as the ALAM feared, were mayflies.

The ALAM itself as it had evolved in the few year after the Winton settlement, came to resemble not so much a monstrous oligopoly as a democratic trade association--whose dues, to be sure, were collected in the form of royalties. This fact is illustrated by an episode which occurred in the midst of the Selden lawsuit. The Electric Vehicle Company, despite its steady income from the Selden patent, had always been heavily mortgaged and in 1907 it passed into receivership. Almost simultaneously George H. Day, the guiding spirit of the ALAM, died. These developments were disheartening enough to the ALAM leadership then waging the legal battle against Ford, but they were soon faced with a revolt from within. Member firms demanded, and received, a reduction in the royalty rate from one and one-quarter percent to four-fifths of one percent. And William C. Durant, the owner of the licensed Buick company, declared his intention to withhold even the reduced royalty. Both he and the recalcitrant owners of Olds Motor Works had to be pressured into line.

The ALAM dissolved soon after the 1911 decision, but not without leaving valuable marks on the American automobile industry. During its lifetime the organization sponsored a Mechanical Branch that promoted standardization of parts and dimensions among manufacturers. This useful work was subsequently carried on by the Society of Automotive Engineers which absorbed the Mechanical Branch.

At least part of the revenue George B. Selden garnered from his patent he invested in a Rochester automobile manufacturing enterprise which bore his name.

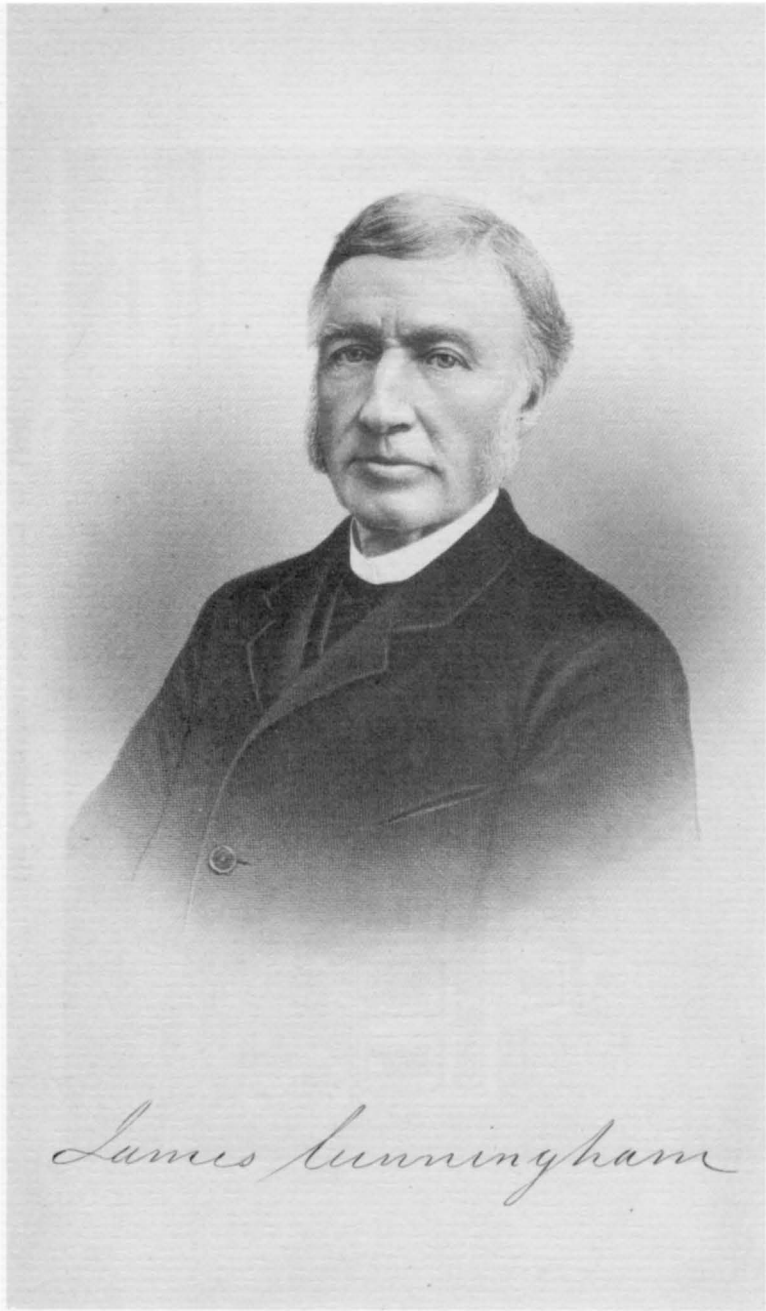
Made in Rochester

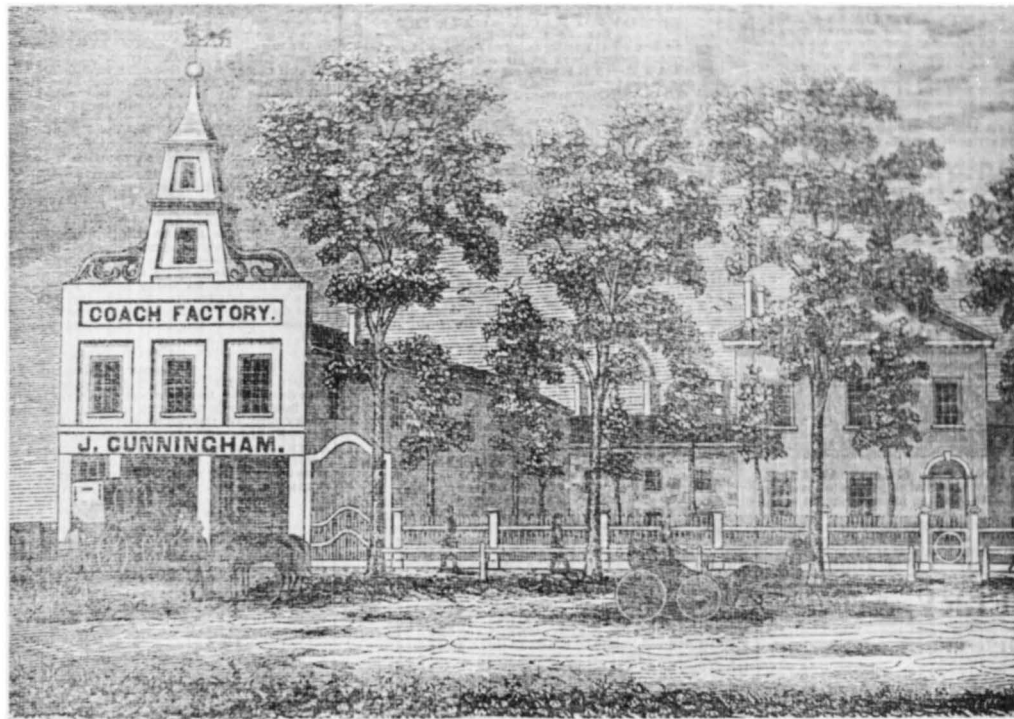
The Selden Motor Vehicle Company and James Cunningham, Son & Company were Rochester's two major automobile manufacturers. Cunningham, which enjoyed a much longer corporate history, produced finished automobiles from about 1908 until the early '30s. The Selden company, which likewise began serious production about 1908, switched to the manufacture of trucks in 1913.

The Cunningham company in 1908 was already one of Rochester's oldest business concerns. Its founder was born in 1815 in County Down, Ireland. Four years later his father died and the widowed mother and her five children emigrated to Canada. At an early age James Cunningham exhibited unusual talents in carpentry, mechanics, and construction. Cunningham moved across the lake to the newly chartered City of Rochester in 1834. After several apprenticeships he formed a carriage-making partnership with Blanchard Dean and James W. Kerr in 1838 known as Kerr, Cunningham, & Company. Rochester and the nation as a whole were sliding into a severe depression that year and the partnership was dissolved after a few years. Cunningham personally assumed the burden of a \$6,000 debt that remained from the venture.

Undaunted, Cunningham carried on the carriage making business alone and enjoyed a steady expansion. About 1850 he purchased land between Canal and Litchfield Streets. The site was north of Buffalo Street (Main Street West) and conveniently located near the Ohio Basin of the Genesee Valley Canal and the yards of the Tonawanda Railroad. With later additions, the site remained the location of the Cunningham concern for over a century.

Cunningham's carriage factory grew to one of the largest in the world. At the time of his death in 1886 it employed some 500 men. The Cunningham name was associated with durable, high quality carriages of all types; many are today the prized possessions of collectors. Cunningham made vehicles of all sizes and shapes, but if the factory could be said to have had a speciality, it was in the manufacture of hearses, funeral carriages, and ambulances. At the Columbian Exposition of 1893 in Chicago, the Cunningham exhibit consisted of two hearses, one finished entirely in white and the other in black.





The Cunningham coach factory *ca.* 1860

Five years before his death Cunningham incorporated his business as James Cunningham, Son & Company. Its initial officers were James Cunningham, president, Joseph T., a son, secretary, and Rufus K. Dryer, a son-in-law, treasurer. Early in the twentieth century several grandsons assumed leadership of the company, which remained under family control until 1968.

The conversion of the Cunningham carriage works into an automobile factory was undertaken gradually. For some time Cunningham produced both horse-drawn and gasoline powered vehicles. Its initial experiment in the automotive field was the production of some electric automobiles used by company officers.

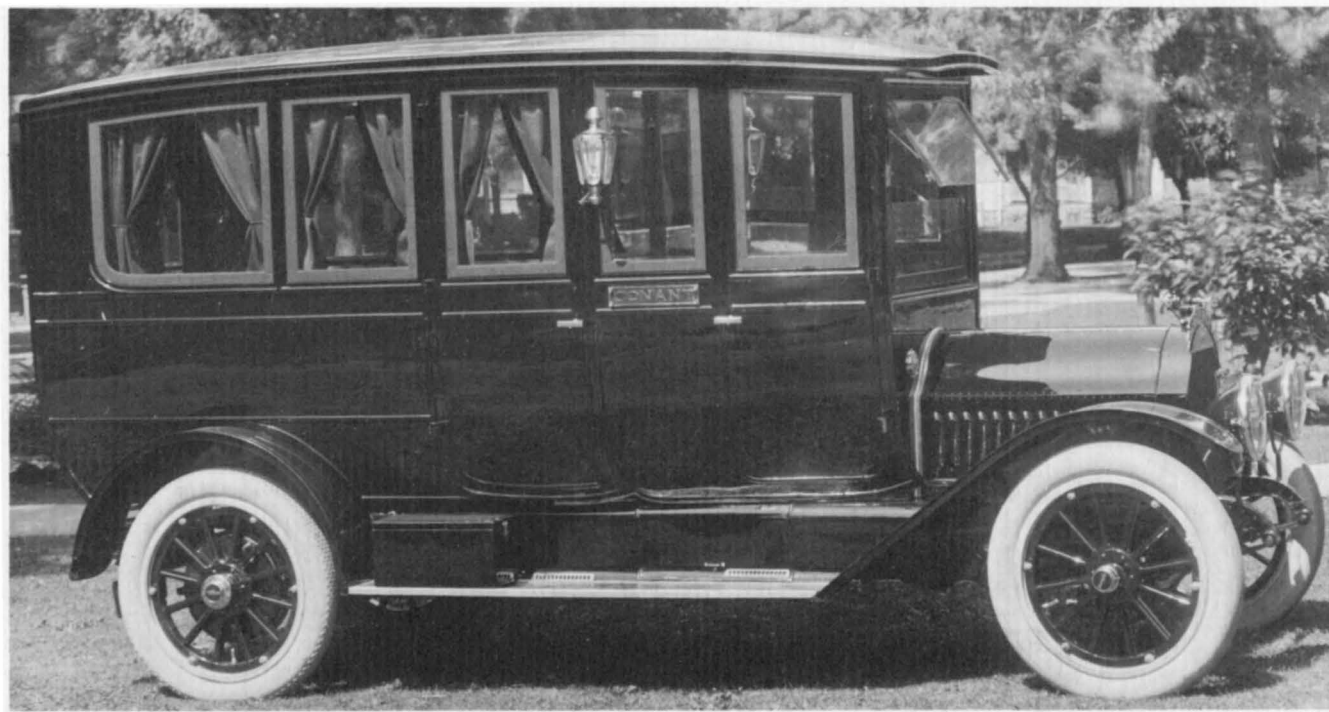
By 1908 the company offered a full line of gasoline automobiles. Its advertisements, which had earlier read "Manufacturers of Fine Coaches, Hearses And Family Carriages" now read "Manufacturers of Touring Cars, Baby Tonneaus, Limousines and Landaulets." (The company did not, incidentally, bother to obtain an ALAM license.)

For its first automobiles Cunningham relied to some degree on outside manufacturers of components. But by 1910 its cars were mounted on a rugged chassis with a four cylinder overhead valve engine of Cunningham design and manufacture. In 1914, with its four cylinder model "S", Cunningham introduced a Westinghouse self-starter. In 1916 it began offering the first of its V-8 models in a variety of body styles.

In World War I Cunningham ventured for the first time into military production. It filled an order from the Bureau of Aircraft Production for 115 balloon windlasses. Called "Cunningham-Caquot" windlasses, these odd-looking machines combined a Cunningham V-8 engine with a reel containing a mile of steel cable with a telephone wire core. The mechanism was mounted on a truck chassis.

In the prosperous 1920s Cunningham established itself as a leading producer of luxury automobiles. Not that its output was ever very large: its work force at the beginning of the decade numbered 800, and its annual production about 650 vehicles. The figures grew but little, for the Cunningham automobile was a hand made product until the end. In an era when mass producers like Ford and General Motors were perfecting the assembly line, Cunningham clung to the dignified standards of its carriage making days.

The majority of Cunningham workers were body craftsmen. Major components of the car bodies were fashioned from whitewood and ash, strengthened with iron braces, and covered with sheet



Cunningham funeral car, Style 942



Selden 35 R Roadster, 4 cylinder

aluminum shaped by hand. Hoods and fenders were of steel. The exterior finish began with a coat of priming, two coats of lead, and five coats of "rough" paint. The rough paint was stained and rubbed, and followed by two coats of "color". The car was then varnished no fewer than three times, each coat of varnish being smoothed by men using powdered stone. The final step was enameling in a dust-proof room.

Cunningham paid similar attention to interior woodwork, upholstery, and fittings. Nickel plating was done "in house." Even glass shaping and polishing was performed in the plant on Canal Street. For the most part, Cunningham purchased only electrical equipment from outside manufacturers. Its mechanical department set exacting standards. Every completed chassis was, for example, put through a road test of 300 miles.

Cunningham's willingness to undertake custom work attracted famous and wealthy customers. Owners of Cunningham automobiles included William Randolph Hearst, Marshall Field, William and Philip Wrigley, Harold Lloyd, and Mary Pickford.

The company's success with wealthy purchasers, however, only underlined its failure to reach the mass market it never attempted to gain. Like other manufacturers of luxury automobiles, Cunningham was unable to pursue this line of business beyond the early 1930s. It did continue to produce car bodies for other automobile makers, notably the Ford Motor Company, as late as 1937. Cunningham's engineers and skilled workmen proved adaptive. As we have seen, the company produced large windlasses during World War I. In the 1920s Cunningham cooperated with the War Department in making a series of fast, light tanks and other armored vehicles.

In 1928 Cunningham launched a new venture, the Cunningham-Hall Aircraft Corporation. Relying on slotted wing patents held by the inventor Randolph Hall, the aircraft company used the production facilities on Canal Street. Like its parent corporation, it was a family held affair. Cunningham turned out numbers of single-engined cabin airplanes during succeeding years, including the one in which George Eastman took his first plane ride. Although abandoning the construction of complete aircraft, Cunningham produced airplane parts (as well as other defense goods) during World War II.

In the post-war era the company survived through additional diversification. In the mid-50s it produced electronic goods, notably crossbar switches used in the broadcasting industry. In 1961 Cunningham moved to Honeoye Falls; in 1968 it became a division of Gleason Works.

The Selden Motor Vehicle Company was the belated fulfillment of George B. Selden's ambition to actually manufacture automobiles. Selden lent his name to the company, organized in 1905. His two sons, Henry R. and George B., Jr., served as engineer employees.

Ironically enough, given the association of the Selden name with the ALAM and its disdain for fly-by-night auto makers, the Selden company was in fact a mere assembler of automobiles. Its factory near Probert Street on the city's east side produced cars for only about three years, 1909-1912.

In 1913 the company underwent major reorganization. A new Selden Truck Sales Corporation converted the company's entire production to trucks, ranging in size from three-quarters to five tons. As Selden Truck Sales the company achieved noteworthy success. After the outbreak of war in 1914 it secured contracts with Russia and France. In 1918 it also produced machines for the United States, completing over a thousand Model B Liberty Trucks.

In the domestic market, Selden Truck Sales was an important innovator of the time payment plan. In 1930 it was absorbed by the Bethlehem Truck Company of Pennsylvania which removed the operation from Rochester and retired the Selden name.

A Pioneer and Some Minor Makers

If George B. Selden became the acknowledged automobile pioneer of Rochester, its less-well known but perhaps more legitimate pioneer was local inventor and industrialist J.B. West. In 1896, one year after the government issued the Selden patent--very possibly unknown to him--West produced the first horseless carriage in the city. West experienced his share of difficulty: his original homemade engine proved unreliable, and so he imported one from France. That, too, was unreliable, and so he crafted a steam powered car which ran for several years.

The chief interest in West's pioneering efforts lies in a legal battle he successfully weathered. In the late '90s it was as yet by no means

certain that horseless carriages were safe or legal. One day motoring past the Rochester Theological Seminary, then located at East Avenue and Alexander Street, West frightened a horse hitched to a laundry wagon. According to legend, clean laundry was scattered the length of Alexander Street. The laundry wagon was wrecked and its owner sued West for damages. West's initial defense was that the laundry horse was prone to "spook." The first court test went against West. On appeal, however, he won a decision from Federal Judge Alfred E. Coxe that mechanically driven vehicles could legitimately use the roadways. Highways, said the Judge, were made for men to use no matter what means of propulsion they chose. Thus a Rochester incident contributed to the case law which was gradually building in favor of the automobile.

As was the case with other northeastern cities Rochester spawned a number of evanescent automobile makers during the pioneer days of the industry. None of these approached the success of Cunningham or even of the Selden enterprise, although one, the Sullivan Motor Truck Corporation, turned out light and medium trucks from 1914 to 1922. An outgrowth of Sullivan Brothers, carriage makers, the firm's factory was south of East Avenue a little distance east of the Park Avenue intersection. Some of the Sullivan plant still stands.

More typical of Rochester's short-lived ventures were the Foster Steam Automobile Company, the Empire State Auto Company, and the Rochester Cycle Manufacturing Company, all of which turned out a few steam cars and quit the business by 1906. Another group of local companies devoted to gasoline powered automobiles, starting business in 1910 or 1911, included Gearless, Genesee, Jenkins, Parsons and Regas. All but Jenkins produced fewer than a dozen cars.

In the early 1920s a Rochester manufacturer supplied engines for an exotic luxury automobile known as the Richelieu--assembled in, of all places, Asbury Park, New Jersey. The president of the Richelieu company was an officer of Rochester Motors Corporation, a gasoline engine maker earlier known as the F.A. Brownell Motor Company and now (1921) controlled by the Symington interests. If this is not confusing enough, the engine supplied to the assembly plant in Asbury Park was called the Rochester Duesenberg. Following World War I the Duesenberg brothers abandoned their "Model G" racing engine, selling the rights to manufacture it to Rochester Motors. This four-cylinder, 85 horsepower engine was apparently the major *raison d'etre* for the Richelieu. However, the buying public

was surfeited with expensive high-powered makes at the time and in early 1923 Richelieu filed for bankruptcy.

A manufacturing venture of the late 1930s shared in that era's enthusiastic schemes for small, lightweight, inexpensive cars--cars wedded in design elements if not in practical terms to the airplane. Nationally, the best known example of the type was the Dymaxion car of Buckminster Fuller. Between 1932 and 1935 three Dymaxion prototypes were sold. Fuller, a visionary designer rather than a practical industrialist, could not secure the means for mass production.

Rochester's contribution to the field, a three-wheeled automobile called the Airomobile, was born in Denver, Colorado. Paul M. Lewis, the designer, organized a company originally known as Lewis American Airways Incorporated. In early 1937 the firm moved to 1042 University Avenue in Rochester. A prototype constructed on University Avenue incorporated front-wheel drive, monocoque body, and a wheel base of 126 inches. Syracuse engineers supplied a four-cylinder, 60-horsepower, air-cooled engine. The body style of the Airomobile was "tear-dropped," with a single tracking wheel in the back.

The Rochester prototype Airomobile, painted red, was driven about the country in search of investors. As many as fourteen workers including some former Cunningham sheet metal men worked in the Airomobile plant. By 1938 the company moved again, to East Rochester, but never achieved real production.

Accessory and Auxiliary Industries

Thus Rochester never did become a major production center for finished automobiles. In this respect its automobile history does not rival even that of its near neighbors. Buffalo's Pierce-Arrow and Syracuse's Franklin companies occupied important places in those cities' industrial histories. The same cannot quite be said for Rochester's Cunningham and Selden companies.

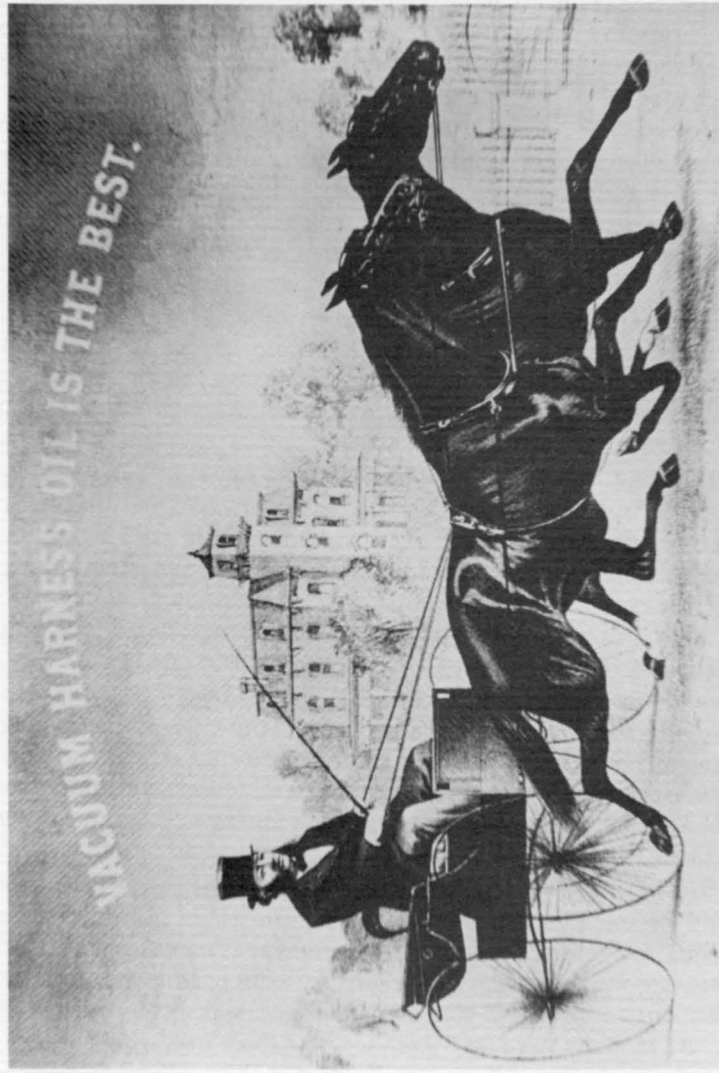
However, Rochester has played a major supporting role in American automobile history through its contributory industries and even today automobile parts manufacturing supplies a large portion of Rochester's industrial jobs--a fact not generally known outside the city.

One of Rochester's first important auxiliary industries was the Vacuum Oil Company. The company was organized to refine petroleum into useful products in 1866, seven years after Drake's pioneer well was drilled in Titusville, Pennsylvania. The oil regions of Pennsylvania and New York were experiencing the initial stage of America's first oil rush.

Men had collected and sold petroleum in small quantities for many years, in North America and elsewhere, chiefly for medicinal purposes. The new oil boom was based on its use in a refined state as a fuel for illumination, replacing whale oil and other smelly animal fats.

In 1866 Hiram Everest, a Wyoming County native, was a grocer in Rochester. He joined forces with Matthew P. Ewing, an inventor, in his experiments with the distillation of petroleum under a partial vacuum. Their intention was to extract larger quantities of good kerosene from the crude oil. The vacuum process proved, however, to be especially useful for producing a clean residue which could be sold as harness oil. Everest bought out Ewing and organized the Vacuum Oil Company to market the product.

Everest soon discovered that another product, lubricating oil, could be refined from the petroleum residue. At the time steam engines and other machinery were lubricated with lard. Everest's substitute was a success, particularly for such harsh applications as steam engine cylinders. He patented the product as "Gargoyle 600-W." By 1876 the Vacuum Oil refinery had three stills with a capacity of 170 barrels. The refinery was located in the southern part of the city, initially west of the Genesee Valley Canal; ultimately it stretched along a half mile of the west bank of the Genesee River in the Nineteenth Ward.



Early Vacuum Oil lithograph, date unknown

WEDNESDAY, DECEMBER 22, 1887.

NAPHTHA!

Terr'ble Explosion which
Destroys Three Mills.

FLAMES IN THE SEWER

Three Men Killed and Twenty
Seriously Injured by

FLYING ROCKS

Pavements Torn in Fragments by
the Powerful Fluid

floor of the Clinton had gone down with the flooring of the race and in the icy water of the latter were five or six human beings struggling for life among the mass of debris. On Mill street in the center of the square formed by the junction of Factory street was a large, ragged hole from which a sheet of flame was issuing. The Flat street tunnel was literally on fire and to look at the tongues of fire as they leaped upward from the black orifice, one was strongly reminded of the poetical expression of the "Mouth of Hell." At the next corner south was another large hole from which sheets of flame were issuing. At this point the fire was first noticed, an explosion having broken off the "man-hole" top. The box was in fact pulled for this outbreak.

Such, in brief, was the scene that confronted the firemen. The chief's trumpet was instantly at his lips and orders came quick and fast. It needed but a glance to see that the Jefferson and Clinton Mills were doomed. The explosion had literally blown the former into fragments and the Clinton Mill was a wreck. The front and west walls of this structure had partly fallen in and were crumbling to pieces under the action of the heat. A wall of masonry separated the Washington and Jefferson Mills but this had proved little protection and the upper story was on fire.

Lines of hose were quickly connected with the hydrants in the vicinity and soon several powerful streams of water were playing on the Washington Mills. As quickly as possible streams were turned on the buildings south of the Clinton Mills. Next to that building are the ruins of another mill burned several years ago. Luckily this prevented the flames reaching the structures beyond, but it required the utmost efforts to keep the sparks and cinders from igniting them.

Long and gallant was the fight for the Washington Mill Building. The

of the hotel and one employe, who was working there at the time, was slightly injured. At neither of these places of explosion was any loss visible.

The Final Explosion.

In the vicinity of the destroyed mills nearly everyone noticed a queer sound as early as 1 o'clock. This was the case in machine-shops and knitting mills, as well as the flouring mills, and in nearly every place it was attributed to escaping gas. The smell became so strong in Light's factory at the foot of Flat street that many of the workmen said they would have to lay down their work if the leak was not found and remedied.

It was almost exactly 3 o'clock and while the employes were discussing the subject of escaping gas that the man-hole to the main sewer directly in front of the Jefferson mill was blown out. The report was heard at some points a mile distant and the shock was so terrific that the windows in widely built buildings as far away as two blocks were shattered. Men rushed out of their offices and workmen left their benches, some of them never to return. The first thought of those who heard the report but did not see the rocks and broken earth as they were hurled in to the air, was that a general earthquake had occurred. The men in the offices of the Washington and Jefferson mills saw the upheaval following the report and rushed into the streets. The Jefferson mills were located nearest the point of the explosion and right over the sewer outlet some 14x20 feet, and the shock was so much more plainly felt that every employe of the mill stopped work and started to leave the building. Not two minutes after the first explosion, and while more than fifty men and boys were crowding round the seams of the gaping earth, a second and far more explosion followed. The men and boys were thrown promiscuously with the rocks, some of them a hundred feet. At the same mo-

Judging from his advertising in the mid-1870s, Everest was an early believer in diversification. The Vacuum Oil Company proclaimed themselves as not only "Manufacturers of Lubricating Oils" but also of "the celebrated Vacuum Oil Blacking" for harness. In addition, one could purchase "sperm, whale, elephant, lard, and signal oils" in wholesale lots from Vacuum. The Vacuum Oil Company's Printing Office also offered "plain and ornamental job printing" at its office on State Street!

George B. Selden, it is said, approached Hiram Everest with a difficult problem in 1877. The use of lard oil in his experimental engine created intolerable smoke and odor and fouled the cylinder. Everest produced a lubricating oil lighter than that used in steam cylinders but heavy enough to endure use within an internal combustion engine.

In 1879 Everest leased a large tract of land in the Oatka valley with a view toward finding a nearby source of crude oil. Fortunate even in misfortune, Everest found no oil, but his test well near Le Roy struck a valuable vein of rock salt at about 1,300 feet. Everest's test well marked the beginning of western New York's salt mining, an industry that continues to this day.

In the same year Vacuum Oil became a division of John D. Rockefeller's great Standard Oil trust. Hiram Everest and his son, Charles, were paid \$200,000 for the company. Hiram retired to California. Charles became the active manager of Vacuum, a job he retained until his death in 1917.

Not even a brief history of Vacuum Oil in Rochester would be complete without a description of the great naphtha disaster of 1887. On an otherwise quiet afternoon in late December the city's peace was suddenly shattered by a series of muffled but powerful explosions. Some citizens at work downtown were certain there was an earthquake. Others concluded it was a dynamite conspiracy--anarchists at work. The mystery seemed partly clarified when the City Hall fire bell tolled the coded alarm for the Mill Street-Brown's Race factory district. This densely packed area of shops and mills, some already antiquated in 1887, was the frequent location for the city's worst disasters. A mob chased the fire companies to the intersection of Mill Street and Brown's Race, only to gape at a great crater which had appeared in the street above the race.

Although streets had been torn up in several places, the most severe eruption had taken place at that intersection. Three flour mills, the Washington, Jefferson, and Clinton, were entirely destroyed in the explosion and ensuing fire. Numerous other

buildings were damaged by concussion and flying debris. The fire alarm was registered at 3:00 P.M. As the afternoon wore on, additional underground explosions blew manhole covers hundreds of feet. When this phenomenon spread to State Street panic nearly ensued among the crowd.

Three men were killed in the disaster, and there were numerous injuries. Initially, it was believed that a gas leak was responsible. When it was apparent that a volatile substance was burning underground, it was believed that Vacuum Oil--some two miles away--had discarded residues into the sewers which had clogged and backed up in the system.

As investigation proved the Vacuum Oil refinery had no connection with the city sewers, since it sold all fractions of its petroleum. Naphtha, an explosive distillate halfway between kerosene and gasoline, was sent to the Municipal Gas Company through a pipeline along the right-of-way of the Genesee Valley Canal. The Municipal Gas Works were located south of the Erie Canal and east of Canal Street. On the day of the disaster Vacuum Oil pumped 14,000 gallons of naphtha to its customer. Municipal Gas waited hours before alerting the Vacuum refinery that no naphtha was received. A leak in the pipe had allowed the dangerous fluid to enter the sewer system. Following a tortuous path, the naphtha at last collected beneath the streets of the industrial district. Here fumes collected and slowly rose. Many workers complained of the odor of "gas" for hours before the first explosion, and some had been ready to lay down their tools. At last the fumes were ignited, probably by an engine in the ground floor of one of the factories.

Early in this century Vacuum Oil acquired a second refinery in Olean, New York, and a third in Paulsboro, New Jersey. The company prospered along with the growth of the automobile industry. Its lubricating products, marketed under the Gargoyle trade name, dominated the industry.

In 1911 a landmark United State Supreme Court order dissolved the trust which had by now assumed the name Standard Oil of New Jersey. Coincidentally, that was the first year the oil industry produced more gasoline than kerosene. Vacuum Oil underwent a series of corporate reorganizations. In 1931 Vacuum merged with Standard Oil of New York and in 1934 became the Socony-Vacuum Oil Company, Incorporated. Another merger with Standard Oil of New Jersey resulted in a name change to Standard-Vacuum Oil Company. After World War II the company became a partner, with other oil giants, in the Arabian American Oil Company (ARAMCO).

In 1955 the company placed one of its trademarks in the corporate name: Socony Mobil Oil Company, Inc. It is now known as Mobil Oil Corporation. Although the company dismantled its Rochester refinery in 1931, since 1962 it has again become a major factor in the regional economy. Nearby Macedon is the headquarters and largest manufacturing facility of the Plastics Division of Mobil. The Plastics Division is the descendant of the Kordite Corporation, a business begun just after World War II by the Rochester brothers Howard and Richard Samuels.

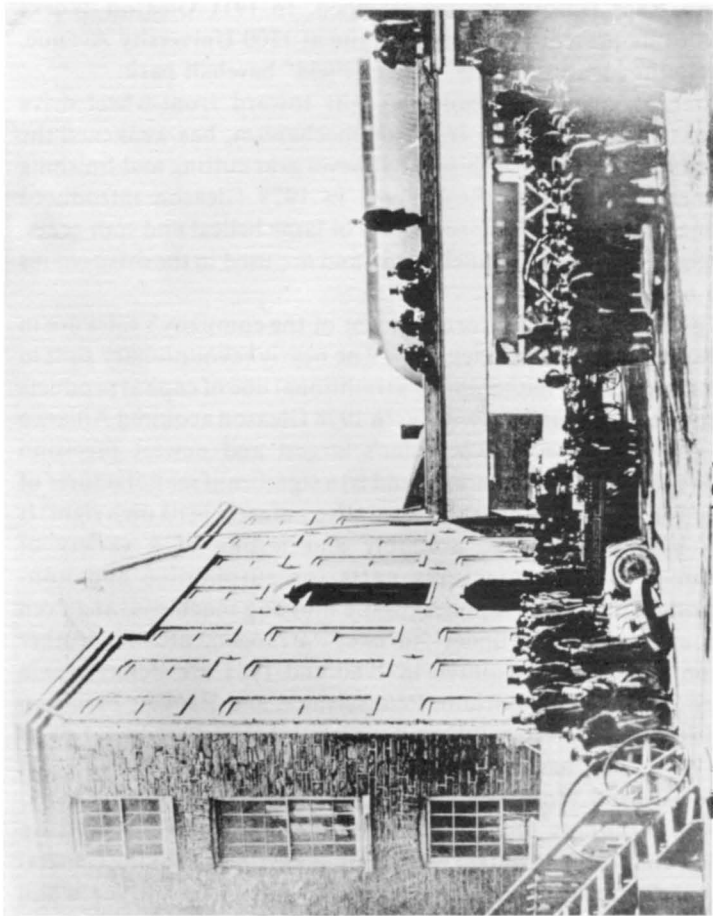
The Gleason Works, a major supplier world-wide of production equipment for the automotive industry, began as a modest machine shop near the head of Brown's Race. William Gleason, the founder, came to Rochester from Ireland 1851. He served as an apprentice machinist here and during the Civil War worked in the Colt Armory in Connecticut. Returning to Rochester, he immediately set up shop with first one, and then a second partner in the manufacture of various machinery. For a time he was associated with the Kidd Iron Works, also on Brown's Race. Gleason began operating independently as William Gleason, Tool Builder and, in 1888, organized the Genesee Foundry. The foundry was destroyed by fire in 1889 and rebuilt on an enlarged scale in 1890 as the Gleason Tool Company. At last the business was renamed The Gleason Works, a New York State corporation, in 1903. The company traces its birthdate to 1865, when the predecessor firm of Connel and Gleason began.

But a landmark year of at least equal significance to the enterprise was William Gleason's invention of the bevel gear planer in 1874 (patented 1876). The teeth and the working surface of a bevel gear are set at an angle not parallel with the shaft that drives the gear (or is driven by it). Such gears work in pairs to convey power in different directions, or "around corners." Until Gleason's invention, bevel gears were extremely time consuming and expensive to make. Each gear casting was finished by hand; for some applications wooden gear teeth were inserted in metal rings. Handmade gears were imprecise, wasted power, and had little endurance. The gears produced by Gleason's automatic machine were far superior and less expensive.

Gleason's gear-cutting invention, improved and enlarged over the years, proved invaluable to the growth of the automobile industry. One major application of the bevel gear in automobiles is in the rear axle, where power from the drive shaft must be distributed at right angles to each rear wheel.



William Gleason



Gleason's shop on Brown's Race, 1865

At the turn of the century Gleason Works made a crucial decision to abandon the manufacture of most other types of machinery and the production of parts. Instead, Gleason concentrated on the sale of its gear machines to those who needed the gears in their own manufacturing. That strategy helped establish the company as the world leader in its specialized field. As its business expanded, the Brown's Race factory became cramped. In 1911 Gleason Works moved to its present thirty-six acre site at 1100 University Avenue, formerly the location of the "Culver Field" baseball park.

In recent years the wholesale shift toward front-wheel drive vehicles, which require no rear-axle mechanism, has weakened the demand for Gleason's sophisticated bevel gear cutting and finishing machines. Anticipating the change, in 1979 Gleason introduced machinery for high-speed production of large helical and spur gears. Such gears operate in parallel planes and are used in the drive chains of the newer cars.

At present only about forty percent of the company's sales are in automotive production machinery. The nearly revolutionary shift in demand away from the company's traditional line of capital products has required Gleason to diversify. In 1978 Gleason acquired Alliance Tool and Die, one of Rochester's largest and newest precision machine builders. Alliance was (and is) a significant manufacturer of production equipment for the automotive industry in its own right. It makes machines for the assembly and testing of a variety of components. It manufactures parts for automotive and non-automotive industries, supplies plastic molding machines, and even builds entire factories under "turnkey" arrangements. Two other Gleason subsidiaries acquired in 1980 and 1981 are Pennsylvania Pressed Metals of Emporium, Pennsylvania and Hackett Precision of Nashville, Tennessee. These divisions manufacture metal parts using the exotic new technologies of flow- and cold-forming. At present Gleason Works employs about 3,500 persons in Rochester.

Delco Products Division and Rochester Products Division together employ over 10,000 workers in good times, making General Motors Rochester's third largest industrial employer when automobile sales are strong.

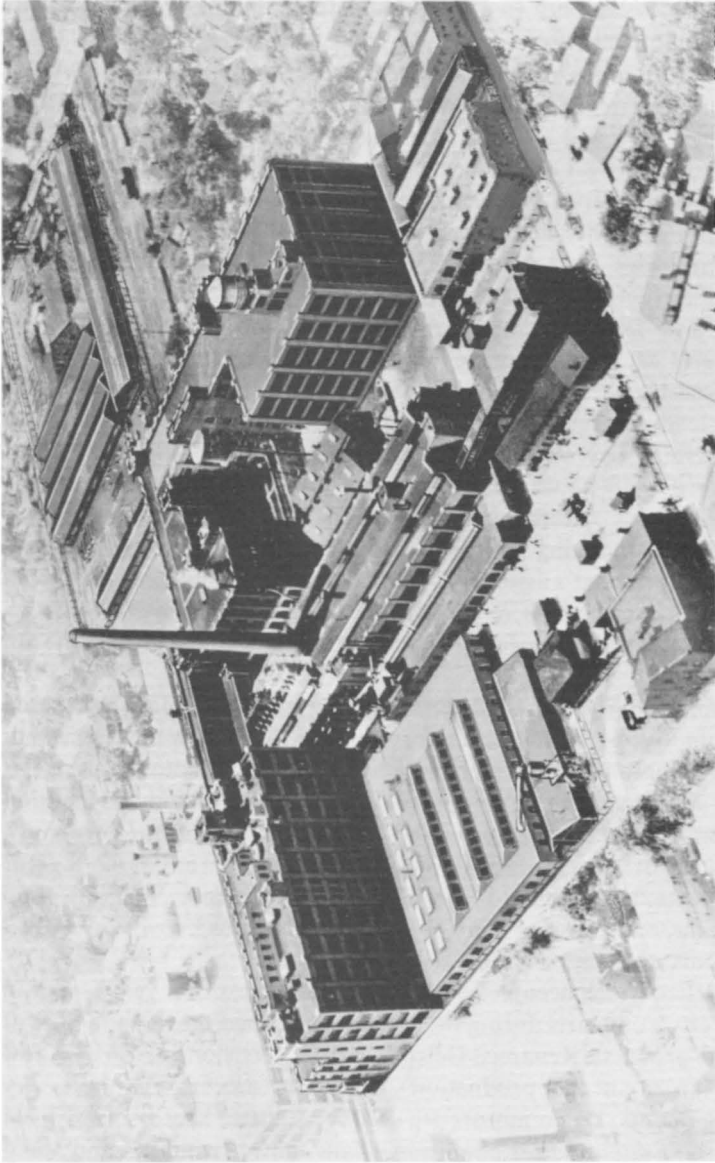
The two Rochester divisions of General Motors may trace their ancestry to the Rochester Coil Company, a small North Water Street concern launched in 1908. The organizers of the shop, whose principal business was the repair of trolley car motors, were Joseph C. and Edward A. Halbleib. The company was presently renamed the North East Electric Company and in 1911 Edward Halbleib

designed and built a practical automobile electric starting system. North East sold its starting systems, and later ignition, lighting, and related devices both to auto manufacturers and to owners as "add-on" equipment.

The fortunes of the company prospered along with rising automobile registrations and consumers' dislike of hand starting. Soon it occupied a substantial cluster of buildings south of Lyell Avenue just west of the Broad Street intersection. In 1929 General Motors acquired the firm. General Motors already owned a conglomerate division known originally as the Dayton Engineering Laboratories Company (DELCO) which in turn managed such diverse enterprises as Delco-Remy, Frigidaire, Inland Manufacturing, and Delco Aviation. As part of a complex reorganization General Motors first made Frigidaire independent. Then in 1930 it merged the Delco Lighting Company with North East Electric and physically moved much of Delco to Lyell Avenue in Rochester. A new North East Appliance Corporation under the management of Edward Halbleib was given the task of manufacturing a line of Delco products for automobiles; the Delco Lighting Company was to continue producing its line of water-pumping and gas and electric plants for rural customers. During the next few decades Delco Appliance (as it was renamed) in Rochester also turned out such products as electric fans, air conditioner motors, and home oil burners.

Meanwhile General Motors required more and more assembled automotive parts from its factory here. In 1939 a new plant was built on Lexington Avenue to handle the need for automobile parts. At first a subdivision of Delco Appliance, Rochester Products Division manufactured tubing, automobile locks and keys, carburetors, and a host of other automobile components. Gradually Rochester Products has come to specialize in carburetors, fuel injection systems, and emission control devices, and is now known as "the fuel systems division" of General Motors.

Delco, which occupied a new factory complex on Lyell Avenue in the city's outskirts during the 1950s, abandoned the manufacture of home products. Renamed Delco Products Division in 1965, it now specializes in the production of electric motors and accessory components. Delco motors are used for General Motors windshield wipers, heater and air conditioner fans, power windows and seats, power door locks, and the like.



North East Electric Company, 1926

Voplex and Schlegel, two Rochester corporations which supply specialized body materials to the automobile industry, had strikingly similar origins.

The company begun by Albrecht Vogt is the older of the two. In the early 1870s Vogt and a partner, Frederick Haiger, operated a narrow loom shop in an Exchange Street loft. At first the shop made woven fringes that were then popular on women's dresses. Haiger soon moved to Buffalo and Vogt shifted operations to the St. Paul Street industrial district. There he gradually expanded his line of merchandise, first with upholstery trimming and then with broadlaces used to trim horse-drawn broughams and coupes. Doubtless Vogt was a supplier to Cunningham and other Rochester carriage makers.

With the coming of the automobile Vogt Manufacturing concentrated on all types of cloth interior trim materials. In 1927 the company built a new factory on Fernwood Avenue. It shortly acquired the Waterloo Woolen Mills and the George Carter Company of Detroit, enabling it to supply automobile cloth and concealed nail bindings.

Since the 1920s the company has continued its expansion through the acquisition of generally small, advanced-technology manufacturing firms, among them Leaming Industries of Canandaigua (1961) and Allerton Chemical of Rochester (1964). By shifting from a concentration in textiles towards one in plastics the company maintained its role as a supplier of automobile interior components. At present it counts sixty percent of its business as automobile related. In 1970, at the time of construction of its ultramodern headquarters in outlying Pittsford, the company's name was changed to Voplex, an amalgam of Vogt and plastics.

In the late 1880s Charles P. Schlegel with his partner Henry A. Schaefer began a similar narrow loom enterprise. After a short stay on North Water Street, Schlegel moved the shop to Canal Street near the Cunningham factory, finally to Goodman Street at the corner of College Avenue. The Schlegel product line, as advertised well into the twentieth century, consisted of "carriage, basket, and dress trimmings." Schlegel Manufacturing also supplied textile trimmings to the automobile industry. Eventually it developed a specialty within that field of producing the door and window weather seals for autos.

After World War II, Schlegel turned its experience in weathersealing automobiles to the broader field of sealing doors and windows of all types. It has become an acknowledged leader in this

area, prospering greatly because of the demand for greater energy conservation in recent years. Today Schlegel is a far-flung conglomerate of over thirty divisions, still based in Rochester where its headquarters is the adapted Sibley mansion on East Avenue. The corporation's Rochester Division in nearby Henrietta is one of its important manufacturing centers. Products for the automobile industry are no longer made by Schlegel in Rochester; however, automobile door seals are made by a division elsewhere.

Because of Rochester's historically diverse manufacturing base and the importance of the automobile industry in the scale of the national economy, dozens of local firms at one time or another have served as suppliers. It would seem impractical to describe them all, but at least a few additional companies deserve some mention before bringing this account to a close.

Besides Gleason Works, one other Rochester company supplies heavy production equipment to the industry. Now known as Farrel Rochester Division of Emhart Corporation, the plant in the triangular junction of Blossom Road and University Avenue was first operated in the 1920s as the Consolidated Machine Tool Corporation. Farrel produces many types of large machinery for working in metal and plastic. The automobile industry is a customer for its plastic injection molding machines and aluminum extrusion presses. Such machines are valuable (among other things) for producing lighter automobile components which contribute to energy efficiency.

The Dollinger Corporation, which today produces industrial filters and filtering systems, began in 1920 as the Staynew Filter Company. The Staynew Protectomotor was an improved air filter invented by Lewis Dollinger and sold at first to truck operators. For decades Staynew filters were supplied as original equipment on a wide variety of automobile makes.

Bastian Brothers and Metal Arts Companies, recently merged under the latter's name (although it was an offshoot of the former) have been manufacturers since the turn of the century of jewelery, novelties, medallions, commemorative objects, campaign buttons, and decorative insignia. Both companies have made the nameplates which identify automobiles by maker or model. F.A. Smith Company (FASCO) manufactured small motors and defrosting fan units, switches, and circuit breakers. It left Rochester in 1975.

Note on Sources

Because of its importance to the history of the American automobile industry and to the evolution of patent law, an extensive literature on the Selden patent case exists. The definitive work is William Greenleaf, **Monopoly on Wheels** (Detroit, 1961). Greenleaf's monograph is comprehensively documented and may serve as an introduction to most of the literature. **Monopoly on Wheels** approaches the story with a detectable pro-Ford bias. Also dealing with Selden from the Ford point of view is Alan Nevins, **Ford, the Times, the Man, the Company** (New York, 1954); Nevins acknowledges the research contributions of Greenleaf. A thoughtful, if much briefer, account of the Selden controversy may be found in Robert F. Scott, "I Invented the Automobile," **Automobile Quarterly** 4 (Winter 1966), 314-325. Scott, like J. Harold Byers, "The Selden Case," **Journal of the Patent Office Society** 22 (October 1940), 719-736, points out that Selden's patent never was held invalid. Selden's sons left behind their personal accounts: Henry R. and George B. (Jr.) Selden, "Some Rochester Inventions," **Rochester Historical Society Publications** 14 (1936), 191-211; George B. Selden, Jr., "Horses Hated Rochester Alumnus, Pioneer, Inventor of Automobile," **Rochester Alumni-Alumnae Review** 18/14 (February-March 1940), 16-17; Selden Jr. interview, by Lee McCanne and Katharine Thompson (January-February 1965), untranscribed, in Monroe County Historian's Office.

For the history of Rochester automotive manufacturing this account owes a great debt to W. G. Yengst, "The Automotive History of Rochester, N.Y.," **Antique Automobile** 33 (November-December 1969), 4-17, reprinted substantially in **Rochester Engineer** 55 (January 1977), 112-116. Another published source is Percy R. Gilbert, "Richelieu Motor Car Corporation," **Antique Automobile** 42 (September-October 1978), 14-18. In the Local History Division, Rochester Public Library, Rochester Industries Scrapbooks III, p. 2, is an anonymous clipping, ca. 1920 which describes the progress and operations of the Cunningham company to that date. Also in the Division is Raymond J. Diringer, "The Airomobile Motor Car," 2pp. typescript, n.d.

These sources aside, much of Rochester's automotive manufacturing history has been pieced from the Division's newspaper clipping files, City Directories, uncatalogued pamphlets, and the like. For Vacuum Oil, however, there is a useful account in John P. Herrick, **Empire Oil; The Story of Oil in New York State** (New York, 1949), pp. 245-253; (Mobil Oil Corporation), "A Brief History of Mobil" (12 pp. pamphlet, 1980?) provides dates and genealogical detail. The Rochester naphtha disaster was extensively covered in the local press, and clippings were collected in the Barton Scrapbooks II, pp. 18-24 (Local History Division). The Gleason Works has twice issued (anonymous) memorial volumes which contain corporate histories: **The Story of the Gleason Works 1865-1950** (Rochester, 1950), pp. 9-24 and **The Gleason Works 1865-1965** (Rochester, 1965?) pp. 1-14. Finally, helpful corporate histories (including those of Alliance Tool Corporation, Dollinger Corporation, Gleason Works, Mobil Chemical Company, Rochester Products Division, and Schlegel Corporation) are contained in Howard Hosmer, "Partners in Progress" in Blake McKelvey, **A Panoramic History of Rochester** (Woodland Hills, Calif., 1979), pp. 193-253.