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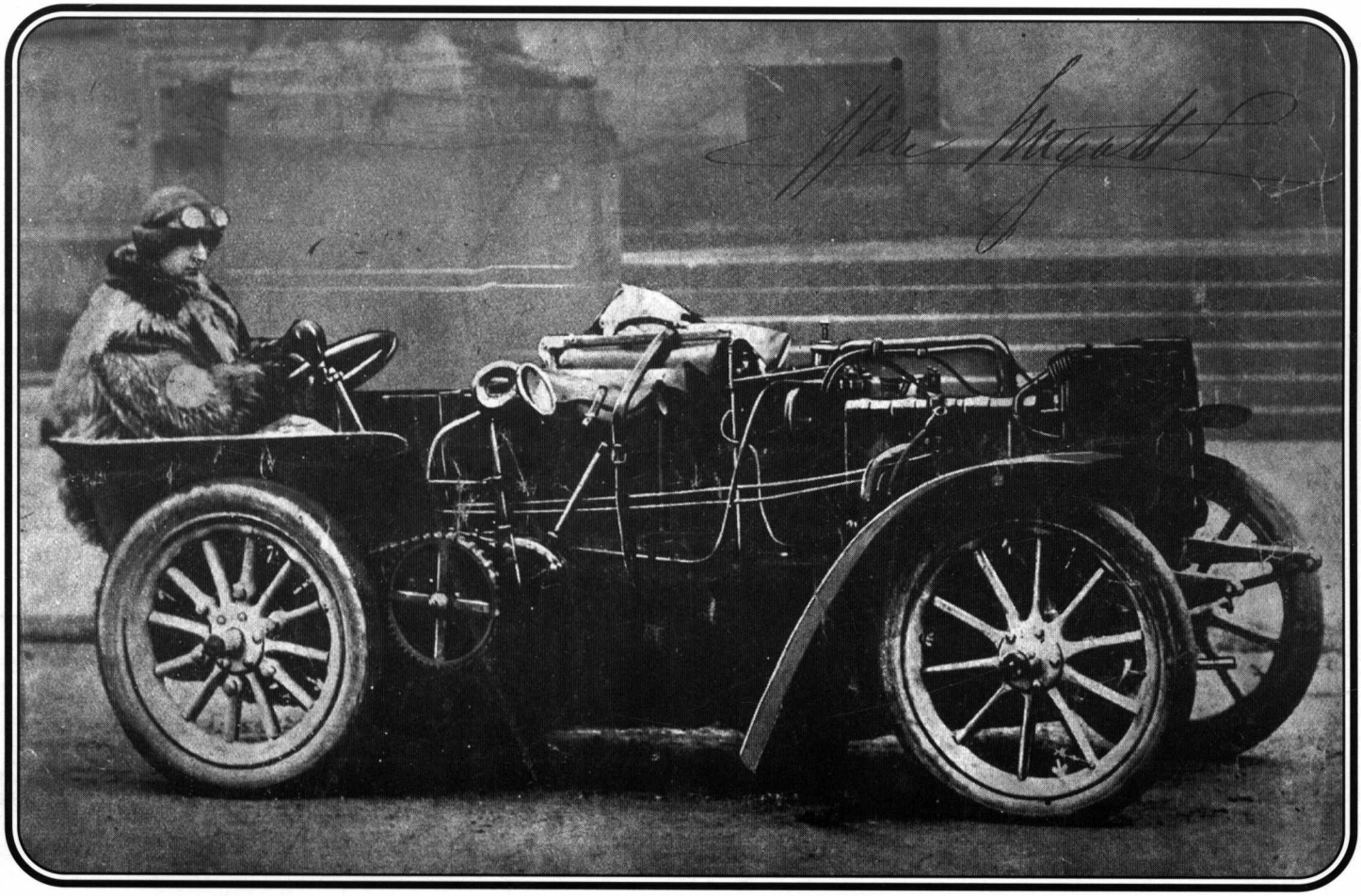

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EDITOR'S NOTES

Some folks these days worry that the younger generations, X or Y or whatever, aren't much interested in cars. Maybe it's the product, they think, too utilitarian, or that it's not cool to be interested in machinery they view as unfriendly to the environment. And, to tell the truth, judging by the age of the crowds at Hershey this past year, you'd think they might have a point.

SAH has never done demographics, though names are a pretty good indicator of sex, but we really haven't much of a clue as to the age of those members who don't drop by the History Tent at Hershey or come to one of our functions elsewhere. But my observation from having gone to the four Automotive History Conferences is that there are more "youngsters" out there than you might think who are interested in automotive history and related topics. Thus, the idea arose to develop an issue of the *Review* to showcase writers 40 and under, those born in 1963 and later (which, to many of us, is only a blink in the past). And this is the issue before you, coincidentally, our No. 40.

The front cover of this "youth" issue is, appropriately enough, our youngest-ever cover boy, only 19 when the picture was taken in 1900. He is Ettore Bugatti and that is one of the first cars he designed. At first glance, it's awkward-looking, ungainly even. But look more closely; it's uniquely underslung, unlike virtually all other automobiles of that day.

Several years ago, the SAH Board decided that it wanted to promote automotive history on the college and graduate level, and established an award for the best paper written annually by a student. The award would be in cash and the winning paper published in the *Review*. *David Lewis*, a former SAH president who has had a notable career as a professor in business history at the University of Michigan, Ann Arbor, is an advocate of peer-reviewed publications as an assist to the careers of young academics and other writers, and we agreed to try that concept on this issue of the *Review*.

Dave explained to me his [edited] thoughts in the following manner:

> Reviewers (referees) need not be academics; they can be anyone conversant with the subject. In the instance of the *Review*, most of these people will be non-academics. . . . When contacting reviewers, simply ask them if the manuscript is worthy of publication. If so, why; if not, why not?
>
> How do you find reviewers? If a reviewer's name does not come to mind, perhaps the "Index to Member Interests" in the SAH *Directory* could be consulted. Or, down the road, perhaps a call for volunteers could be published in the *Journal* and/or the *Review*. For starters, I'll volunteer to review anything having to do with Ford.
>
> Academic journals are sticklers for documentation – footnotes/endnotes/bibliographies. I don't think we should get hung up on this requirement. Later, maybe, but one step at a time. Let's begin by seeing to it that manuscripts/articles have been peer reviewed, and deemed worthy of publication.

Dave and *Sinclair Powell* were the judges of the initial Student Paper competition and chose as the winner for 2001, "Driving the Dream: The History and Motivations Behind 60 Years of Automated Highway Systems in America," by *Jameson M. Wetmore*, who, at the time he wrote this paper, was a doctoral candidate in the Department of Science & Technology Studies, Cornell University. He is now a postdoctoral fellow with the Division of Technology, Culture, and Communication, School of Engineering and Applied Science, at the University of Virginia, Charlottesville. We are pleased to make it the lead-off article for this issue. Jamey was a presenter at the Third Conference, and the abstract of his paper, "Moving Relationships: Comparing the Corporate and Personal Practice of Naming Automobiles," appeared in *Review* No. 34, p. 42. The Award was not presented in 2002, and, for 2003, has been divided into two: one for the best paper on the graduate level, and the other, on the undergraduate. Judges Lewis and Powell are considered the peer-reviewers of this article.

Back in 2000, *Michael L. Bromley* sent us "Scorching Through 1902: 'The Automobile Terror.'" I explained that there was a backlog, but that the centenary of the events he wrote about would be an appropriate target date for publication. Well, 2002 came and went, and recently Michael e-mailed me about his article. Somewhat off-handedly I replied that if he were under 40, we might run it in this issue. He promptly replied that he thought he qualified, not hitting two score until June. Michael is a graduate of Hamilton College and launched his writing career with *Stretching It: The Story of the Limousine*, SAE Press (2002), co-authored with Tom Mazza. His second book, *William Howard Taft & the First Motoring Presidency, 1909-1913*, McFarland (2003) is a narrative of the Taft presidency woven around his relationship to the automobile. *Keith Marvin*, who needs no introduction, was the peer reviewer.

One of the more unusual articles to come our way in recent years is "The Litigation of Auburn Automobile Company: The Historian's Use of Legal Resources," by Thompson Smith. This is a corner of automotive history rarely delved into. Thom, who practices law in Auburn (with his father, *John Martin Smith*) while a student at Valparaiso University School of Law from which he received his J.D. in 1997. He is treasurer of the National Automotive & Truck Museum of the United States (Auburn) and on the Board of Directors of the Auburn-Cord-Duesenberg Festival in Auburn. This article was peer-reviewed by former SAH President *Sinclair Powell*, a practicing lawyer for many years.

Our next article, "If Only in Another Time . . . . The Story of the DeVaux-Hall Motors Corporation" was written by Keith R. Jones for Dave Lewis's Global Automotive Industry course at the University of Michigan, Ann Arbor, and sent to us by his step-father, *Howard E. Reinke*, who was also his inspiration for the paper. Keith, who has a degree in Electrical Engineering, is now a Team Leader and Certified Sigma Six

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Front Cover: Ettore Bugatti at the wheel of an underslung vehicle he built in 1901 at the age of 19 years. (cover, *Automobilia*, September 1947).

Rear Cover: Arkansas migrant child, Berrien Co., Michigan, 1940, John Vachon for the Farm Security Administration, reproduced from the Collections of the Library of Congress.

Acknowledgements: The illustrations in Michael Bromley's article are reproduced from the collections of the Library of Congress. Messrs. Wetmore, Jones, and Keefe provided illustrations with their articles. The illustrations in the articles by Messrs. Engelhard and Fiorani are from the editor's collection. Mr. Smith and the editor provided illustrations for Mr. Smith's article.

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Driving the Dream – The History and Motivations Behind 60 Years of Automated Highway Systems in America

by Jameson M. Wetmore

Pick up any automobile enthusiast magazine today and there will inevitably be an article about the newest convertible or sports coupe that describes the thrill and pleasure of driving. The authors in publications such as *Car and Driver* and *Motor Trend* scorn the very idea that the car might simply be a mechanism to get from here to there. And while they occasionally appreciate driving aids such as traction control, they often decry vehicles available only with an "automatic" transmission. They much prefer the control and connection to the car that a manual transmission and clutch provides. They preach to their millions of readers that happiness is driving a car along windy mountain roads with the wind blowing through your hair as you shift at the right times, brake at the right times, and hit each apex with precision.

But this love of driving is not the only form of automobile enthusiasm. While there are few magazines or fan clubs dedicated to the subject, there has been a group of enthusiasts who have argued that the best automobile is one that would require no driver whatsoever. These enthusiasts advocate the implementation of what is today known as an "automated highway system" or AHS.[1] Although it has been given generic names like "automatic control highways" and brand names like "autoglide," the basic goal has been the same—create a technology that links highways and vehicles to allow for hands-off, feet-off "driving." Since as early as the 1930s, thousands of automobile engineers, vehicle component manufacturers, government officials, individual inventors, and even the readers of popular technology magazines have envisioned the creation of an automated highway system. To achieve this goal, they have planned, designed, researched, developed, funded, and dreamed about the idea of automobiles that drive themselves.

This article is an attempt to better understand the enthusiasm for automated highways. It is somewhat different from a traditional automotive history in that it does not chronicle the success of an automobile, significant individual, or company, and illustrate how they contributed to the joy of driving. Rather, it will examine the continued failure of an idea that would eliminate drivers altogether. But just as automobile success stories have been fueled by dedicated individuals, the idea of automated highway systems has been kept alive by a handful of engineers, civil servants, and others who have pursued their vision for over 60 years. I argue that although automated highways have not yet been built for public travel, the continued enthusiasm for them is worthy of historical exploration and explanation.

If one took at face value the predictions made by automobile companies, the government, and individual engineers and inventors over the years, one would be led to question why we do not yet have a working AHS. An examination of the difficulties encountered by these groups in the development of automated highways, however, would cause one to ask a very different question: Why has enthusiasm for AHS been so prevalent?

I will address these questions in three separate parts. First, I will sketch some of the historical highlights of automated highways to show how the technology has evolved over the past 60 years. Second, to better understand why the American public does not drive automated vehicles today, I will examine the long list of difficulties that those espousing the technology have encountered. Finally, I will contrast these "failures" with the various reasons why the idea of automated vehicles has had such a powerful effect on people for so many years. Simply put, this essay will attempt to explain the drive behind the dream.[2]

AHS: A 60-Year History

Americans were first formally introduced to the idea of automated highways right off of "Horse and Buggy Lane" at General Motors' Futurama exhibit at the 1939 New York World's Fair. The Futurama was designed to be "a thought provoking exhibit of the developments ahead of us . . . to help us get a glimpse into the future of this unfinished world of ours."[3] In the exhibit, visitors were carried in three-seat cars around dioramas of what the world was supposed to look like in 1960. The ride took people past an amusement park; multi-modal transportation centers that bring together automobiles, trains, and airplanes; multiple lane super-highways; and a "modern farm [where] hours of work have been shortened, with almost universal electrification of rural areas."[4] (Fig. 1). In this future world where technology had solved most of the world's problems and helped to ensure "abundant sunshine, fresh air, fine green parkways—all the result of thoughtful planning and design," automobiles were designed to steer and propel themselves, leaving the public free to enjoy a fast and relaxing ride.[5]

Although computer chips and even transistors were years away at the time, the vision presented at the '39 World's Fair was detailed enough to address the type of technologies that could be used. Every automated highway system must control the vehicle in at least two distinct ways. It must monitor and adjust its lateral movement to keep the car in its lane, and it must maintain a proper headway so that the car does not crash into the vehicle in front of it. GM's '39 exhibit explained that a safety distance between cars would be maintained through a sophisticated system of radio control (presumably using vacuum tubes). The car's lateral position was stabilized through a little less sophisticated mechanism. Barriers were built between the lanes of the road that curved upward steeply to the height of about three or four feet in much the same manner as a modern

Fig. 1 – Two children and a rabbit celebrate an Easter holiday amid the vast limited-access highways and high-speed on- and off-ramps presented in the 1939 Futurama.

day skateboarding "half pipe." If the car began to veer out of the center of the lane, its wheels would begin to climb this barrier. The hope was that the car's inclination to climb the wall would be countered by gravity, and the vehicle would gently "fall" back into the center of the lane.

Little evidence exists that this particular approach was ever developed beyond the simulated model stage. But it does demonstrate that the basic idea of an automated highway was being discussed and was even being sold to the public as early as the late 1930s. Over time, the technologies that have been built into the dreams of automated highway systems have changed, but the ultimate goal has remained the same.

Automated Vehicles in the 1950s and 1960s

Although the 1939 Futurama predicted a working system by 1960, General Motors engineers did not put serious research into an automated highway project until the mid-1950s. If they had originally planned to look further into the idea, such efforts were interrupted by World War II, which was escalating even before the Futurama exhibit had been dismantled. During the 1940s, the major automobile manufacturers turned to producing a variety of equipment for military use rather than develop new civilian technologies.

But even though the idea was put on the back burner for a decade or so, advances made during the war and soon after, like radar and new electronic technologies, would help give automated highway programs a new life. These new technologies were first applied to automated vehicle control in the early 1950s, when General Motors teamed up with the Radio Corporation of America (RCA). By 1953, GM and RCA had developed a scale model automated highway system, which allowed them to begin experimenting with how electronics could be used to steer and maintain proper following distance.[6]

Soon after, GM developed a series of concept cars known as the Firebirds. These dramatically styled vehicles served as both running test-beds and promotional vehicles for the idea of automated driving. In 1956, General Motors demonstrated the Firebird II at its Motorama, a traveling show created to introduce the public to GM products and ideas. In actuality, the Firebird II had no automated capabilities whatsoever. Its highlight was the gas-turbine engine that powered it. But in films shown at the Motorama, it was supposedly "under the direction of an 'electronic brain' on a dream highway of the future."[7] The concept was that Firebird II would be electronically controlled by traffic control towers placed at various spots along major highways (Fig. 2).

Within two years, General Motors had moved from mockups to full-scale technologies that could spark the interest of the public not only through conceptual ideas, but also demonstrations. A group of engineers led by Joseph Bidwell, head of the GM Research Engineering Mechanics Department, and overseen by Lawrence Hafstad, Vice President in charge of GM Research, installed a pair of "pick-up coils" on the front of a 1958 Chevrolet. These coils could sense the alternating current of a wire embedded in the road and would adjust the steering wheel accordingly. On Friday, February 14, 1958, a GM press release proudly announced:

> An automatically guided automobile cruised along a one-mile check road at General Motors Technical Center today, steered by an electric cable beneath the concrete surface. It was the first demonstration of its kind with a full-size passenger car, indicating the possibility of a built-in guidance system for tomorrow's highways. . . . The car rolled along the two-lane check road and negotiated the banked turn-around loops at either end without the driver's hands on the steering wheel.[8]

To emphasize the fact that no driver was required, one of these vehicles was even built without a steering wheel.

Although this demonstration was considered a successful technical test, GM executives wanted to present this new technology to the public in something a little less mundane than a '58 Chevy, so it created the third car in the Firebird series. Firebird III had a gas-turbine engine like the previous model, but it also sported a new electronic control system called "unicontrol." Instead of using several input technologies to pilot the vehicle, like the steering wheel and brake and accelerator pedals, unicontrol united all of these input systems into a single joystick. A driver could simply wrap his or her hand around it and, "Move it forward to accelerate, back to brake, right or left to steer, twist it back up to park."[9] According to the engineers involved, it was this development of centralized control through hydraulic and servomechanisms that made possible the "Autoguide" automated driving system they were developing.[10] By placing all directional instructions into a single instrument, GM engineers could progress beyond "steering only" systems (Figs. 3 and 4).

While General Motors was developing new vehicle systems, others were developing road and centralized control systems. Most notable was television pioneer Dr. Vladimir Zworykin from RCA who had been working on a road system for several years.[11] Zworykin had devised a system based on railroad block signals that used circuits buried in the road to magnetically sense a vehicle's speed and location. Based on this information, a central "computer" could send back instructions to the vehicle to ensure safe passage and avoidance of accidents. In 1960 such a system was demonstrated in 1/40th model form at the Highway Research Board's (now the Transportation Research Board) Annual Meeting in Washington D.C.[12] The model was able to detect if a car or object was blocking a lane and automatically stopped the cars short of the obstacle to avoid an accident.[13]

Throughout the late 1950s and early 1960s, General Motors focused on presenting concept vehicles to the public, until 1964 when a *new* New York World's Fair was held. GM took this second Fair as an opportunity not to just display cars, but also to present an updated vision of the future in Futurama II. Created with the same goals in mind as the first, the second Futurama gave a peek into the future at the height of the excitement over nuclear power.[14] In its dioramas, everything from a five-story tall road-building vehicle that cut through the "green hell" of the South American rainforests to Antarctic submarine trains ran on nuclear power. There were no nuclear powered automobiles, but General Motors did present an automated highway concept. A magazine article from the

Fig. 2 – The Firebird II was promoted as a vehicle that would communicate with control towers to receive traffic and safety information.

period described the display as quite similar to the AHS envisioned by Zworykin: "A revolutionary 'Autoline' expands the capacity of a three-lane expressway: Electronically, a control-tower operator steers, brakes and sets the speed of each car in an automatic lane; groups of cars move at equal intervals as a group."[15]

This presentation sparked public interest for a few years, but with the passing of the '64 World's Fair, AHS research and development sagged. According to one engineer involved, "there was sort of a hiatus as we came to limitations in terms of the technology that was available when measured against the economic feasibility."[16] Although technological progress (or lack thereof) may have been a part of the lack of enthusiasm, the industry was also being distracted by several new concerns. Beginning in the late 1960s, the Federal government began passing a series of safety standards, and by the early 1970s, it was also putting in place new fuel consumption and emissions standards. These new mandates led to rising costs and there was impetus to focus much of the research and development efforts on near-term solutions to meet these new demands. Automated highways were again put on the backburner for about a decade.

Recent Developments

In the early 1980s, a handful of General Motors engineers revisited automated highway systems. This time, however, there was little fanfare and the public was not presented with a futuristically styled vehicle. They simply produced a paper report for the Federal Highway Administration (FHWA) that explored the possibilities, challenges, ramifications, and potential benefits of an AHS system.

Although it was not coupled to a radically styled show car, this 1981 report did not disappear silently. The GM report and reports like it provided inspiration to a group of public and private transportation engineers who were under more and more pressure to fix the problems of the nation's highways. Although they did not foresee a completely automated system in the near future, this disparate group envisaged applying new advances in technologies–such as computers, radar, and telecommunications–to automobiles and highway infrastructures to alleviate congestion and potential dangers. In 1986 they formed an initiative known as "Mobility 2000." After lobbying and obtaining the U.S. Department of Transportation's backing, these transportation officials and engineers convinced Congress

Fig. 3 – GM/RCA demonstration of a convertible Chevrolet Impala navigating a road course without driver or steering wheel.

Fig. 4 – The 1958 Chevrolet Impala with "Unicontrol."

to insert a special section in the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA). The section called on the Secretary of Transportation to "develop, submit to Congress, and commence implementation of a plan for the intelligent vehicle-highway systems program (or IVHS)."[17]

In response to this order, the U.S. Department of Transportation (DOT) helped form IVHS America, an organization that changed its name a few years later to ITS America because the label "Intelligent Transportation Systems" was more inclusive than "Intelligent Vehicle-Highway Systems." Since the early 1990s, this organization's mission has been to "foster public/private partnerships that will increase the safety and efficiency of surface transportation through the accelerated development and deployment of advanced transportation systems."[18] Using conferences, committees, publications, and a web site, ITS America has promoted a number of technologies that link highways with electronics and communications technologies.

Although ITS America occasionally mentions automated highway systems in its literature and broad predictions for the future, much of its efforts have focused on "nearer term" technologies. Rather than attempt to overhaul the entire system of automobiles and highways, ITS America promotes technologies such as electronic toll collectors, driver information systems, and traffic management systems. But the establishment of this organization did not completely satisfy the Congressional directive given to DOT. There was also a small section of ISTEA that had large implications for automated highway system research. In 1991, Congress also called upon the Secretary of Transportation to:

> Develop an automated highway and vehicle prototype from which future fully automated intelligent vehicle-highway systems can be developed. Such development shall include research in human factors to ensure the success of the man-machine relationship. The goal of this program is to have the first fully automated roadway or an automated test track in operation by 1997.[19]

DOT cautiously responded to this directive in 1993 by granting a contract to Honeywell Aerospace to study the one question given specific emphasis in the legislation, human factors. Later that year, DOT began a series of 15 "Precursor Systems Analyses" to determine the feasibility of the automated highway system idea. But DOT still had to deal with the call for a "fully automated roadway . . . or test track" by 1997. Therefore, before it had even seen the results of a single precursor study, DOT issued a request for applications for a consortium to research AHS and perform a demonstration by 1997. Ford Motor Company applied, but a group of nine companies led by General Motors won the contract and the National Automated Highway System Consortium (NAHSC, or Consortium) was formed.

By 1997, the Consortium had gathered over 120 associate participants, reviewed various AHS concepts, and put together a demonstration to show the world what could be done with automated highway systems. "Demo '97," as it was called, brought together motor vehicle companies and universities from across the world to showcase cars that could relieve the driver of

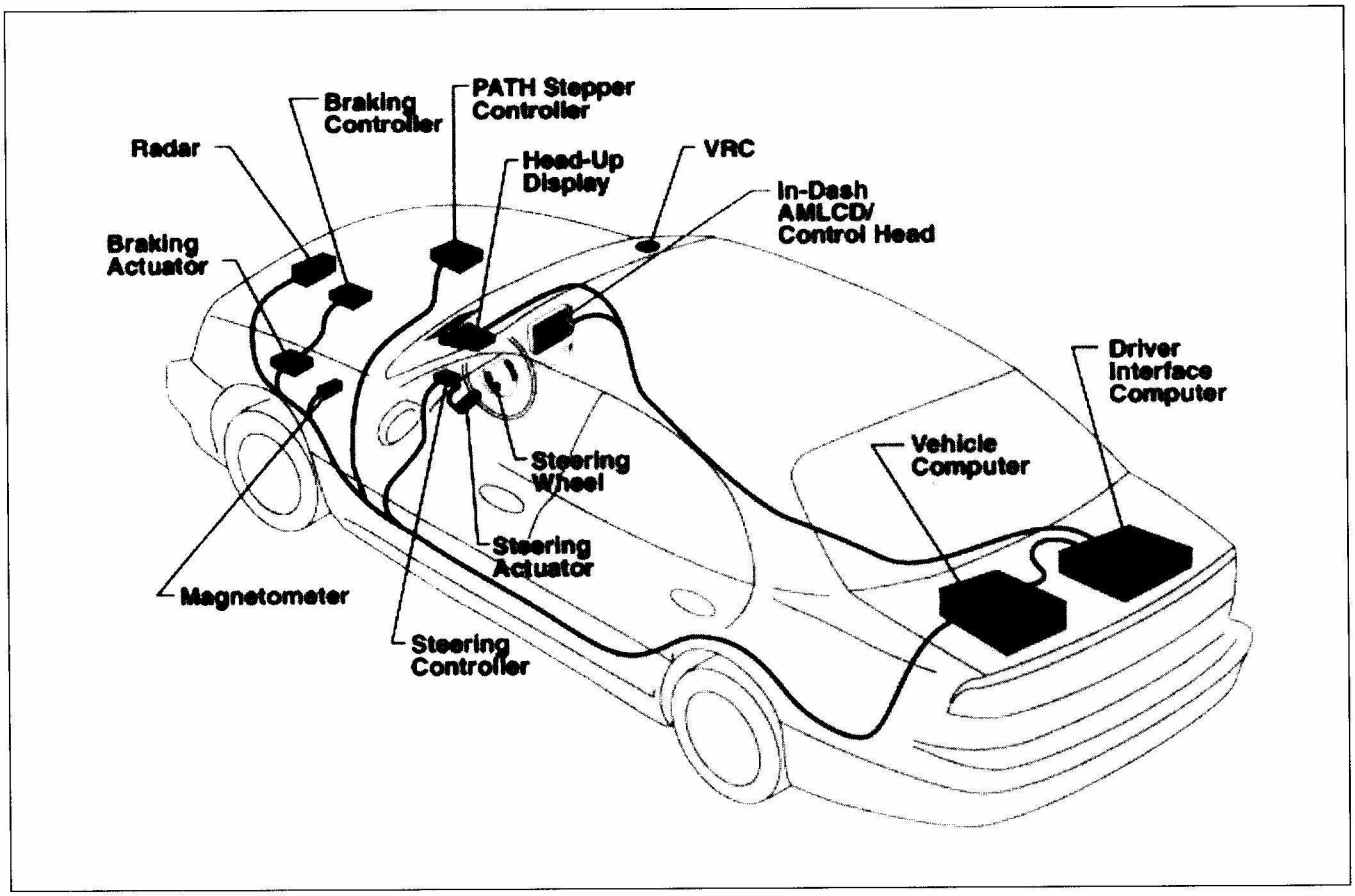

Fig. 5 – A generic AHS vehicle architecture presented as a schematic drawing by the NAHSC in 1997.

most or all tasks (Fig. 5). The demonstration was focused on a seven-mile stretch of Interstate 15, just north of San Diego. Magnets buried in the road, magnetic tape on the surface of the road, and all sorts of optical recognition systems and radar devices, guided a fleet of over twenty different vehicles in an effort to show the progress made on applying AHS ideas to interstate highway travel. Companies like Delco Electronics argued that they had finally created "an integrated vehicle control system that is helping move automated highways from science fiction to reality."[20] (Figs. 6 and 7).

The Difficulties of Implementation

For the last 60 years, Americans have been told that AHS was right around the corner. Before people even had a chance to be skeptical in the 1939 Futurama, the voice guiding them through the future argued, "Does it seem strange? Unbelievable? Remember, this is the world of 1960."[21] In 1958, *Business Week* magazine noted that, "Some knowledgeable auto men predict we'll have . . . complete electronic control 15 or 20 years from now."[22] Although the NAHSC was hesitant to publish official figures, many of those involved in the program in 1997 estimated it would be 20 to 30 years until there would be a substantial automated highway network. Automated highways have been "only 20 years away" for over 60 years.

The primary reason for this delay is that regardless of the fanfare surrounding displays like Demo '97 and GM's Futuramas, AHS has never been as simple to implement as various press releases and government officials have made it seem. Every AHS development project has encountered more than a handful of difficulties. And despite the fact that the technology of 2001 is significantly different from what automotive engineers had to work with in 1939, the difficulties of implementation have remained remarkably similar. A brief explanation of some of these recurring problems will help to show why automated highway systems are so difficult to construct.[23]

The Traditional Concern of Cost Effectiveness

As with many new technologies, one of the concerns about implementing AHS has been the cost involved. For the most part, the cost of changing the roadway has not been seen as a problem. For instance, in 1960 RCA argued that installing the necessary equipment would run about $100,000 per mile, or about 10 percent the total cost of building the road itself. Current estimates sit at the low price of $10,000, largely because the recent plans call for most of the sophisticated technology to be installed in the vehicles. The extra money AHS would add to the price of a car, however, has usually been seen as more significant. 1960 RCA estimates ranged from $100 to $1,000. Current estimates hover between $1,000 and $2,000.[24] Such costs are significant in terms of the total price of a new car and could make it difficult to sell the technology to the public.[25]

But in actuality, the cost problem is rather insignificant. There are examples throughout the history of technology where expanding markets and new production processes have solved the problem of cost. What are more

Fig. 6 – Photo taken from the backseat of a California PATH designed automated vehicle while taking part in a platooning exercise at Demo '97 in San Diego.

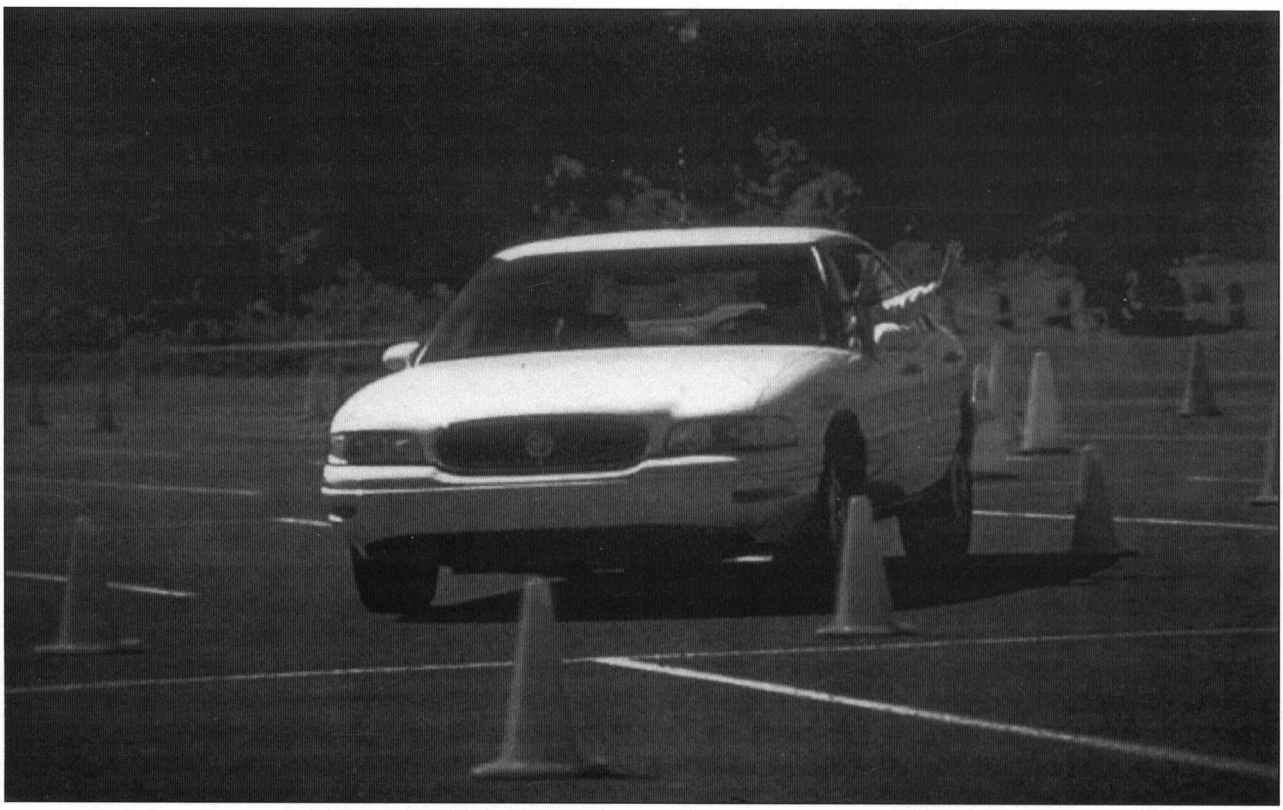

Fig. 7 – To demonstrate their enthusiasm that the vehicles were doing the driving, many "drivers" of AHS vehicles stuck their hands out of the windows at Demo '97.

important for the future of AHS are the problems that are specific to AHS technology.

Computer Concerns

Computing systems have been a central part of AHS plans since at least the 1950s and as such, much work has gone into making them as fool-proof as possible. But, even though the development of new computing systems have alleviated some problems, additional problems have developed. In fact, new understandings of computers have uncovered many difficulties never before conceived.

During the early development of automated highways, it was felt that a major difficulty of implementation would be the reliability of the computing hardware. Especially in the 1950s and '60s when automated cars were controlled by stacks of vacuum tubes and fragile transistors, simply keeping the components in one piece was a key concern. A bad bump could jar a vacuum tube and shatter its glass bulb. A small mistake like that at 60 miles-per-hour could be deadly.

Most of the basic hardware reliability problems have been alleviated with the evolution of the silicon chip, but new computer concerns have taken their place. A question that has been increasingly asked is whether or not a computer can be programmed to handle every situation a vehicle might encounter. For vehicles with optical recognition systems, this has been seen as especially difficult. Passing through the shadows cast by overpasses can confuse the computer and result in the car veering off the road.[26]

Cars that bypass this difficulty by getting their lateral guidance data directly from systems embedded in the roads run into other problems. Implementing this set-up often requires that computers in the car communicate with computers in other cars and/or the road. The stumbling block here lies in the fact that computers do not always "speak the same language." Should one small bit of information be misread, the results could be deadly. When computers are produced by different people at different times and with different programs, it is difficult to say how well an AHS system would be able to integrate everything without problems. Many of those involved are concerned about whether computer systems can be designed to safely deal with an uncertain environment made up of both foreign scenarios and computers.

Dealing with a Reckless Public

Another important cause for concern has been problems in the area of "human factors." In fact, the ISTEA legislation singled it out as being perhaps the biggest hurdle to clear. The anxiety arises from questions about how people will interact with automated vehicles, especially considering that how people interact with normal motor vehicles is not very well understood. Because engineers cannot directly design the driver, unknown and perhaps dangerous variables can be introduced into the driving environment. Efforts have been made to solve this problem. For instance, the Federal government has funded the creation of enormous simulators to try and determine what exactly goes on in the driver's seat.[27] But many questions still remain.

With automated highways, many of the problems resulting from human factors are multiplied because it is difficult to strike a balance between computer and human control. There are many reasons why human drivers should be given some control of automated vehicles. For instance, a human driver would be useful as a backup in case of computer failure; to navigate rural areas or local roads that cannot cost-effectively be equipped with automatic controls; and even just to park in one's own driveway. Situations like these give rise to many questions. If non-automated vehicles are allowed to drive alongside automated vehicles, how can reckless drivers be mitigated? If automated interstates are the first form of AHS built, and vehicles must transition from automatic to "manual" lanes, how exactly will a person handle the shift from relaxing or sleeping to being in control of a 3,000 pound automobile traveling 60 miles per hour? If an override button exists, what happens if an impatient driver grabs the controls and slams on the accelerator? Again, the concern about human factors is not new. A 1958 article on the Firebird III noted that one "factor that will retard the total victory of electronics is the familiar, 'nut that holds the wheel.' "[28]

Institutional Conservatism

One problem that has surprisingly received a lot of attention is the difficulty of changing large American institutions. The engineers and officials who oversee the U.S. transportation system were trained in a specific way of thinking and it is difficult to adjust their viewpoint. Building, running, and maintaining a nationwide AHS would require an enormous number of people who understand the complexities of electronics, computers, and vehicle/road interfaces. Most of the current government highway engineers come from a strict civil engineering background and are not terribly excited about introducing new technologies they do not understand.

These problems were recognized at least as early as 40 years ago. A magazine article from 1958 noted that when General Motors proposed its "Autoguide" external control system, "Highway officials screamed at the idea that their new superhighways might be torn up for such cables."[29] The fact that every state, every county, and every city has its own set of engineers and administrators does not make the job any easier. In addition to the need for highway engineers to understand electronics and vehicle dynamics, the producers of the vehicles themselves have to understand the basics of civil engineering and road management in order to design the vehicles properly. Major organizational change like these come slowly and only when absolutely necessary.

Discouraging Examples

Despite all of these technical and institutional reasons for why it is difficult to build automated highway systems, a few isolated systems have been built. But although engineers have succeeded in developing and assembling these localized systems, the experiences tend to make one less optimistic about public systems rather than more.

Demo '97 in San Diego, for instance, showed that automated highways could be made to work in very controlled circumstances. But each demonstration was composed of carefully built vehicles that were specifically prepared for a single seven-mile stretch of road that was carefully inspected between every run. The amount of controls that were established was staggering. Most drivers were specially trained test drivers

from the U.S. Army, each driver had a button physically attached to his or her hand to deactivate the system should anything go wrong, and all operations were halted if there was inclement weather. Despite all of this, there were still occasional failures. More than once the "disengage" buttons were used. After the demonstration was over, many transportation experts were curious as to what had actually been proven about the feasibility of a public system.[30]

Those involved in the one automated highway system that is up and running and used almost daily paint an even bleaker picture. Chrysler Motors has developed an Automated Durability Road at its Chelsea, Michigan, Proving Grounds. Engineers at this proving ground use this automated vehicle-highway system in order to test the suspension and durability of new suspensions over bumpy roads without sending drivers to daily chiropractic visits. Chrysler installs coils on the front end and robotic control systems inside test vehicles. These vehicles are then controlled from a central tower around a road embedded with a wire in a system fairly similar to the GM proposals of the early 1960s.

Despite triple redundancy to shut down the system if there is a problem, they have had several "run-offs." One vehicle went over a berm and into the parking lot, crashing into several trucks. The company is still not completely sure why.[31] The automated testing road is still used because the cost of a few trucks is cheaper than the cost of broken backs. It does not, however, make those involved optimistic about the future of automated highway systems. Even this strictly controlled system that has been used for several years on a regular basis has not been made completely foolproof.

The Environment

Should all of these socio-technological difficulties be eventually solved, however, some still argue that AHS would remain bogged down with problems because of the negative consequences it would have. A large part of this criticism has been directed at the potential environmental effects of AHS, which is somewhat ironic because for many years, automated highways were hailed as a solution to several environmental problems. It had been argued that if automated vehicles increased the efficiency of a given set of highway lanes, it could reduce the amount of land changed into highways each year and "the natural" environment could be preserved. In addition, smoothly flowing traffic would save fuel and reduce emissions thanks to the elimination of traffic jams. Recently however, many have argued that the likelihood of such promises coming true is rather suspect.

Hank Dittmar, Director of DOT's Surface Transportation Policy Project, argued in 1997 that:

> recent models indicate that traffic flow improvements [which could be made possible by AHS] actually worsen emissions of another pollutant, NOX. In addition research indicates that most of the traffic flow improvements from added capacity are short term, as added capacity is soon filled by induced travel as motorists change routes, alter timing of their trips and make new trips.[32]

Should automated highway systems actually be built, they could very likely result in a large increase in both the vehicle miles traveled and the accompanying fuel consumption and emissions. This is a scenario that many environmentalists dread, and it is a possibility they are working against.

There are also critics who claim that automated highways would not create the free-flowing highways that have been promised. It is commonly argued that an automated highway can carry two to three times the current capacity of a given stretch of highway. But if automated highways feed into smaller manual lanes, backups are likely to occur. For instance, if an AHS is built into a busy downtown area, and many previously hesitant drivers take advantage of the new form of transportation, where will all of these cars go? Parking lots in most cities are already full to capacity. Adjoining roads are crowded as well. If an AHS must depend on existing manual roads, exits, and parking lots, many of its benefits are lost.

Many AHS critics argue that in order to evaluate the benefits of an automated highway system, one must look at the big picture. One must understand not only the individual technological components, but also the organizational difficulties, the interaction of complex systems, and the human sphere in which these technological artifacts would need to perform. In the end, they argue that the problem does not lie in any single technology that can be the focus of extensive engineering efforts. Even though GM built a car in 1958 that could follow a wire, integrating everything into an enormous workable system is a systems problem that is rather baffling.

After examining all of these difficulties—the seemingly insurmountable technical problems, new environmental concerns, and the complexity of establishing large systems—the fact that we do not yet have automated highways does not seem so puzzling. Instead, the fact that begs for an explanation is why the idea of automated highways has been so powerful for so long.

The answer to the question of why the dream of automated highway systems has been so persistent over the last 60 years is difficult to pin down. There are likely as many reasons as there have been engineers, politicians, government officials, and industry advocates involved. But while it may be impossible to cover all of them, there are a handful of factors that stand out as especially important in the history of AHS. Like the difficulties encountered by AHS promoters, the roots of the enthusiasm for automated highways have been surprisingly similar throughout its 60-year history.

A New Type of Personal Mobility

Perhaps the most basic of all, and the one to which most people can relate, starts with America's fascination with the automobile. Personal mobility, and all of the things that are wrapped up in it, has had an enormous impact on the culture of this country. People demand to go where they want, when they want. While schedules regulate buses and trains, the automobile gives people the freedom they have come to expect.

But the automobile in its present form has some drawbacks. Certainly driving can be quite enjoyable at times. The fascination with the Sunday drive has a history as long as the automobile. But at other times, the fact that the driver must stay in control of the car at all times can make life difficult. Some may argue that there is nothing better than a summer drive in a convertible, but more than a few believe the daily commute

to be one of the worst parts of their day. Others enjoy taking their cars on vacation so that they have easy mobility once they get to their destination, but dread the multiple-hour trips it takes to get there.

Automated highways could potentially solve these nagging problems. Tired of 20-hour drives to Florida that take two days? Set your course for an automated highway and read stories to your kids while you enjoy the scenery. Frustrated with the morning commute? Pull onto an automated highway and spend your extra time getting another 30 minutes of sleep or enjoying a more leisurely breakfast. A souvenir pamphlet from the 1964 Futurama described this motivation well as it took visitors past a diorama of an automated highway.

We move smoothly beside the highway which is acquiring new lanes and picking up considerably more traffic as we approach the City. But despite the traffic volume, there doesn't appear to be any confusion or delays. There's a good reason for this free flow; it's the automatic highway that man is using here. How smoothly and effortlessly cars move on and off this road of tomorrow. We envy the drivers in the automatic lanes as we watch them relax and read, or talk with passengers, while their cars move along swiftly, safely and surely.

Automated highway systems would combine the best of both worlds: personal mobility and the ability to relax. This has perhaps been the major driving force behind automated highway systems since the beginning. What the driver/passenger should do with this free time is about the only thing that evolves. In a GM film from the early 1960s called *Easy Street*, a male driver leans back and lights a cigarette.[34] In some of today's promotional material, a woman turns to the passenger's seat where she has a laptop computer and phone to conduct business.[35] (Fig. 8). Regardless of what one does with their extra time, many believe that the added comforts and conveniences that could come with automated highway systems would be the ultimate realization of the automobile.

Creating Visions of the Future

In many ways, automobile companies like General Motors were quick to pick up on the advantages and disadvantages of the automobile and in the middle of the 20th century. At the time, they were not certain that the automobile would remain a dominant form of transportation forever. Playing up the AHS idea gave themselves, and the general public, the hope that the automobile would continually progress and become an ever better way to travel. In justifying the work on Firebird III, for instance, Dr. Hafstad argued, "If others are not to wrest away Detroit's primacy in providing personal transportation, the auto industry must get down to basic research."[36] Automobile manufacturers promoted the AHS idea to get people excited about the future of automobile travel.

To share/promote its idea of the future, General Motors hired Norman Bel Geddes, an industrial designer as the primary contractor for its 1939 Futurama. Bel Geddes argued that: "One of the best ways to make a solution understandable to everybody is to make it visual, to dramatize it.... Until mass opinion is crystallized, brought into focus, and made articulate, it amounts to nothing but vague grumbling."[37] In constructing the two Futuramas and countless other displays, GM shared its vision of the future in moving, three-dimensional forms and went a long way in crystallizing positive public opinion for the automobile and its future.

Such an approach was not uncommon. The Futuramas are some of the best known examples, but throughout the century and a half history of world's fairs, companies and even countries have used the idea of the future to both construct the present and shape the future. Mitchell Wolfson, Jr., a world's fair scholar, describes the process in the following way:

> World's fairs are the very soul of propaganda in its most constructive form. Their persuasiveness is evident in their lasting effects upon history and our daily lives. All the elements of human activity are incorporated in a fair's structuring, organization and presentation. By coordinating these elements of human endeavor, man is able to review his immediate past, reflect on what is being summed up, and move forward into new areas, secure in knowing that the past has been absorbed.... And though world's fairs are generalizations, they serve mankind as monumental beacons, showering light not only for protection but for *guidance*.[38]

The Futuramas were immensely successful in achieving this very status. The interstate highways and cloverleaf interchanges that connected them in the 1939 dioramas inspired an entire generation of civil engineers. Over the next several decades these engineers worked to make such a system of highways a reality. In a similar way, the vision of AHS exhibited by GM at world's fairs was contagious and was caught not only by the public, but by automotive engineers as well.

Marketing and Showmanship

But, as Wolfson alludes, by selling the future GM was also selling the present. Through these presentations of future automated highway systems, GM was making the automobiles of the day more appealing. At the 1964 World's Fair, William L. Mitchell, GM styling vice-president, argued that the presentations were not predictions, but rather illuminations of the possibilities of the present: "We are not saying all these things will be done, but we are saying current technology shows they can be done."[39] The hope was that the future would captivate people and cause them to believe in the present.

In many ways, the presentations of AHS in the Futuramas were a rather complex marketing plan. In fact, automated highway systems have been wrapped up in the ideas of marketing and advertisements from the very beginning. Even the display of AHS in Demo '97, which was constantly referred to as a "Congressionally mandated demonstration of feasibility," was criticized by many as simply being a marketing ploy. Over the years, nearly every automated highway system project was affiliated with a large demonstration or exposition that linked it closely with current models for sale.

It was probably General Motors that advanced the idea of marketing a vision of the future into an art form. GM participated in nearly every world's fair held in the 20th century. When there was not a world's fair available, its corporate planners created their own in the form of public presentations in traveling "Motoramas." Each of these expositions gave GM a chance to introduce its newest model year with flare. As potential buyers were shown advanced vehicles like the Firebird III and a corresponding vision of the future, they were reminded

that this same car company was producing products that could be purchased today. To buy a car from GM was to participate in the future. This type of advertising has continued to the present day. A Buick press release issued during the summer of 1997 argued that the LeSabre is the perfect car for an automatic highway system. Buick had donated eight LeSabres to the University of California PATH program to be used in an automated platooning demonstration at Demo '97, and was hoping to sell a few more of them by linking the product with AHS, the vision of the future.[40]

Publicity through Entertainment

While presentations of AHS were meant to inspire visions of the future, they also had the simple objective of entertaining the public. This can be seen in General Motors' decision to hire the industrial designer Norman Bel Geddes to work with its own designers in building its 1939 World's Fair exhibit. Bel Geddes had a certain flair for causing excitement. This was evident not only in the Futurama he helped to design, but also in the other major projects at the Fair that he spearheaded, including a concession called the "Crystal Lassies" or "A Peep Show of Tomorrow."[41]

Crystal Lassies was a peep show "of the future" because while there was only a single "dancer," she was surrounded by hundreds of mirrors, providing views from many angles and giving the illusion of dozens of women, all moving in perfect harmony. The connection between the Futurama and this peep show did not go unnoticed by the people of the day either. *The Brooklyn Eagle* argued that "the same showmanship which has made General Motors' Futurama the most popular exhibit at the Fair is responsible for the Crystal Lassies."[42] As a result, the "Peep Show of Tomorrow" was often simply referred to as the "Sexorama." GM's choice of Bel Geddes was an effort to made sure that the display and visceral experiences a person had sparked a lot of interest, and possibly some desire.

Bel Geddes-type showmanship was employed at the Motoramas as well. An article in *Harper's Magazine* describes the opulence of the 1958 New York Motorama held at the Waldorf-Astoria:

> Five long, cream colored cars—Chevrolet, Pontiac Oldsmobile, Buick, and Cadillac—were suspended high in the air. . . . The performers [who were for the most part scantily clad women] hailed each car with song and dance. In a final rite, the dancers genuflected to the new Cadillac, a magnificent Golden Calf made of plastic and steel.

The AHS-equipped Firebird III presented at this Motorama may have lured some of the public to come in, but GM executives were hoping they would leave with more than a vision of the future. Visions of the future were meant to entertain as well as instruct and shape expectations. Presenting AHS was just one of many techniques that GM and others used in an effort to get the public to "Come for the show, leave with a car."

In the end, General Motors did get a great deal of publicity out of its exhibitions. The line to the 1939 Futurama was often two miles long and it is still known to this day as the great success of the Fair. 28,000 people a day fought to get inside. GM certainly used this captive audience for its benefit. It was not uncommon for the dazzling displays to have a lasting influence on the overall opinions of GM. One young man at a Motorama remarked: "They'll take Ford apart; they've got eye-appeal."

Transportation Problems

As was mentioned in the brief history of AHS above, some of the primary motivating factors behind the recent increase in AHS interest are a bit more practical than public showmanship and the desire to sell cars. Of particular concern are the ever-increasing problems this country is having with its transportation system. In 1995, 42,000 people were killed on American roadways. In the same year, DOT estimated that motor vehicle travel would grow 35 to 50 percent over the subsequent two decades. With the problems of cost, traffic fatalities, ever-increasing traffic jams, and a desire not to allocate more land to roads, many people believe the future of America's highway system looks bleak. AHS is seen by some as a silver bullet that will alleviate, if not eliminate, all of these problems.

Many argue that putting vehicle control in the hands of computers would eliminate the number one source of automobile collisions today—human drivers—thereby making the roads significantly safer. Traffic jams would be eradicated because these computers could allow vehicles to follow very closely to each other at high speeds, thereby allowing many more vehicles to drive on a given stretch of highway. And the increased efficiency that would result would reduce not only the amount of fuel required for traveling, but also the emissions produced and the future land required for roadways and shoulders.

The view of AHS as an automotive panacea is not simply a recent phenomenon either. Nearly every time the idea of automated highway systems has surfaced throughout the years, these basic transportation problems are mentioned as justification for developing an AHS. In 1960, GM argued that developing and building an automated highway was worthwhile because it would create: "Increased highway capacity through controlled spacing of vehicles... [and] potential safety improvements through elimination of driver error." That same year, Dr. James Hillier, Vice-President of RCA Laboratories, argued that: "This pioneering approach uses advanced concepts of both electronics and automotive engineering to achieve a practical system that can vastly increase convenience and safety in driving, and multiply the traffic handling of our highways." Automated highways have a history of being justified by and seen as a potential solution for the ground transportation problems of this country. AHS continues to capture the imagination of engineers and the public because it appears to be a technique that would eliminate many of the problems that plague current automobile travel as well as prevent many of the negative visions of the future from being realized.

Government Funding and Support

Often these visions of turning crowded highways into Elysian Fields have been presented in popular science and technology magazines and are dreamed up or at least

embellished by writers. But such presentations would have little effect and would likely dry up quickly if they were not backed up by concerted technological research. To keep the idea of AHS vigorous and full of life, money is needed to turn ideas into hardware. Much of this funding has come from the institution that gets most excited about the arguments for solving national transportation problems with AHS—the Federal government.

The U.S. Department of Transportation and its officials take it as their responsibility to ensure that the transportation systems of this country run smoothly and fulfill the needs of American citizens. With the promises AHS has made over the years, it is little wonder that the government has responded favorably to movements like Mobility 2000. In return, the public and many engineers have been given new reasons for enthusiasm. When Congress passed ISTEA in 1991, a new generation of automated highway engineers was born and the hopes of many Federal officials ran high.

In October 1993, the Administrator of the FHWA, Rodney Slater, made a public announcement of the DOT's desire to begin an automated highway system project. His speech gives the reasons why DOT was pursuing AHS so "vigorously":

> Our current highway transportation system, as effective and as elegant as it is, is at a critical crossroads in its evolution and has started to plateau in its ability to provide significant new operating performance in its present form. The deployment of IVHS technologies will offer substantial performance improvements in this and in coming decades. However, the benefits to be derived from a mature IVHS system will be limited by the abilities of the person in the driver's seat. This, combined by increasing traffic demand and our nation's desire for greater safety on the roads and lessened environmental impact, compels us—yes, it challenges us—to consider this next major leap: full automation of the driving function.

Along with this inspirational speech, the FHWA promised over 20 million dollars a year for seven years to a consortium of companies that would eventually be the NAHSC. Hundreds of people were organized, and many ambitious AHS programs were begun. A large part of the transportation industry had become engaged in the idea. As can be seen by the results of government "intervention" in space travel, computing systems, and airplane design, nothing gives a technology a boost like government attention and funding.

Technological Enthusiasts

Although I have described the justification and motivations for AHS largely in terms of corporations and the government, at the root of all of this has been the desire and motivation of individuals. People like Lawrence Hafstad, Charles Kettering, Vladimir Zworykin, and GM's retired director of ITS, William Spreitzer, dedicated a fair amount of their lives to automated highway systems and many others continue to push for their ultimate creation. Why do all of these people fight so hard? Partially because they can envision all the benefits of a working system, but perhaps just as importantly, because they believe that man's ability to create beneficial technology will triumph in the end.

In the last few decades, many Americans have lost their intrinsic enthusiasm for technology because of significant disasters like Three-Mile Island, Bhopal, and Challenger. Others base their pessimism on the sum effects of technology on things like the environment, interpersonal relationships, and democracy. But throughout the 20th century, there were those who focused on the benefits of technology and the possibilities that exist for transforming the world into a better place. The potential negatives that others present to them are downplayed as "ultimately solvable." Harold Skramstad, the president of one of the U.S.'s premier technology museums, the Henry Ford Museum & Greenfield Village, described the history of these types of enthusiasts when he argued: "Their attitude scarcely differed from that of millions of other Americans, whose enthusiasm for technology was a basic tenet of their faith in democracy. They believed that the right tools and the right system could solve almost any problem."

Much of this enthusiasm originated in dreams of the future, like those that were presented at the Futuramas and at other world's fairs. Some even argue that it is "engineers fleeing boredom [that] are enchanted with the prospects of a whole new family of developments." But most of these enthusiasts retort that their beliefs are more than wistful dreams or diversions. They argue that technologies are more of a positive than a negative and when people still express doubt, they point to the mistakes of the skeptics and the accuracy of the world's fairs of predicting a brighter future that had been created.

For instance, in 1939, Robert Moses, organizer of both the 1939 and the 1964 New York World's Fairs and legendary urban planner, visited the original Futurama and apparently "brickbatted GM's transcontinental-highway network as 'plain bunk' [while] President Franklin D. Roosevelt, who seldom lined up with the mauling Moses, agreed." History has shown that neither of these esteemed men successfully predicted the future. In addition, General Motors forecasted that 38,000,000 vehicles would be driving American roads by 1960. The figure was actually reached 12 years earlier than that and had more than doubled by 1963. An article from the 1960s noted that the technological enthusiasm of the first New York World's Fair had become reality:

> Ten million Americans took the General Motors Futurama ride during the 1939–40 New York World's Fair. They saw a startlingly accurate preview of what the nation's landscape would look like in 1960. Concrete ribbons laced major cities, tunneled mountains, vaulted streams. Traffic flowed swiftly, unhindered, along expressways and wheeled off via looped ramps at 50 mph. This was a dream. Engineers soon turned it into a reality. . . . It was . . . a crystal-ball triumph. In fact, it was the future.

With all of this success in past predictions, many technological enthusiasts do not shy from arguing about the amazing possibilities in the future. They simply ask the skeptics to step aside while they make the future happen.

In addition, it is important not to forget that to a large extent, the general public is still fairly enthusiastic about technology. An Internet poll was taken in 1997 to determine how interested people were in AHS. 70 percent of respondents rated

AHS positively. Of course, the Internet approach was selected because it is an excellent source of "Innovators" and "Early Adopters," but then again these are the same people who shape many of the technologies the general public eventually uses. Technological enthusiasts have a large influence on the evolution of technologies. When people argue that the automated highway system is just too complicated a system and would require too many institutional changes, the average technological enthusiast simply points to the existence of an immensely complex interstate highway system in the United States. It seems that AHS is the only thing from the first Futurama that this country is still waiting for. Technological enthusiasts are working to fulfill its only outstanding promise.

Technological Improvements

Despite the criticisms they have received, the technological enthusiasts have had much to be enthusiastic about. While they may cite the realization of other dreams as justification for their hope, they will argue that the technologies available today make AHS more feasible than ever. The view is that we have certainly made progress because progress is easily seen in the present. After all, improvements in radar, global positioning systems (GPS), and advanced computing systems have made pinpointing the location of objects a much more reliable task. Such technologies make AHS appear a distinct possibility. Looking back at the technologies available in the past, it is difficult to discern how people even thought AHS was possible before recent times.

Again, citing technological improvements as a genuine reason for being enthusiastic about AHS is nearly as old as AHS itself. In the 1950s and 1960s, vacuum tubes and transistors, technologies that seem mundane today, were sparking great interest in the automobile industry. After all computing systems were getting "amazingly" smaller. Why not put one on a car? Research that was felt to be closely related to automated highways was making great strides as well. The improvement of the unicontrol in the late 1950s made direction controllable from a single stick. With this step forward, it did not seem that automating this stick would be far behind.

While the engineers had an intimate knowledge of research and development going on behind the scenes, the general public was being showered with an array of new electronic components. At the time, each one must have seemed more amazing than the previous and must have made AHS seem inevitable. For instance, in the early 1950s, many new American automobiles were assisting the driver with power steering. In 1958, General Motors introduced cruise control to American motorists. Cruise control was so new that an article published that year on the Firebird III had to describe it in detail, explaining: "a device . . . by which a predetermined speed is maintained by servomechanism connected with the throttle." The cruise control is now such a widely accepted and used technology that it is considered mundane. But at the time, it must have appeared to be a significant achievement toward the realization of automated highways. With technologies that appeared to be stepping stones to a fully automated highway system being invented, released, and appreciated, AHS must have appeared right around the corner.

Despite the continued failures and setbacks that those who develop automated vehicle technology have encountered, the enthusiasm that they hold is not unfounded. Perhaps part of the spark for developing AHS was started by corporate promoters at public expositions, but such presentations were more than self-serving visions of the future. They inspired a series of engineers and dreamers to work out the technological difficulties of establishing automated highways. As problems with our existing transportation networks have increased, the push for AHS has also increased. With each advance that is made, those who push for automated highways are further justified that their dream can be made a reality.

The Future of the Dream

But even if the dream is justified, the question remains as to whether the syndrome of AHS being "just 20 years away" is ever going to end. Unfortunately, that is a difficult question to answer. It is nearly impossible to disprove the possibility of a technology. As has been argued, many people have made that mistake in the past. It seems as though the only certain way to resolve the question is to actually build the technology and answer the question in the affirmative. If they are never built, the question always remains. Many things over the years have been built that were thought impossible. As a result, this is no longer the question that many government and transportation officials ask. Rather they are looking into the ramifications of the technology, and demanding to know whether or not it can solve the problems for which they need remedies.

For the near future, however, things do not look promising for AHS. Government interest in AHS reached a peak in the 1991 ISTEA legislation that went out of its way to give support to automated highway systems. It compelled DOT to fund 80 percent of what eventually became the National Automated Highway System Consortium. But when ISTEA expired on October 1, 1997, much of the government funding for, and interest in, AHS ended as well.

There were several debates between Congress and DOT as to what an ISTEA replacement should look like, but AHS did not figure prominently in the discussions. Despite the fact that the Consortium was initially intended to be a program spanning from 1994 to 2002, the legislation that DOT proposed as an ISTEA replacement went out of its way to discourage government funding of AHS projects. Instead of sponsoring most of the costs of programs like the Consortium, the DOT-proposed National Economic Crossroads Transportation Efficiency Act (NEXTEA) stated: "For long range activities undertaken in partnership with private entities for the [purpose of ITS research and program support activities], the Federal share payable on account of such activities shall not exceed 50 percent the costs thereof."

DOT's support of the NAHSC waned in 1997 as well. During that year, it began to shift its interest to vehicle automation technologies that it believed could be implemented in the short term, like advanced cruise control and blind-spot warning systems. It began organizing an Intelligent Vehicle Initiative (IVI) "to accelerate the development, introduction, and commercialization of driver assistance products to reduce motor vehicle crashes and incidents."

Congress considered several ISTEA replacement proposals. It passed a six-month bill in October of 1997 to continue the salaries of many people whose jobs are funded through ISTEA. All funding to the Consortium, however, was cut and it reduced its expenditures by 70 percent and relied upon money it had saved while it awaited its fate. On June 9, 1998, ISTEA's replacement, The Transportation Equity Act for the 21st Century [TEA-21], was enacted. The legislation made no special mention of fully automated highway systems as ISTEA had. Instead, the priority areas listed under the category of ITS research focused on near-term "IVI-like" technologies like toll collection, traveler information, and crash-avoidance. A mere four months after Demo '97 the NAHSC web page was taken down. The corporations involved in the Consortium shifted their resources to other projects.

Although TEA-21 was a blow to those involved in advancing and promoting automated highway systems, it will not likely spell the end of AHS. ITS America is still going strong and new developments in vehicle control technologies are being made every year. As understanding of computers, systems, and human-machine interfaces grows, so will the possibilities for AHS. Many of those involved in the NAHSC have found new organizations in which they can channel their enthusiasm for AHS. Since the IVI was proposed, many engineers have tried to show how AHS fits into its framework. They have not given up the fight yet, and there are likely to be many more opportunities in the future.

The dream has lasted this long; it will not die easily. It is too compelling to too many people. If automated highway systems are ever made a reality, they would respond to a promise made a long time ago. The only question that would remain is whether or not automated highway systems fulfill all of their promises.

Illustration Credits

Figure 1: Frank Cronican, as reprinted in *The Queens Museum, Dawn of a New Day, the New York World's Fair 1939/40* (New York: New York University Press, 1980), p. 101.

Figure 2: Photo courtesy of GM Research and Development Center.

Figure 3: General Motors photo as reprinted in Donovan, *Wheels for a Nation* (New York: Crowell Publishing, 1965), p. 291.

Figure 4: Photo courtesy of GM Research and Development Center.

Figure 5: From the NAHSC website (as of March 2003, http://www.monolith-mis.com/ahs/delcoUser.htm.

Figure 6: From the collection of the author.

Figure 7: From the NAHSC website (as of March 2003, http://www.monolith-mis.com/ahs/overview.htm.

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Endnotes

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[1]As with many technical and governmental endeavors, the rhetoric surrounding automated highways is full of abbreviations.

[2]This essay is exclusively about AHS in America and concentrates on the role of General Motors in these efforts. Engineers in Europe and Japan have also been involved, but as there has been little interaction between the United States and other countries until recently, they will not be addressed in this essay. The essay's GM-centric focus is a result of the fact that General Motors has had a more concerted AHS effort than any other American corporation. In addition, it has been by far the most active in getting the public excited about the prospects of the technology by presenting the idea in a variety of forms.

[3]"General Motors Corporation Building," *New York World's Fair Information Manual*, February 28, 1939; General Motors Corporation, *To New Horizons, the 1939 Futurama*, film, 1978.

[4]Ibid.

[5]From the Futurama's running audio commentary, as quoted in Rosemarie Haag Bletter, "The 'Laissez-Fair,' Good Taste, and Money Trees: Architecture at the Fair," in Bletter, et. al., *Remembering the Future: The New York World's Fair from 1939 to 1964* (New York: Rizzoli International Publications, Inc., 1989), p. 114.

[6]General Motors Corporation, "An automatically guided automobile cruised along a one-mile check road at General Motors Technical Center today . . ." 10:30 A.M. (EST), Friday, February 14, 1958, Warren, Michigan, press release, p. 1.

[7]Anton Beard, ed., "On Camera–Firebird II," *GM Research Staff Lab Notes*, February 1956, p. 9.

[8]General Motors Corporation, "An automatically guided automobile cruised along a one-mile check road at General Motors Technical Center today..." 10:30 A.M. (EST), Friday, February 14, 1958, Warren, Michigan, press releasae p. 1.

[9]"GM's Electronic-Jet Dream Car," *Business Week*, September 13, 1958, p. 126.

[10]William M. Spreitzer, Technical Director of General Motor's ITS Program, interview at General Motors Research and Development Center, Warren Michigan, November 26, 1997.

[11]Devon Francis, "Some Dreams, F.O.B. Detroit," *New York Times Magazine*, October 25, 1959, p. 80.

[12]William M. Spreitzer, interview, November 26, 1997.

[13]Although the videotapes that remain of this model show it working perfectly, a few transportation engineers that were there remember seeing cars pile up on top of each other.

[14]"Will this be the No.1 show?" *Science Digest*, April 1964, pp. 14, 16.

[15]Al Rothenberg, "Fair: Builder of Dreams," *Look*, February 11, 1964, p. 91.

[16]William M. Spreitzer, interview, November 26, 1997.

[17]"Intelligent Vehicle-Highway Systems Act of 1991," Part B, Sec. 6054 (a)(1), of the Intermodal Surface Transportation Efficiency Act of 1991, Public Law 102–240–Dec. 18, 1991.

[18]ITS America, *ITS America Access*, http://www.itsa.org/, downloaded December 18, 1997.

[19]"Intelligent Vehicle-Highway Systems Act of 1991," Part B, Sec. 6054 (b) of the Intermodal Surface Transportation Efficiency Act of 1991, Public Law 102–240–Dec. 18, 1991.

[20]Delphi Automotive Systems, "Delphi Automotive, Delco Electronics Make Crucial Vehicle Systems for Automated Highway Test," Pontiac, Michigan, press release, August 1997.

[21]General Motors Corporation, *To New Horizons, the 1939 Futurama*, film, 1978. Seeing these words in print does not do the voice-over justice. The emphasis and determination in the original voice is quite dramatic

[22]"GM's Electronic-Jet Dream Car," *Business Week*, September 13, 1958, p. 127.

[23]For a more detailed explanation of many of these difficulties see: Transportation Research Board, *National Automated Highway System Research Program—A Review*, Special Report 253 (Washington D.C.: National Academy Press, 1998).

[24]These recent figures are, however, somewhat suspect as they were not justified by economic analyses of the time and materials involved, but rather the price auto-manufacturers believe people would pay for AHS.

[25]The RCA estimates in this paragraph and the previous one are taken from Kenyon Kilbon, "Tomorrow's Thruway," *Electronic Age*, Autumn 1960, p. 29. The current estimates are from talking with various engineers at Demo '97.

[26]This was one of the most common failures at Demo '97 in San Diego.

[27]Transportation Research Board, *Estimating Demand for the National Advanced Driving Simulator* (Washington, D.C.: National Academy Press, 1995).

[28]"GM's Electronic-Jet Dream Car," *Business Week*, September 13, 1958, p. 127.

[29]Ibid, p. 126.

[30]The information for the material in this paragraph and most of the other material pertaining to Demo '97 in San Diego comes from my own personal experience. I rode on two of the scenarios and was an observer of the demonstration from August 6–8, 1997.

[31]Bernard Robertson, Vice President for Engineering, Chrysler Corporation, presentation at Second Committee Meeting of the TRB Review of the NAHSC, open session, Washington D.C., October 10, 1997.

[32]Hank Dittmar, Executive Director, Surface Transportation Policy Project, "Why We Need to Get Beyond the Automated Highway System," letter to the National Automated Highway System Assessment Committee, National Academy of Sciences, Washington D.C., October 10, 1997.

[33]General Motors Corporation, Futurama—*New York World's Fair 1964–65*, souvenir booklet, 1964, p. 8.

[34]General Motors Corporation, *Easy Street*, film, 1961. NAHSC, " . . . Driving the Future of Transportation," pamphlet, 1997.

[35]"GM's Electronic-Jet Dream Car," *Business Week*, September 13, 1958, p. 125.

[37]Norman Bel Geddes, *Magic Motorways* (New York: Random House, 1940), p. 4, as quoted in The Queens Museum, *Dawn of a New Day, the New York World's Fair 1939/40* (New York: New York University Press, 1980), p. 57.

[38]Mitchell Wolfson, Jr., *The Great World's Fairs and Expositions* (Miami, Florida: Miami-Dade Community College, 1986), Forward.

[39]Al Rothenberg, "Fair: Builder of Dreams," *Look*, February 11, 1964, p. 90.

[40]"Platooning" is a popular technique advocated in many automated highway system concepts. In platooning, groups of 3 to 10 vehicles are linked electronically through radar and computer systems. These platoons then act as a unit in negotiating the road and other vehicles. This organization is a more manageable distribution of control than outside control towers because the logistics of controlling a few vehicles traveling close to one another are much simpler than coordinating hundreds or thousands of vehicles spread over a large area.

[41]Robert W. Rydell, *World of Fairs* (Chicago: The University of Chicago Press, 1993), pp. 135–141.

[42]*Brooklyn Eagle*, May 30, 1939, as quoted in Rydell, *World of Fairs*, p. 141.

[43]David Boroff, "Mr. Harper's After Hours: Showgirls in Big Biz," *Harper's Magazine*, January 1959, p. 82.

[44]Roberta Fleming Roesch, *World's Fairs: Yesterday, Today, Tomorrow* (New York: The John Day Company, 1962), p. 65.

[45]David Boroff, "Mr. Harper's After Hours: Showgirls in Big Biz," *Harper's Magazine*, January 1959, p. 82.

[46]National Highway Traffic Safety Administration (NHTSA), *Rural and Urban Crashes: A Comparative Analysis*, Report DOT-HS-808-450, U.S. Department of Transportation, 1996.

[47]USDOT, *1995 Status of the Nation's Surface Transportation System: Condition and Performance*, Report to Congress, 1995.

[48]Keith Gardels, "Automatic Car Control for Electronic Highways," General Motors Research Laboratories report, June 1960, p. 1.

[49]Kenyon Kilbon, "Tomorrow's Thruway," *Electronic Age*, Autumn 1960, p. 27.

[50]Rodney Slater, Administrator of the Federal Highway Administration, Speech Inaugurating the NAHSC Program, October 21, 1993.

[51]FHWA, "Request for Applications Number DTFH61-94-X-00001 to establish a National Automated Highway System Consortium," December 15, 1993, p. 45.

[52]John L. Wright, ed., *Possible Dreams: Enthusiasm for Technology in America* (Dearborn, Michigan: Henry Ford Museum & Greenfield Village, 1992), p.7.

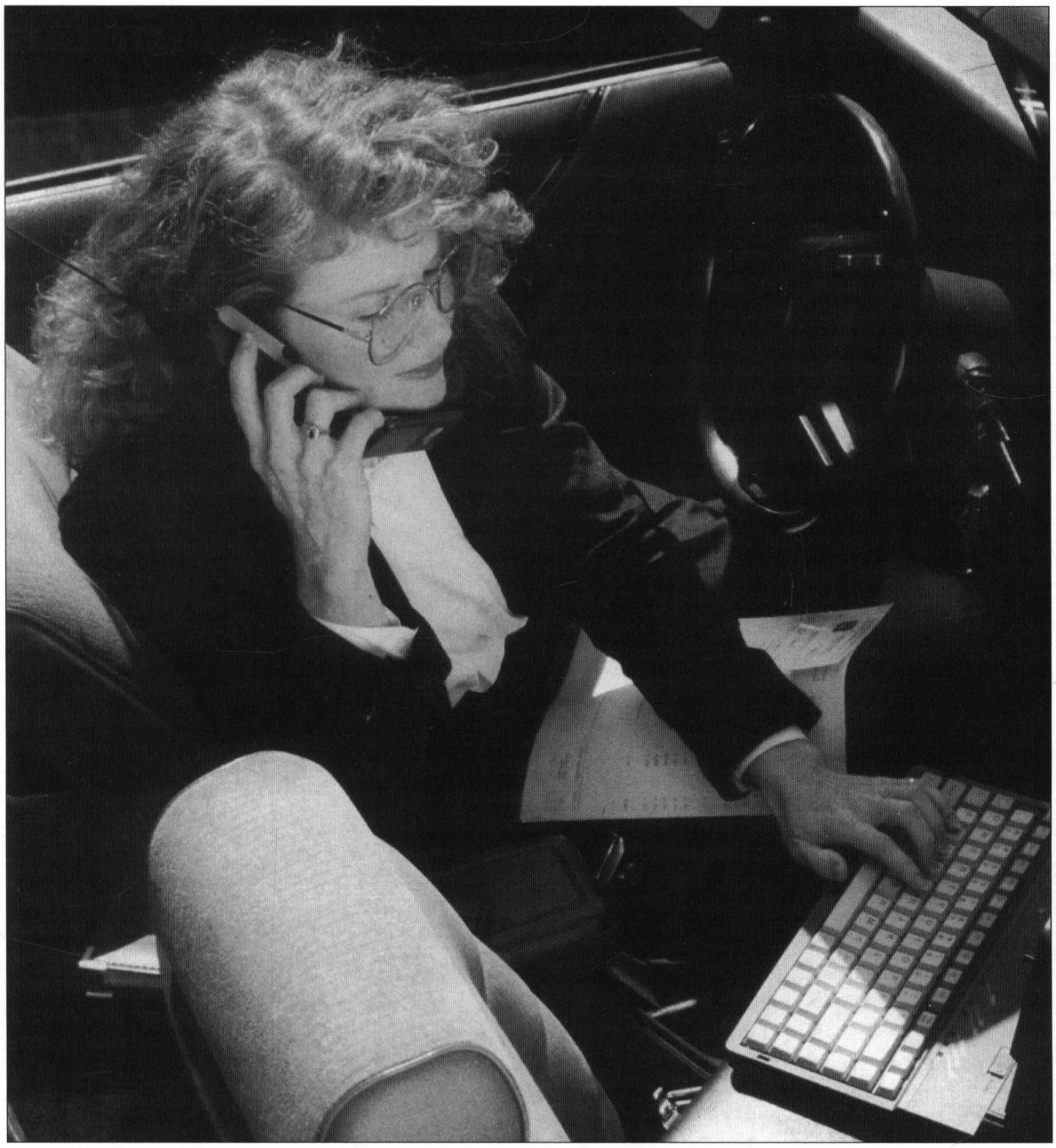


Fig. 8 – A recent depiction of what traveling in an automated vehicle might be like.

[53]Devon Francis, "Some Dreams, F.O.B. Detroit," *New York Times Magazine*, October 25, 1959, p. 14.

[54]Al Rothenberg, "Fair: Builder of Dreams," *Look*, February 11, 1964, p. 90.

[55]Ibid.

[56]Ibid.

[57]Avraham Horowitz, "User Needs for Automated Highway Systems (AHS); Results from an Internet Survey," Motoresearch Incorporated, http://www.carsurvey.com/results/nahscresults.html, downloaded September 25, 1997.

[58]William M. Spreitzer, interview, November 26, 1997.

[59]In 1954 power steering became standard on all Chevrolet products.

[60]"GM's Electronic-Jet Dream Car," *Business Week*, September 13, 1958, p. 126.

[61]DOT, "Intelligent Transportation Systems Act of 1997," Sec. 6058 {c} (3) of the *National Economic Crossroads Transportation Efficiency Act*, proposed legislation, 1997.

[62]DOT, *Intelligent Vehicle Initiative (IVI) Draft Business Plan*, October 1997, p. 1.

[63]William M. Spreitzer, interview, November 26, 1997.

[64]See the DOT website for the full text of "TEA-21" at: http://www.fhwa.dot.gov/TEA21/h2400.htm

[65]Transportation Equity Act for the 21st Century, Sec 5207 (b).

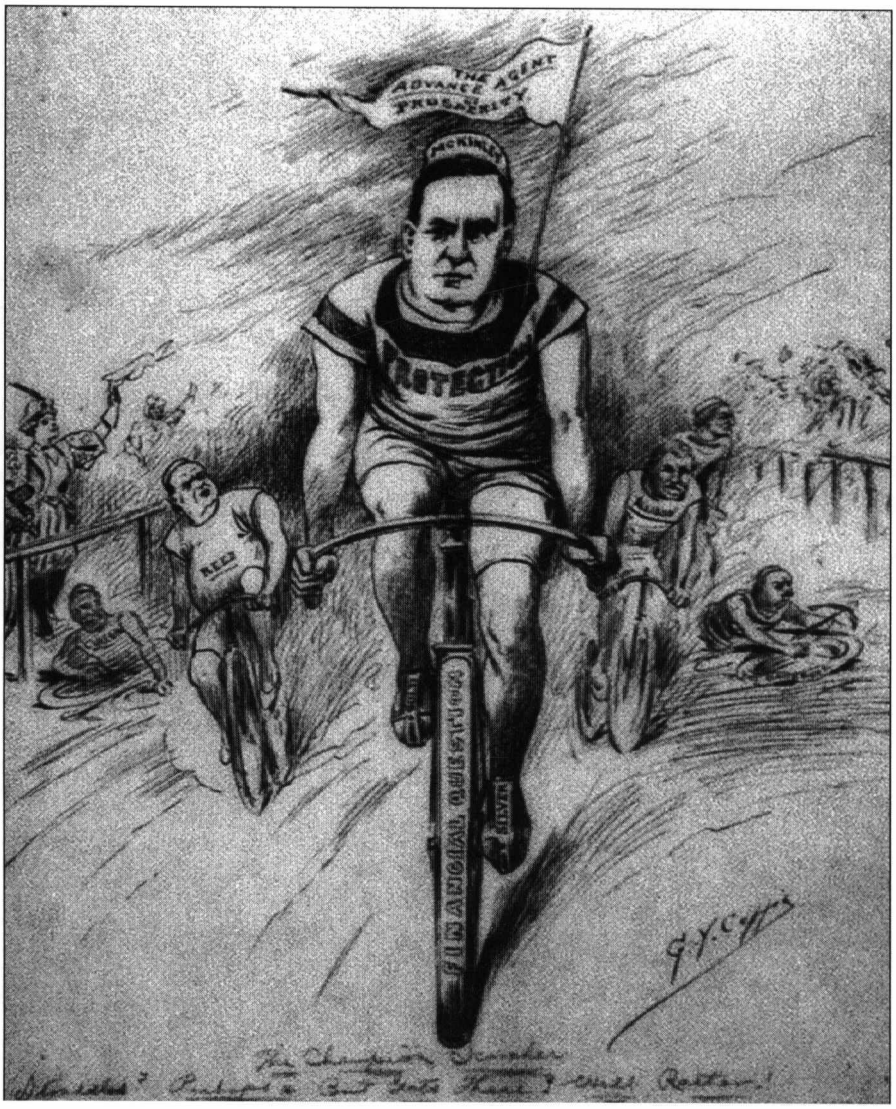
[66]Parts of the NAHSC website have actually been reposted, but only as a way for the web design company that created the page to demonstrate what it can do. See: http://www.monolith-mis.com/ahs/Default2.htm

[67]For recent activities of ITS America, see its website at: http://www.itsa.org/

Scorching Through 1902: "The Automobile Terror"

The Year in Automobiles and Death in *The New York Times*

by Michael L. Bromley



President McKinley in a political cartoon as the original "scorcher." Bicyclists gave rise to the term when they tore up the roads during the cycling craze of the late 19th century. (c. 1890s)

The automobile scorcher is the worst enemy of the sport . . .[1]

Eight miles an hour. A run, perhaps, but scarcely beyond a fast walk. A horse would call it an easy trot. A cop might hold a bicycle to this limit, but only on principle. Any self-respecting farmer would think an automobile running that slow a waste of good shot. Speed records had already exceeded a mile-a-minute and were soon to move into three digits. But in 1902 New York City, the limit to speed was eight miles an hour (Fig. 1).

OK, so the newspapers brought accounts of priests, children, widows, and assorted pedestrians and other innocents maimed by motor cars. But not a few had limbs torn or worse from runaway and spooked horses, flipped carriages, out-of-control trolleys, or any hazardous combination thereof. Any given week's dispatch in 1902 brought news of the injured, the crippled, the burned, and the dead. No big deal if it was on account of broken ice, collapsed mines, jealous husbands, malfunctioning elevators, bicycles, tornados, riots, fire, earthquakes, volcanos, anarchists, train wrecks, malaria, at least one flying cow[2], or an unfortunate reenactment of William Tell's archery skills,[3] which cumulatively contributed to more deaths in 1902 than there were automobiles on the road.

But God forbid a motor car scare a couple of horses!

Especially if the auto-terrorized animals bolted and tipped the carriage, and the thrown passenger, as one Joseph B. Hughes claimed, suffered permanent damage to his spine. Should that have happened, the owner of the motor car, in that case, banker Felix Warburg who had to pay $12,070 for the privilege of seeing Hughes's simulated flight and other acting skills, was to be fully liable. Why Warburg had to pay that exact amount is unclear, but the odd 70 bucks was likely from adding up carriage repair and compensation for one of the horses which had to be shot.[5]

Worse, should your car's mere passing somehow result in the death of a carriage rider, as happened to chauffeur H. B. Marble, you could get a year in the can (and a one dollar fine). Marble was employed by a New York automobile maker, and all he did was try to pass the vehicle of the horse-traction variety from which the son of John Molz was thrown and later died. No matter if the collision was arguably Molz's fault. One year, malicious chauffeur!

No wonder, then, two days after Marble was sentenced, the "hit and run" technique was employed by two automobilists who struck a pedestrian in Meriden, Connecticut, leaving the man for dead in a barn (the next day's newspapers worried that he would not recover).[6] No wonder, then, "the owner of a big red

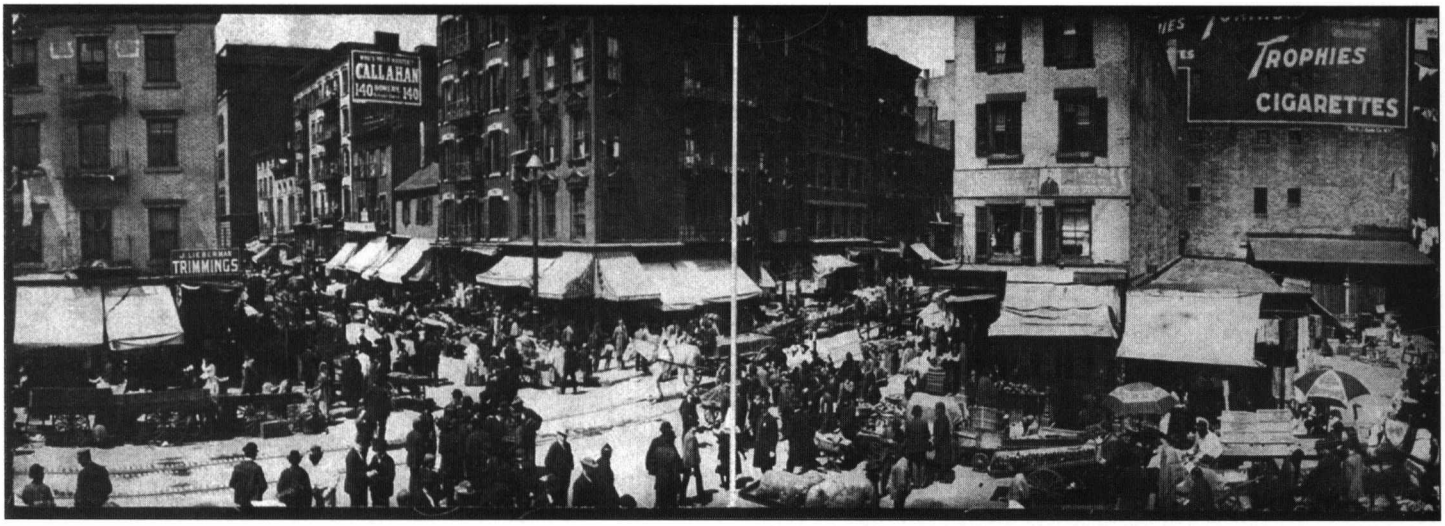


Fig. 1 – Whatever the motorists were, there wasn't much room for them on New York City Streets. (1902)

automobile" rode off after striking a wagon and rendering its driver unconscious. This man, said to be a "manufacturer of the machines," though chased by a mob, managed to escape. Clearly, he made a good product. He also made the front page of the *New York Times*.[7]

This was great press. One can almost imagine the copy editor's glee:

> Dead and Maimed in Wake of Automobile (no crash, just a frightened horse)[8] . . .
>
> Banker's Automobile Runs Down A Boy (as a Panhard backed up, "the lad was thrown violently to the street")[9] . . .
>
> Two Killed in Auto's Wild Plunge off Bridge ("possessed by 'speed madness,' Frank J. Mathews, a well-known real estate broker and clubman of Jersey City, ran his automobile at full speed over the Park Avenue bridge . . .")[10]

Accidents, suicide, and murder generally made page two. Death by horse, train, or a fall down an elevator shaft earned page one treatment only if the spectacle or quantity of maimed was sufficiently shocking. The *Times* deemed automobile crashes "Fit to Print" on the front page regardless of outcome, even if everyone walked away. These headlines sold papers and generated great activity in the "letters" columns. Indignation and shock followed every automobile crash.

On the 13th of February, front and center of page one, in letters of equal size to another headline about President Roosevelt's illness and somewhat larger than those below, "Six Dead in Kentucky Fight," "21 Injured in Erie Wreck," and "Dr. Ravold Found Guilty" (that of a quack who administered to children an antitoxin for diphtheria which resulted in 13 fatal cases of lockjaw), rang the *Times* headline, "Fatal Automobile Ride: Gen. Thomas's Son Runs Down and Kills a Child." The article continued,

> Edward R. Thomas of 17 West Fifty-Seventh Street, a broker and son of Gen. Samuel Thomas, railroad President and financier, speeding his automobile with a party of friends aboard through Convent Avenue at 1:45 o'clock P.M. yesterday, ran over and instantly killed Henry Theiss, seven years old.

Great story, for not only have we the privileged son of a railroad despot, but the young man was driving an "obnoxious" machine that once belonged to the most notorious Scorcher of them all:

> The machine, though now painted black, is the original "White Ghost," which, under the ownership of William K. Vanderbilt, Jr., gained much notoriety on the Long Island roads.[11]

Although the "White Ghost" was good for eight times the speed limit, neither the *Times* nor onlookers were forgiving of young Thomas's evident restraint at the wheel of the great German Daimler car:

> Witnesses say the vehicle was going at forty miles an hour . . . Their estimates may be wrong, but it was nearly three blocks from the little crushed body lying in the avenue when its owner finally brought it to a standstill. . . . "I'll never ride in an automobile again as long as I live," [Thomas] exclaimed passionately.

The news excited letters to the editors, including one which questioned the manliness of Thomas for not "own[ing] up to his neglect" and another which demanded that something, something must be done:

> I understand that the bill now before the Legislature will regulate the wild career of our city automobiles. Action cannot come too soon and cannot be too strictly enforced if we would not be in time as childless a city as Hamelin after the departure of the piper. . . . Not a day passes that I do not observe these outrageous vehicles rushing along in parks or streets at a speed far in excess of what the law allows. Fines mean absolutely nothing to automobilists. We must have imprisonment. It is a little too costly to wait in such case until murder, as is told in today's *Times*, effects a change of heart and a "swearing off."
>
> [Signed] An Anxious Mother.[12]

With the "White Ghost" still in mind, and following the lively news of Death by Scorching of Mr. and Mrs. Charles L. Fair in France, whose new 45 HP car burst a tire and landed the pair plus chauffeur into a tree, and of Nevada Senator Stewart's wife in California due to an unfortunate encounter with a telegraph pole, on October 14 the Times declared an epidemic: "The Automobile Terror." The article recounted those and various other motor car accidents and listed 24 deaths so far that year.

In those days, death was not the antiseptic, unmentionable event of today. Death was very much a part of life: it was sudden, expected, and likely to come at any time to any one. Funerals were social events, and a good funeral oration was a prized political stunt and a great photo-op.[13] Death was normal. But if death came by motor car—especially if it blew up—that was news, such as reported on May 18: "Girl and Man Blown Up in Automobile Explosion." This was a juicy story. Miss Emma Knoeln "probably was fatally injured" and Frank E. Logan "received burns of a most painful character" (one wonders) when, after their automobile "suddenly stopped" and Logan began to inspect the machine, it exploded and he was "blown almost across the street," while the 19-year old Miss Knoeln was "thrown into the air and landed in the street."

A motor car accident had all the elements of a good scandal: danger, vice, class envy, and money. Even better, it occasioned treasured opportunity for moral outrage. What offended the *Times* and its readers was not that people died from automobiles, not even so much that they died from recklessness, speeding, "fast flying," racing, and other forms of "rowdiness." No, what really burned the *Times* was that the motor car was an instrument of social oppression. Editorials lustfully boiled with class envy and calls for vengeance against The Scorchers:

> The worthless sons of an earlier generation of rich men in this country used to manifest their high spirits and low breeding by getting drunk and becoming disorderly in public places, to the annoyance and disgust of decent people. That sort of thing was tolerated for a time, and then the police and the police courts put an end to it. . . . There are fifty or a hundred times as many rich men's sons now . . . those among them who are cads and rowdies are justly regarded as about the least useful class of society. A good many of this class have taken to automobiles . . .[14]

Dutifully reported in the *Times* was the Reverend Dr. George C. Lorimer, who, in a speech to the American Tract Society at a Baptist Church, railed:

> The men who ride down people in automobiles are generally rich men. They are likely to be persons of cultivation, and personally their feelings toward the poor are doubtless amiable enough. But when it is a matter of interfering with their amusements the life of a poor man counts for nothing with them (Fig. 2).

The Good Reverend Doctor Lorimer was only getting started. An eye for an eye, he challenged, for "Every life that is sacrificed in that way ought to be paid for in the electric chair," surely bringing the congregation to its righteous feet. "The Committee of Fifty" was formed to garner public petitions for new speed laws. Responses to the 30,000 surveys distributed by the Committee included a few gems such as "I was nearly killed by an auto yesterday, and hereafter I shall carry a gun. Nothing but a bullet could have caught this one," or, "Is there no limit to aggressions of public safety?" and, "Has there been a single owner imprisoned?"[15]

Legislatures reacted in kind. Speed limits, penalties, licenses, taxes, and other overreactions censured the automobile. Police were instructed to nail every Scorcher, and magistrates and sheriffs across the land treated speed enforcement as a display of virility. The domineering and mean "Southern Sheriff" of 1970s films had nothing on the 1902 Mayor of Winnetka, Illinois. This Chicago-area local chief gave literal meaning to the "speed trap":

> . . . it is stated that the Mayor had a rope stretched across the road where the automobiles are in the habit of testing their speed and guards with stop watches stationed a distance each way from it, and that whenever an automobile comes along, trying to break the record, the guard signals and the rope is drawn tight. This compels the automobilist to stop or have his machine raked fore and aft by the rope. Policemen are on hand to arrest him. The first afternoon three autos were caught in this way, and the Mayor promises to continue the same method until automobile speeding is stopped in that locality.[16]

Back in New York, another traffic cop technique was launched, the unmarked bicycle:

Fig. 2 – Here's how political culture viewed motorists. The evil "Xerxes of the Trusts" rode automobiles at the expense of "the common people." (1902)

> Three chauffeurs, driving huge racing automobiles, were arrested on Pelham Avenue on Saturday afternoon for racing their machines faster than the law allows. . . . Inspector Cross has issued orders to all bicycle policemen in the Bronx to wear citizen's clothes. While in the uniform the bicycle policemen were kept to the jump all the time trying to catch offenders, who seemed to take delight in braving the police.[17]

The great American inventor joined in with ideas and contraptions to stop the Scorchers. Minneapolis resident E. J. Hodgson, the *Times* reported, "has invented a speed register for automobiles, the use of which, if required by city governments, may solve the problem of keeping the 'devils' within the bounds as to speed."[18] A huge "speed register" was to be mounted on the side of a motor car so that pedestrians and policemen could know at a glance its speed. The *Times*' own automotive journalist later noted that Mr. Hodgson's contraption "is not likely to be in voluntary demand among automobilists generally."[19] One wonders if other, more pointed observations weren't deleted by the editors.

Motorists, dear reader, were undaunted, some indignantly so, such as the sage and imminently reasonable Mr. W.J. Morgan, who called the *Times* on its blatant distortions. The distinguished Mr. Morgan spanked the paper:

> It has been with some amazement and regret that I have noticed not only the letters that have appeared in the *Times* denouncing automobilists and automobiles, but your editorial attitude as well. A good many of us read the *Times* as a corrective and safeguard, fleeing to it for safety from the biased and sensational newspaper, therefore it is with more than regret that I have noticed that the *Times* has acted as chief huntsman to the howling mob that has assailed automobilists so intemperately and unreasonably the past few weeks in your columns.[20]

Mr. Morgan noted that a recent stoning of a motor car was one of "the fruits of the Anarchistical utterances" in the newspaper. He correctly related the public hysteria over motor cars to a similar reaction to the earlier bicycle craze, while pointing out that the motor car had already yielded far more public benefit than the bicycle ever would. Modern animal-rightists would be compelled to agreement with Mr. Morgan that the automobile was a savior to the "beast of burden." Could even the most unrepentant Luddite argue against Mr. Morgan's sentiment that "I never look at a poor struggling and straining team in our inferior downtown streets but that I feel thankful for the advent of the automobile?" (Without the horse, nor would Mr. Morgan have any longer to look downward upon city streets to avoid stepping on its noxious exhaust).

Others took the law into their own hands. Quite literally. Mr. Benjamin B. Tilt, "a silk manufacturer," and Mr. Frank W. Duryea, "a broker," were Committed Scorchers. Policeman Neal saw them coming down Seventh Avenue at 135th street without headlights, "sounding the horn incessantly . . . at a tremendous pace." Although it is not explained how Officer Neal managed to catch up to the pair (probably on a bicycle), six blocks later when they had "slowed up," Neal jumped in the car and instructed "his prisoners" to drive directly to the station. The news article describes the next instance, when these brave pioneers gave back:

> As they reached Eighth Avenue, one said to the other: "Let's give the cop a ride." The words were no sooner spoken than the machine turned south, and in another instant was rushing down Eighth Avenue at the top of its speed. Neal tried to grab the levers, but they told him to stop, or he would blow the machine up, and all its passengers along with it. So he kept his police whistle blowing, sat still, and watched his comrades split the wind until they reached Ninety-eighth Street on Central Park West.
>
> "Stop this damned machine and I'll let you go!" he then exclaimed. Laughing, they shut off the power and applied the brakes. One block further down the auto stopped, and immediately five policemen leaped into it.[21]

Tilt was freed on $500 bail, while Duryea was fined five dollars for "interfering with the police." Undaunted, "the two men left the court together, saying that now they would make a trip to West Point, and would run the machine in faster time than that they were making when they were arrested." Officer Neal's desperate promise was left due.

The coveted labels of "cads" and "rowdies" were earned by a group of six riders of "a low, heavy racing machine," spotted by Bicycle Policeman Gillis going down Central Park West at a speed that Gillis knew to be "far in excess of that allowed by law." When Gillis called out, "the chauffeur gave a glance over his shoulder . . . and let his machine out a peg . . . [Gillis] shouted to the occupants to stop, but their only answer was something like a shout, which floated back to the pursuer." At the speed Gillis said to be 25 miles an hour, his bicycle hit a piece of wood and the officer was thrown ten feet in the air. At the sight of this, "the occupants of the automobile . . . gave a cheer" and were away. Police were looking for a "low, long racing automobile capable of seating six persons."[22]

Not even Edward R. Thomas could be kept down for long. Within weeks of slaughtering the child with the "White Ghost," Thomas was back at it, this time in an "immense red automobile." This time Thomas was the victim. As he motored down 44th Street with his wife, brother-in-law, and chauffeur, "a mob of one hundred boys" attacked:

> Tin cans, boilers, pails, stones, and sticks were hurled at the occupants of the vehicle, while the boys yelled themselves hoarse as they surrounded the machine, which had been damaged by one of the gang throwing a boiler between the wheels and brought it to a stop. . . . Mrs. Thomas was struck in the head with the lid of a boiler and rendered unconscious. Even then, however, the gang did not desist, but kept up the fusillade and showered the party with everything they could lay their hands on.[23]

As Thomas shielded his wife, the chauffeur, Mr. Otter, bravely fending off the continued blows, somehow dislodged the obstruction and drove off, the attackers in pursuit until a policeman scared them away. This brave sacrifice to the sport by the Thomas party was noted by Mr. Morgan in his defense of

automobilists. Thomas avenged the disgrace and went on to further glory on August 16 of that year by running his "120 horsepower Hotchkiss racer" into a carriage that carried two women and landed himself into a cast, with a fractured leg and facing jail time.[24]

Throughout the year of 1902, Scorching remained a hot item for the newspapers, legislatures, city councils, and automobile clubs and journals who decried the practice and declared it "ungentlemanly." To the modern reader, conspicuously absent from accounts of motor car tragedies is mention of alcohol. Perhaps it just was, so it went unnoticed, unless, of course, it was taken away, as happened in Southampton, New York, which prohibited the sale of alcohol the year before. ". . . members of the Meadow Brook Country Club had to bring their own liquor and wines, and it was not an infrequent spectacle to see several men who liked their afternoon refreshment going to the club with a bottle under each arm."[25] Like the Scorchers, dedicated drinkers wouldn't let the law get in the way of a good time.

On the road, arrests were made, especially during the summer months when New Yorkers rode about New Jersey, Long Island, Newport and Bar Harbor in their new and ever faster motors. Magistrates smelled gold. Hired chauffeurs, as usual, took the brunt of the legal consequence, some ending up in jail. We'll assume that owners regularly posted bail for the drivers, though not always. At least not in the case of the chauffeur to Frederick C. Havemeyer, Edmond Fromont.

While Mr. Havemeyer was hunting in Colorado, the chauffeur, who was imported from France along with the "big Fournier automobile," wanted to show off. He took a group of friends, including "two young women," on a ride and was stopped for doing 20 miles an hour, more than double the limit. Mr. Fromont was tossed in jail. The news account noted that the chauffeur "said that Mr. Havemeyer did not know that he had taken the machine out, and seemed to fear that his employer would learn of it." This vile, thrilling chauffeur's practice came to be known as the "joy ride" and a few years later replaced Scorching as the object of automotive outrage in the *Times*.

By 1909, when William Howard Taft came to power in Washington, Scorching had become a part of life, no less rued but not as shocking as in 1902. The huge play by the press against Scorching had numbed the public, and its less pleasant results were now likely to be found on page two. After an ugly battle in Congress, Taft brought automobiles to the White House, a motoring triumph. The winning argument was that it would be a cruelty to animals should the hefty President ride a horse.

Taft was a fine Scorcher who loved the rush of the wind and the blur of the scenery from the back of his beloved White steamer, a great machine capable of a mile a minute. Taft freely joked of his "joy rides" and called the open country tour "atmospheric champaign (sic)." He made news for hitting 56 mph on a race track in Atlanta. Despite deferential sidesteps by the press, Taft's speed disease was well known. The *Times*, of course, let it out, ever so unsubtly: "Reports from the capital have it that our Chief Executive is fond of speeding, but it would be lese majeste to say that he does not regard the speed laws," lèse majesté, being, apparently, the reporter's specialty. Taft's aide-de-camp, Captain Archie Butt, and head of security, Secret Service man Jimmy "Doc" Sloan, were unable to contain the President's lust for speed.

Taft gave important presidential approval to the motor car, which had been shunned by his predecessor, Theodore Roosevelt. When in 1910 Taft's son crushed a road worker, an Italian immigrant, the President worried about the political fallout. There was none. The country had come to accept "The Automobile Terror."

The forward-thinking nation chose the immeasurable benefits of the motor car despite its dangers. Besides, the Scorchers would not be restrained. While the more dedicated automobile demons such as the great Roscoe Turner and Eddie Rickenbacker sought higher speeds in flying machines, racers, tinkerers, gangsters, and every other sort of road burner laid the path to destruction; rum running, NASCAR, and high insurance rates would follow over the decades. If the editors at 43rd Street only knew back then: 1902 was just a beginning.

Endnotes

[1]"Automobile Topics of Interest," *New York Times*, July 13, 1902. Unless otherwise noted, all articles are from the *New York Times*.

[2]"Killed by Falling Cow: Animal Thrown From Track by Chicago Limited Mortally Wounds Oliver McVeigh," March 17, 1902.

[3]"William Tell Feat Has Tragic Ending: Marksman Misses Apple, Hits Man's Head on Which It Rested." October 27, 1902.

[4]"Automobile Victim Wins," October 8, 1902; and "Seabright Automobile Case," October 27, 1902. Warburg later appealed the case.

[5]"Chauffeur Sent to Prison," November 1, 1902. The one dollar fine was not particularly steep, especially when compared to the five dollar fine "and costs" assigned by a Chicago judge to a man who refused to take off his hat in a theater.

[6]"Hurt By Automobile," November 5, 1902.

[7]"Angry At Automobilist," December 5, 1902.

[8]May 23, 1902.

[9]August 9, 1902.

[10]August 27, 1902.

[11]Vanderbilt exchanged Newport for Long Island, as his road-burning exploits were made unwelcome in that elite Rhode Island town with imposition of a six m.p.h. speed limit aimed directly this foremost of America's automotive and speed enthusiasts.

[12]Letters to the Editor, February 16, 1902.

[13]A typical joke of the day is of "a Scotchman who attended a funeral which lasted two days. . . . On the second day, having imbibed too freely, he rose and proposed the health of the bride and groom. A friend urged him to sit down, saying 'This is not a wedding; it is a funeral.' 'Well,' retorted the Scotchman, 'whatever it is, it's a grand success'" (from Sept. 14, 1902 Sunday section).

[14]Editorial, June 1, 1902.

[15]"Question of Speed Limit," May 23, 1902.

[16]"Automobile Topics of Interest," July 6, 1902.

[17]"Held For Speeding Autos," September 8, 1902.

[18]"Automobile Speed Register," September 8, 1902.

[19]"Automobile Topics of Interest," September 21, 1902.

[20]"The Anti-Automobile Outcry: Agitations Against Chauffeurs as a Class Declared to be Anarchistical," June 8, 1902.

[21]"Policeman Has Fast Ride," May 18, 1902.

[22]"Policeman Gillis Hurt in Chase for Automobile: Big Vehicle's Occupants Jeer When Their Pursuer Falls—Exciting Scene on Central Park West," April 19, 1902.

[23]"Automobile Party Mobbed by Boys," May 25, 1902.

[24]"Can Send Thomas to Prison," August 17, 1902.

[25]"Club Life In Town and Country," July 6, 1902.

[26]Bar Harbor banned automobiles.

[27]"French Chauffeur Arrested," October 9, 1902. Fromont was at the forefront of a new practice of chauffeurs that came to be called, "joy riding"—taking the boss' car out for a spin after hours. As for the "two young women," Madison Avenue later on figured what that was all about.

[28]Senator Clark of Missouri said on the Senate floor, "the incoming President is of such ample proportions that it is dangerous to any horse he would ride." (from the *Congressional Record*, February 2, 1909, pg. 1726).

[29]"President Taft's Landaulet," *New York Times*, May 16, 1909. See "William Howard Taft & the First Motoring Presidency, 1909-1913," by Michael I. Bromley, McFarland & Co., Jefferson, NC, 2003.

EDITOR'S NOTES—*continued*

Black Belt at Ford Motor Company's Romeo, Michigan, plant which produces Ford's 4.6L and 5.4L V-8 engines. *Kit Foster* served as the reviewer.

There are few who love Pontiac more than *Don Keefe*, who has provided "The Fabulous Pontiac Club de Mer" story of the marquee's 1956 Motorama concept car. Don, now freelancing, has been the senior editor of *High Performance Pontiac* magazine and editor-in-chief of *Pontiac Enthusiast*. His work has appeared in *Collectible Automobile* and *Special Interest Autos* and other publications. For several years, he has been the chair of SAH's Carl Benz Award Committee. One who just may love Pontiac even more is Thomas E. Bonsall, author of *Pontiac: The Complete History 1926-1979*, *They Promised Excitement*, and *Big Pontiacs: A Source Book*. Tom, a former SAH Board member, seemed the ideal person to review an article on Pontiac.

Peter Engelhard e-mailed me asking if we'd be interested in "Fiat as a German Manufacturer," assuring me that he would qualify as a 40-and-under-writer. His career started at the Marketing Systems company, a German market research company specializing in automotive affairs and now owned by R.L. Polk. He next worked for Robert Bosch GmbH as an expert on worldwide car production. Presently he is "employed by a major German utility." *Ferdinand Hediger* reviewed the article. Ferdy has written numerous articles for *Automobile Quarterly* on European marquees and coachbuilders, as well as being the author of *Klassiche Wagen II*. His insight as a reviewer was most valuable.

Sam Fiorani is no stranger to SAH members, having been the editor of the Journal for most of the '90s, and a current member of the Board. Sam's daytime job is as an automotive marketing analyst for AutomotiveCompass. His article, "Return of the Red Oval," recounts the latter-day history of the marque began by the young man on the cover. This article was peer-reviewed by Lance Tunick, a long-time consultant to the Europeana niche automobile industry and consultant to Bugatti during the early to mid-1990s, who was involved in the efforts, ultimately futile, to bring the EB110 to the United States.

Finally, we close this "youth" issue with our youngest ever rear cover subject. Beginning with No. 31, my "signature" to close an issue has been a rear or three-quarters rear view of an automobile. No. 40 terminates with the haunting image of a migrant's child taken through the backlight of a vehicle whose make is unknown. I found it over 20 years ago among the Farm Security Administration photos at the Library of Congress, Washington.

Once again, my thanks to Kit Foster and *Pat Chappell*, our perennial proof-readers,who, this time, tackled the largest issue of the *Review* since No. 32.

LETTERS TO THE EDITOR:

Review No. 37 (Spring 2001):

Gerald Lombard's memory of Main St. in Auburn [in his letter] is a bit shaky. US 27 did indeed run the length of that street back in the days before I-69. However, it never did go to Indianapolis. It goes to Cincinnati and other points south, running through Main St. of my hometown of Liberty.

Bob Barnard
Indiana, USA

I thought I ought to correct one point in my letter about Swedish motor vehicle and aircraft builders. Scania-Vabis, the Swedish truck and bus builder, did not merge with the Volvo heavy vehicle company as I had stated. The merger proposal, by both companies, was actually vetoed by the European Union Commission at the last minute. Scania is now [June 8, 2001] to a considerable extent owned by Volkswagen, while Volvo, as far as I know, is still quite independent, and is still the manufacturer of aircraft engines.

Len Lonnegren
Connecticut, USA

The Rocket Engine Story by One Who Was There

There were a number of familiar names amongst those listed in the "Notes" on page 37. I was most surprised, though, to see that of Charlie Gadd. Please recall the Gadd Severity Index—an early concept subsequently refined to become the HIC [Head Injury Criteria] still in use to rate the potential for the closed-head injury today. I'm unsure what Charlie's specific contributions might have been at this early stage of his career, but I'm certain that he worked with all the determination and devotion so evident later on.

Roy Nagel
Michigan, USA

continued on page 63

The Litigation of Auburn Automobile Company: The Historian's Use of Legal Resources

by Thompson Smith

"The only limitation of a business in America is the limitation of the men running it."

—E. L. Cord, President, Auburn Automobile Company[1]

Introduction

The Auburn Automobile Company is known for producing some of the finest automobiles ever built. The cars produced by the company are world renowned for style, elegance, and innovation. Examples of the cars that have survived generate fantastic interest.[2] The story of how these magnificent examples of American innovation were created adds to their notoriety. Many books have been written about the cars and the principal figures associated with their production.[3] The story of Auburn is a topic that will continue to pique the interest of the automotive historian for years to come.

Many of the sources that discuss the history of the Auburn Automobile Company have neglected the litigation in which the company was involved. Legal cases are an important primary source that historians should not overlook. While lawyers use legal opinions for the principles of law they contain, the historian may use legal resources for the facts they contain and the insights they provide.

There are five reasons why a historian should not overlook legal resources. First, reported legal opinions are generally trustworthy. The rules of evidence act to screen testimony and exhibits that are not credible. Also, a judge or a jury assesses the credibility of witnesses while testifying. This makes legal opinions trustworthy information on which a historian may rely. Second, legal opinions often include a historical background that puts the issues of the case into context. These historical background sections can serve as a "mini-history" up to the point of the litigation. These background fact statements are trustworthy because they are written closer in time to the events and with firsthand knowledge. In contrast, the modern historian is examining facts from a further distance with no firsthand knowledge. Third, legal opinions often contain exhibits that include invoices, correspondence, physical objects, and—in one case discovered during research for this article—an entire engine.[4] These exhibits are often primary sources that are very valuable to the historian. Fourth, legal opinions typically contain extensive citations. These citations provide credibility to the legal resource and can lead the researcher to other important sources of historical facts. Finally, legal opinions have become extremely accessible. With the aid of computerization, legal databases include virtually every reported legal opinion in the United States. This computerization makes it easy to search for information in legal resources by using key words. With the touch of a few keys, the historian can reach a wealth of information to the extent that could never be possible through the use of conventional research. As a result, the thorough historian should not overlook legal opinions when researching a topic.[5]

The litigation of Auburn Automobile Company reveals important information about how the company interacted with itself, its dealers, its customers, other manufacturers, finance companies, and the government. When the cases are examined in their totality, themes may be recognized, thus providing a broader understanding of the company and the nature of its operations.

This article discusses 13 areas of litigation. The sections range from the most mundane personal injury cases to discussion of a sophisticated stock syndicate. Even the most basic legal case can yield important historical facts about a topic. Therefore, all litigation that was discovered involving Auburn Automobile Company and its related subsidiaries has been included. The focus of this paper is the historical facts contained within the legal resources, rather than the legal issues. Where the legal issues aid the understanding and the overall context of the case and the facts therein, they are discussed in the text or in the footnotes.

Historical Background of Auburn Automobile Company

Auburn Automobile Company was an extension of the Eckhart Carriage Company located at Auburn, Indiana.[6] Charles Eckhart formed the Eckhart Carriage Company in 1874. The company grew quickly and employed 100 men by 1896, turning out 35-40 vehicles per day. The Eckhart family recognized that the carriage business would eventually be replaced by the automotive industry.[7] The first cars produced by the Eckharts, around 1900, were little more than a buggy with an engine attached to it. However, these early cars encouraged the Eckhart family to start a new company to manufacture automobiles.

In 1903,[9] the Eckhart family incorporated the Auburn Automobile Company. Many other companies were formed in Auburn, Indiana to produce automobiles at about the same time. Companies such as the Zimmerman Manufacturing Company and the W. H. McIntyre Company also produced vehicles. These two companies either went out of business or were acquired by the more successful Auburn Automobile Company; however, both companies are considered to be important components of the history of Auburn. For this reason litigation of Zimmerman and McIntyre is included in this article.

The Eckhart family eventually lost interest in the automobile business and moved to the warmer climate of California. As a result, Auburn was sold to a group of Chicago investors in 1919.[10] By 1924, the company had declined and was

producing only six units per day, with over 700[11] unsold touring cars occupying a storage lot. The Chicago investors recognized that the company was in trouble and in need of new management.

The owners made a wise choice when they hired the young[12] Errett Lobban Cord, the aggressive sales manager of the Moon Automobile Agency in Chicago, Illinois. E. L. Cord's meteoric rise to the top of the automotive industry is one of the greatest success stories of the Roaring 20s. Cord became the general manager of Auburn in 1924.[13] Cord agreed to work without a salary, with the agreement that, if he turned the company around, he could acquire a controlling interest.[14]

When Cord arrived in Auburn, he ordered the 700 units of stagnant inventory to be repainted with bright flashy colors and added accessories. This action made the cars much more attractive, and they were sold very quickly. By 1926, Cord had acquired a controlling interest in the company and had become president. Under E. L. Cord's direction, Auburn automobiles broke many speed records and were known for their mechanical and design innovations.[15]

Auburn was making money and E. L. Cord wanted to expand his holdings. So, in 1926, after Duesenberg had declared bankruptcy, Cord bought all the assets of the company. The purchase of Duesenberg brought with it the engineering wizardry of Fred and Augie Duesenberg, who were responsible for building the most innovative engines of the day. The Duesenberg automobile is world renowned for being one of the finest, and most expensive, cars ever made. The chassis only for a Duesenberg Model J cost $8,500, and then the buyer would have a custom coachbuilder design and produce a one of a kind body for the car.[16] A completed Duesenberg automobile could cost as much as $20,000 when most cars could still be bought for around $1,000.[17]

In 1928, E. L. Cord bought Lycoming, Auburn's principal engine supplier, and in 1929 formed the Cord Corporation.[18] The Cord Corporation was a holding company for E. L. Cord's growing empire of manufacturing companies. At its peak, the Cord Corporation controlled 156 different companies, mostly within the transportation industry.[19]

Like most smaller automobile manufacturers, Auburn was unable to survive the Great Depression. The company filed for bankruptcy in 1937 and was liquidated. However, the story of the Auburn automobile did not end then. In 1952 the Auburn Cord Duesenberg Club was formed for anyone interested in Auburns, Cords, or Duesenbergs. Membership in the club grew, and it began holding its annual reunion in Auburn, Indiana. The event was successful and continued to grow as interest in the cars expanded and car values steadily rose.

In the early 1970s, the Auburn Cord Duesenberg Museum was established in the former administration building of Auburn Automobile Company. Later, in 1989, the National Automotive & Truck Museum of the United States was formed in order to preserve the former Service and Experimental buildings of the Auburn Automobile Company. Today, the cars of the Auburn Automobile Company continue to capture the interest of car collectors and automotive historians who strive to learn more about the fascinating history of the cars and how they were produced.

The litigation of Auburn and its related companies of Zimmerman, McIntyre, Duesenberg, and Cord, helps explain the continuing saga of the cars and the manufacturing process that created them. From the turn of the century until the present, courts have dealt with Auburns, Cords, and Duesenbergs. The litigation defines the relationships, roles, and obligations that made up the Auburn Automobile Company.

The Genesis Period of Auburn Automobile Company: The Eckhart Carriage Company

Very few reported cases have been found from the genesis period of Auburn Automobile Company. Auburn was an extension of the Eckhart Carriage Company (Fig. 1). At the turn of the century, it was common for carriage and buggy manufacturers to add an engine to their buggies and begin

Fig. 1 – Eckhart Carriage Company Advertisement

producing automobiles. Eckhart was no different.[20] Two reported cases involved Eckhart in some fashion.

In *Eckhart Carriage Company v. Eden*,[21] the owner of a livery in Sullivan, Illinois bought a light park surrey from Eckhart Carriage Company. A representative and sales agent of Eckhart working in Sullivan facilitated the transaction. The purchase was financed by a promissory note in the amount of $88. When the surrey was purchased, it did not have rubber tires. Since Eden was going to use the surrey in his livery business, he installed rubber tires. However, the second time the surrey was used, one of its wheels was broken to such an extent that a new wheel was necessary. As a result, Eden sued Eckhart Carriage Company for breach of warranty.

The case reveals some previously unknown facts about Eckhart Carriage Company. Eckhart had at least one traveling salesman operating in Illinois. If a network of salesmen existed at the time, that network almost surely was used to set up a network of dealers for Auburn Automobile Company. The company had a printed warranty in its sales catalog. Also, the company, or salesmen themselves, had a practice of accepting promissory notes to finance the purchase of carriages.

An earlier case, *Miller v. Illinois*,[22] 1907, is a somewhat amusing case that has some connection to Eckhart. Miller was charged with the theft of a buggy made by the Harper Buggy

Fig. 2 – Nameplate of the Eckhart Carriage Company

Company. Upon investigation, the Harper Buggy was found in his possession. It had been modified by removing the nameplate of the Harper Buggy Company and replacing it with the nameplate of the Eckhart Carriage Company (Fig.2). A salesman from Eckhart testified at the trial that Eckhart did not produce the buggy. The buggy had also been repainted, and a medallion was removed. These efforts to conceal the theft of a buggy have not advanced much since 1907, because modern car thieves often engage in these exact same practices to conceal the theft of an automobile!

The W. H. McIntyre Company Litigation

The litigation of the W. H. McIntyre Company reveals that the company was in financial crisis during the years of 1913 and 1914 before going out of business in 1915. During the years 1913 and 1914, McIntyre was involved in 11 different lawsuits, a large amount of litigation for a small automobile manufacturer to be involved in during this period of time. McIntyre was the Defendant in seven of these lawsuits and was the Plaintiff in four.

The cases reveal that McIntyre was a broad-scale business that manufactured automobiles, trucks, and cycle cars. Many different suppliers were used for engines and the other components of the vehicles. Some of the suppliers were from McIntyre's home state of Indiana while many of them were out of state. The vehicles produced by McIntyre experienced some design defects and were underpowered. Cash flow seemed to be a problem for the company as it was sued for unpaid debts often during the year of 1914.

W. H. McIntyre Company v. Lycoming Foundry & Machine Company,[23] a 1913 case, involved a contract for the sale of 100 Model Y 6-cylinder engines. The engines were to be 3 1/2" bore by 1 1/2" stroke and priced at $140 each. The Vandalia Railroad transported the motors and McIntyre refused to accept the engines when they arrived. Upon inspection, the motors did not meet the specifications provided in the contract because they were only 3 3/8" bore by 1" stroke. McIntyre claimed that it was unable to fulfill orders for automobiles because Lycoming had breached the contract.

Another case, *Wood v. W. H. McIntyre Company*,[24] reveals the nature of the relationship between McIntyre and its dealers. The case involved a dealership agreement between McIntyre and Charles B. Wood. Under the dealership agreement, Wood was to set up a dealership in Chicago, Illinois, and maintain a sales room, salesmen, and a repair station. Wood paid a $1,500 deposit for the exclusive dealership agreement. McIntyre was to supply 200 cars between September 1, 1911, and July 31, 1912. Wood sued to get back the $1,500 deposit that he paid. It is unclear from the case why Wood wanted to rescind the agreement, but it is obvious that the dealership agreement was very one-sided and bound Wood to several obligations while McIntyre was bound to very little. In addition, the dealership agreement contemplated that McIntyre would deliver 200 cars to Wood in less than a year. It is highly unlikely that a company the size of McIntyre could deliver this many cars even when operating at full capacity. These factors may have been reasons why Mr. Wood, and other dealers like him, were unhappy with their dealership agreements.

W. H. McIntyre Company v. Ives Motor Cycle Corporation,[25] a 1914 case, involved a contract for the sale of 500 motors. The engines were manufactured by the Ives Motor Cycle Corporation to be used in the Imp cycle cars manufactured by the W. H. McIntyre Company (Fig. 3). The pleadings allege a breach of warranty because the motor did not have enough power to propel the Imp Cycle Car. This design defect in the motor for the Imp may have contributed to slow sales.

To make matters worse for the company, some of its employees were stealing parts and selling them. In another 1914 case, *W. H. McIntyre Company v. Benson*,[26] the W. H. McIntyre Company sued Benjamin Benson for the conversion of 65 pounds of bronze castings and one complete crankcase for a Model H McIntyre car. Benson sold the metal as scrap to Weil Bros. & Co., who did not know that the scrap metal was stolen.

Next, the litigation of McIntyre shows a distinct pattern of unpaid bills, especially during the year 1914. In National *Spring Company v. W. H. McIntyre Company*,[27] the National Spring Company of New Castle, Indiana sued McIntyre for an unpaid invoice. The invoice involved the sale of 100 front springs and 100 rear springs. In the end, McIntyre paid the bill and the case was dismissed.

Perhaps one of the reasons that McIntyre was having trouble paying its bills is that some of its customers were not

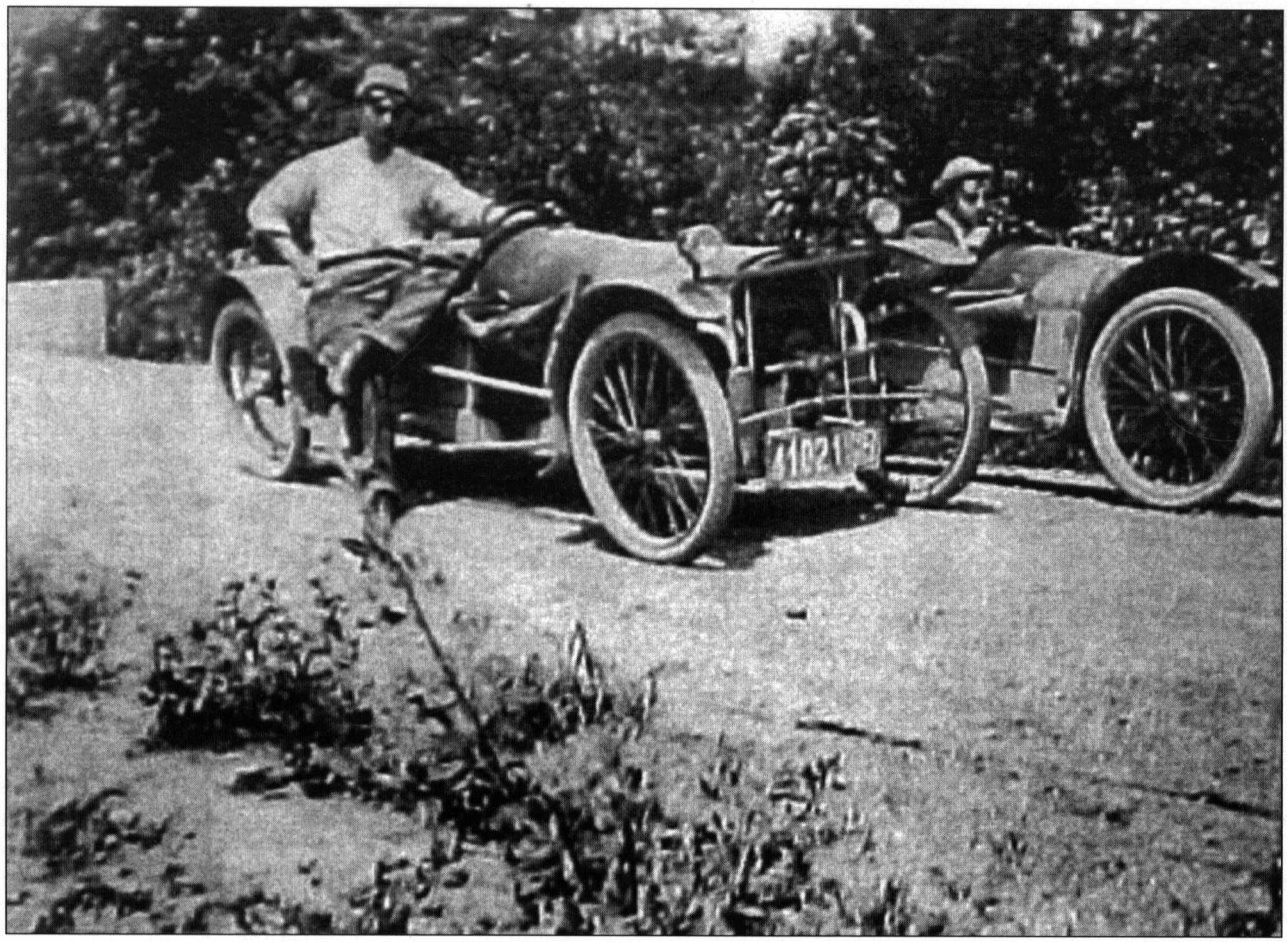


Fig. 3 – McIntyre's Imp cycle cars.

paying it. In *W. H. McIntyre Company v. Universal Machinery Company,*[28] McIntyre sold miscellaneous parts, motors, and magnetos, to Wisconsin-based Universal Machinery Company and was not paid. The case mentions that the contract involves 52 Model J V-2-cylinder engines. The motors were 3 3/8" bore by 3 29/32" stroke and air-cooled. The engines were called "Mack" motors and were used by the W. H. McIntyre Company in its Imp Cycle Cars. It is unclear from the case as well as further research whether or not the motor was produced by McIntyre or bought from a supplier and then sold to the Universal Machinery Company.

The remainder of the McIntyre cases involve four suits between a supplier and McIntyre for unpaid bills and one suit brought by an employee for unpaid wages. In *Backstay Machine & Leather Company v. W. H. McIntyre Company,*[29] McIntyre was sued for an unpaid bill dated April 19, 1914. Backstay was located in Union City, Indiana, and the bill totaled $320.64. In *Perfecto Light Company v. W. H. McIntyre Company*,[30] McIntyre was sued for an unpaid invoice. Perfecto delivered lights to McIntyre on June 19, 1914 and McIntyre did not pay. Perfecto was an Iowa company that manufactured "electric lamps for buggies, autos, and cycle cars." *Ohio Top Company v. W. H. McIntyre Company*[31] involved an unpaid bill of $58.45 dated November 4, 1914. In *Bourne-Fuller Co. v. W. H. McIntyre Company*[32] McIntyre was sued for an unpaid bill. Bourne-Fuller supplied steel to McIntyre for use in the production of automobiles. This scenario is a reflection of the general economy at the time and typical of the events leading to the demise of many small automobile companies during the 1914-18 era.

These four cases show how much trouble the W. H. McIntyre Company had paying its suppliers, especially during the summer months of 1914. In all likelihood, the cash flow problems of McIntyre were compounded as suppliers placed the company on a C.O.D. basis. As this happened, the company could not meet payroll for at least one of its key employees.

In *Bailey v. W. H. McIntyre Company*[33] George Bailey sued McIntyre for salary that was owed to him. Bailey was hired on January 1, 1914 as foreman of the Mechanical Department, on a one-year contract at a salary of $5,000 per year. McIntyre was not able to pay him and he sued to recover his back wages.

Ultimately, the W. H. McIntyre Company declared bankruptcy and went out of business in August 1915.[34] The exact reasons for the demise of the once prosperous company are obscure.[35] Factory Number 1 of the W. H. McIntyre plant burned in February of 1913 and this surely caused problems for the company.[36] Perhaps the design defects in the motors supplied by the Ives Motor Cycle Company contributed to its downfall.

The Zimmerman Manufacturing Company Litigation

The Zimmerman Manufacturing Company was established in Spencerville, Indiana in 1874 and moved to

Auburn, Indiana, sometime in the 1880s.[37] The company manufactured an extensive line of windmills and horse-drawn vehicles.[38] In 1907, the company began manufacturing automobiles. Eventually, the Eckhart Carriage Company acquired the buggy business, and Auburn Automobile Company the automobile business.[39]

The litigation of Zimmerman involved three cases for unpaid debts. In each case, Zimmerman was the Plaintiff. The most significant case addressed a counter-claim against the company for mechanical defects associated with the Zimmerman Model D.

In *Zimmerman Manufacturing Co. v. Inhofe*,[40] Zimmerman sued a customer for an unpaid promissory note. The customer counter-claimed against Zimmerman alleging that the car was mechanically defective, and the warranty had been breached. The car involved in the case was a Zimmerman Model D automobile purchased on June 11, 1912. The customer was a rural mail carrier and bought the car to use for delivering mail. The route required the car to be driven approximately 30 miles per day. The purchaser became very dissatisfied with the car when he tried to use it to deliver mail. Apparently, the car could only be driven under the best road conditions, and when it was driven, it was done so with "constant expense." Many repairs were made to the vehicle, but the purchaser finally gave up and quit paying Zimmerman for the car.

The remaining two Zimmerman cases are rather mundane suits for unpaid debts. *Zimmerman Manufacturing Company v. Rogers*[41] involved an unpaid promissory note for a car sold on June 12, 1912. In *Zimmerman Manufacturing Company v. Baker*,[42] Zimmerman sued a customer for an invoice that was unpaid. The invoice was for service that was performed on a Zimmerman car. The work was performed in 1915 and totaled $209.40, a substantial amount for the time, especially when it is considered that a brand new Zimmerman sold for around $500.[43] The case was probably dismissed because the sheriff was unable to locate the Defendant for service of process.[44]

The litigation of Zimmerman shows that the company financed cars, and that it had trouble collecting accounts receivable from time to time. However, there is nothing unusual about the cases. Zimmerman was probably muddling along as a small automobile manufacturer with a declining buggy and windmill business when the Eckhart Carriage Company and Auburn Automobile Company acquired it.[45] More than likely, the principals of the company recognized the declining nature of the business and decided to sell out to other companies while they still could. John Zimmerman continued with Auburn Automobile Company until 1940 when he, being the last employee, was charged with liquidating the assets of the bankrupt company.[46]

Auburn Automobile Company v. Customers

Occasionally, it was necessary for Auburn Automobile Company to sue one of its customers. There were not many cases between Auburn and a customer because a dealer was usually involved, so typically disputes were between the dealer and the customer. However, Auburn performed factory service on cars and had its own sales division so customers could buy a car direct from the factory if they lived nearby.[47]

Three cases have been discovered involving disputes between Auburn and its customers. Auburn was the Plaintiff in all three cases. Two of the cases involve unpaid promissory notes for cars, and the other case dealt with an unpaid invoice for factory service performed on a customer's car.

The earliest case discovered involving Auburn is *Auburn Automobile Company v. Beam*.[48] In this 1913 case, one J. Beam purchased an "Auburn Model K Roadster #1901, Catalogue No. K, Serial No. 1901." The car was financed by a promissory note executed in favor of Auburn. Beam failed to pay the promissory note, and Auburn brought suit for the balance.

Auburn probably imposed tight credit terms because it was not necessary to sue another customer for an unpaid promissory note until 1925, 12 years later. In *Auburn Automobile Company v. Clark*,[49] Auburn sued a customer who purchased a used Chevrolet with a promissory note. The purchaser did not pay the note, and Auburn repossessed the vehicle. At the time, Auburn probably had an active sales force and accepted trades of all kinds, whether self-propelled or horse-drawn.

The only other case between Auburn and one of its customers concerned factory service performed on a vehicle. In *Auburn Automobile Company v. Schulthess*,[50] Auburn sued a customer for repair work completed on the customer's Auburn Model 639-H. The work was done during the months of May and June in 1922. The car required extensive repairs that totaled $140.45. The case reveals that Auburn was performing factory service on cars as early as 1922. Factory service probably became an integral part of the operations of Auburn because it built a new building in 1923 devoted exclusively to parts storage and factory service.[51]

Duesenberg Liberty Motors Litigation

While Auburn was continuing to grow and become a well-respected regional manufacturer of automobiles, the Duesenberg brothers were active on the East Coast and gaining a reputation for their mechanical genius.[52] The Duesenberg brothers had enjoyed a great deal of racing success and were sought after to build engines.[53] The United States Government needed engines to help fight World War I, and the Duesenberg brothers had the talent to build the best aircraft engine ever produced.[54]

In *Ohio Savings Bank & Trust v. Willys Corporation*,[55] the Third Circuit Court of Appeals reviewed a settlement of a World War I contract between Duesenberg and the United States Government. In 1917, Duesenberg Motors Corporation was manufacturing engines of various types in a new plant at Elizabeth, New Jersey. On November 20, 1917, Duesenberg entered into a contract with the United States to produce 500 Liberty motors.

The original contract for the production of 500 Liberty motors was modified with eight supplements, calling for changes in price, quantity, and type. The new modified contract called for the production of 2,000 motors of a French design.[56] The original plant at Elizabeth, New Jersey, was doubled in size, and another plant in Poughkeepsie, New York[57] was acquired and

moved to Elizabeth, New Jersey.[58] In stereotypical bureaucratic fashion, the government engineers working with Duesenberg determined that the design was defective and required Duesenberg to make nearly 1,000 alterations in the design of the engine. These extensive changes in design were not completed until September of 1918. When production finally started, only four motors were produced before the Armistice.[59]

The case involves the winding up of the government contract and the amount of reimbursement that Duesenberg was entitled to as the result of the significant amount of money it had spent in anticipation of production. Duesenberg reached a settlement with the War Department Claims Board.[60] In the meantime, Willys Corporation acquired Duesenberg and after Willys declared bankruptcy, it litigated the amount of the settlement to Duesenberg.[61]

Fig. 4 – L-29 Cord displayed at A-C-D Museum. Photo by the editor.

The case may provide reasons why Duesenberg, Inc. filed in bankruptcy and was reincorporated as Duesenberg Automobile & Motors Co., Inc.[62] The case shows that the Liberty motors project was subjected to excruciating delay by the government engineers, and Duesenberg, Inc. received substantially less money than it expected to under the government contract. To add insult to injury, the Liberty motor was the subject of a patent infringement suit almost ten years later.

In *Morse v. United States*,[63] Alfred Morse sued the United States Government alleging that the Liberty engine infringed on a patent he was granted in 1911. The litigation spanned 22 years and involved a lubrication system for engines. In 1912, Morse sued the Duesenberg Motors Corporation in the United States Court for the District of New Jersey. The parties settled this case for $1,000, and the court issued a decree holding that the patent was valid and it had been infringed. However, the government continued to use a similar system of lubrication in its Liberty engine. As a result, Morse sued the United States Government for patent infringement.[64] The court discusses the lubrication system used in the Liberty engine and compares it to the Morse patent.[65] Ultimately, the court found that the lubrication system used in the Liberty engine was not so similar to the Morse patent as to constitute a patent infringement.[66]

The Duesenberg version of the Liberty motor was never used in an aircraft.[67] After World War I ended the project was dropped. One example of the Duesenberg Liberty motor exists and is on display at the Auburn Cord Duesenberg Museum in Auburn, Indiana.

Collisions Involving Auburns, Cords, and Duesenbergs

The collisions that involved Auburns, Cords, and Duesenbergs show how these companies were gaining national prominence and selling cars all over the United States. Accidents occurred from Florida to California and many points in between. The collisions show that a regional manufacturer from a small town in Northern Indiana was now a major player in the automotive industry.

Many of the collisions occurred while someone who did not own the car was driving. Presumably, this was because of the car's reputation for speed. Many people wanted to test this reputation when they climbed behind the wheel. As a result, many unfortunate accidents occurred.

For example, in *Estaver v. Auburn Automobile Company*,[68] a Plaintiff was injured in Florida when involved in a collision with an L-29 Cord (Fig. 4). Auburn owned the Cord. A factory representative of Auburn named George W. Wright used the car. Wright was responsible for establishing new dealer and distributor accounts for Auburn Automobile Company in North Carolina, South Carolina, Georgia, Alabama, and Florida.

Wright was in Jacksonville, Florida to solicit new dealers, and allowed Lewis Burnett to drive the Cord. The injured Plaintiff, William Estevar, was a passenger in the car. At the corner of St. Johns Avenue near Canterbury Street in Jacksonville, the Cord was allegedly driven at an unreasonable speed and struck an electric light pole.

The unique features of the Cord are discussed in the complaint. The complaint states that the "Cord automobile was of a new, unique and distinctive mechanical design. That among the distinctive mechanical features was the transmission of the power from the motor to the front instead of the rear axle which feature necessitated proficiency in the steering of a Cord automobile in order to operate it safely at high speeds."

The Plaintiff demanded $50,000 in damages, a large sum for 1932. Ultimately, the case was dismissed. Research has failed to yield any more information about the case.

Two more cases involving vehicles owned by Auburn occurred near the company headquarters of Auburn, Indiana (Fig. 5). In *Carrington v. Auburn Automobile Sales Corporation*,[69] the Plaintiff was injured when struck by an Auburn automobile owned by Auburn Sales Corporation and driven by Paul Krise.[70] The Plaintiff was delivering newspapers

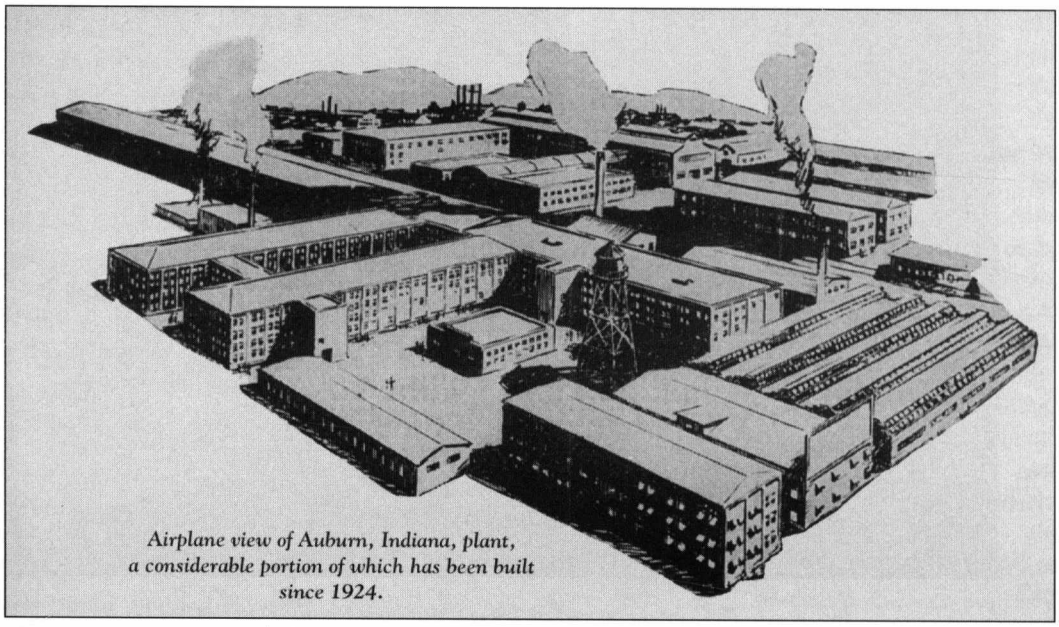


Fig. 5 – The Auburn Automobile Plant (1929).

and had pulled over to the side of the road. Krise attempted to pass the Plaintiff's vehicle, but struck the Plaintiff's vehicle from behind. The Plaintiff dismissed the case on January 5, 1938.[71]

In *Auburn Automobile Company v. Garns*,[72] the Plaintiff was injured when involved in a collision with a car owned by Auburn Automobile Company and driven by Vern Clark. The accident occurred at the intersection of Thirteenth and Jackson Streets in Auburn, Indiana. The impact of the collision must have been great because the body of the car was broken, and the frame was broken, damaging the axles, wheels, tires, lamps, speedometer, fenders, instrument board, vacuum tank, steering wheel, gear pedals, front and rear springs. Auburn rebuilt the car at the expense of $944.31.

Meanwhile, other collisions were occurring in other parts of the country. In *Kirschbaum v. McCarthy*,[73] a Duesenberg driven by P. H. McCarthy was involved in a collision with a Ford. The collision occurred at the intersection of Cole and Hayes streets in the city of San Francisco, California on June 26, 1931. In *Saxman v. United States Fire Insurance Company*,[74] a Duesenberg owned by John Saxman was stolen and destroyed by fire. The case reveals that the prior owner of the Duesenberg was a Mr. Babcock and he had paid $14,250 for the automobile. The litigation involved the issue of the value of the car at the time it was destroyed.

Another California case involved a customer that left a dealership for a test drive. In *Engstrom v. Auburn Automobile Sales Corporation*,[75] a customer was allowed to take an Auburn from a dealership for the purpose of showing it to "Ma and Sis." The dealership gave him two hours to do this and he left at 5:00 p.m. on July 25, 1936. However, he did not return until 4:00 p.m. the next day after being involved in an accident. The dealer had reported the car stolen, and the driver of the other car involved in the collision sued for his injuries. It is unclear from the case whether or not the customer intended to steal the car or simply wanted an extended test drive.

Two cases involve Auburns that were involved in collisions in Ohio. It is not surprising that Auburn sold many cars in Ohio because Auburn, Indiana, is only about 20 miles from the Ohio state line. In *Northwestern National Insurance Company v. Hicks*,[76] an Auburn was destroyed in a fire on December 18, 1931. The litigation involved the value of the Auburn at the time of its destruction. Finally, in *Duncan v. Evans*,[77] an Auburn was involved in a collision with a Packard. The collision occurred on Route 6, four miles west of Bowling Green, Ohio on March 25, 1935. The litigation involved which of the two drivers was at fault.

The collisions involving Auburns, Cord, and Duesenbergs demonstrate that the companies were active through-out the United States and had gained a national prominence. In addition, factory representatives were active for Auburn Automobile Company and were aggressively pursuing new dealers and distributors. Along with the new dealers, finance companies were necessary to facilitate sales.

Dealers v. Finance Companies

Finance companies were an integral part of the operation of an Auburn Automobile Company dealership. Finance companies facilitate sales by giving the customer more purchasing power. Usually, the relationship between finance companies and dealerships was mutually profitable. However, some Auburn dealers tended to abuse the relationship if they developed a cash flow problem.

In *Forgan v. The Gordon Motor Finance Co.*,[78] the Gordon Company and the Credit Trust were companies that financed the purchase of automobiles from dealers under conditional sales contracts. Auburn Woodlawn Motors, Chicago, Illinois, was a dealer of Auburn and Cord automobiles. On September 6, 1929, Gordon advanced the sum of $2,442.68 to Auburn Woodlawn to purchase a Cord automobile from the Chicago Auburn Company which was the wholesale division of Auburn Woodlawn. In other words, Auburn Woodlawn was purchasing the car from itself, presumably financing the car in this manner to gain working capital.

Then, on November 20, 1929, Auburn Woodlawn executed another contract agreeing to sell and deliver the same Cord to a man named Allison.[79] Allison was the secretary and treasurer of Auburn Woodlawn. This contract was assigned to the Credit Trust which advanced $2,256 Trust to Auburn Woodlawn in exchange for the assignment of the contract. In other words, Auburn Woodlawn had financed the same Cord

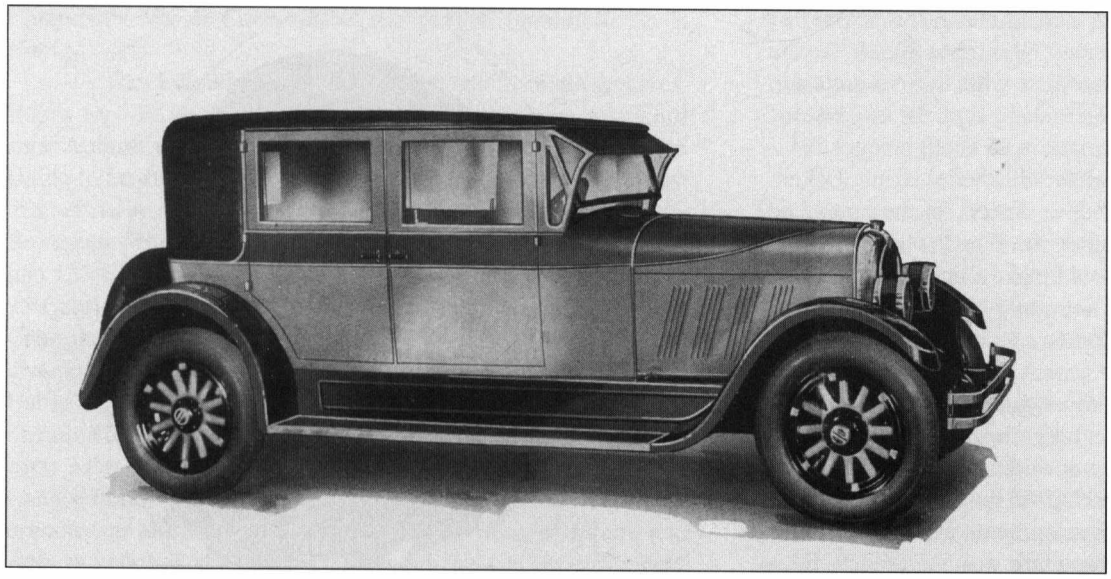


Fig. 6 – "An Auburn sedan of special design?" The 1925 Brougham seems special enough.

automobile twice in an effort to gain working capital for the dealership. Gordon's transaction with Auburn Woodlawn gave it a lien on the Cord and the lawsuit ensued when Gordon seized the car and took it to its place of business. The Supreme Court of Illinois held that the contract with Allison was fictitious and that Gordon, rather than the Credit Trust, had the right to possession of the Cord.

The second case concerned a car that had been purchased, but the dealer did not properly transfer the title. In *McKee v. Ward*,[80] Andy Bushta contracted to purchase a car from the Pittsburgh Auburn Company. The car was to be an Auburn sedan "of special design." (Fig. 6). The purchase price was paid to the dealer, and an order for the car was placed with Auburn. The car was ready for delivery in September of 1925.

The dealer financed the car among its new car inventory. A representative of the dealership met the purchaser in Indiana at the Auburn Automobile Company for the delivery of the car. The purchaser drove the car home to Pennsylvania after taking delivery at the factory. However, the dealer defaulted on the loan. The issue in the case was whether the purchaser or the finance company had title to the car.[81] It is unclear why the dealer did not pay off the car after being paid by the purchaser. Presumably, the dealer developed cash flow problems and used the money for working capital.

One case involves a used car dealer and a dispute that developed with a finance company concerning a Duesenberg among other cars. In *Sorrin v. Pacific Finance Corporation*,[82] the Knickerbocker Automobile Warehouse, Inc. was a dealer in used cars. The Pacific Finance Corporation financed the inventory of the dealership. The dealer defaulted on the loans, declared bankruptcy, and Pacific Finance initiated a replevin action to regain the cars serving as collateral for the loan. Knickerbocker had sold many of the cars that were financed by Pacific Finance but Pacific Finance had not been paid. The court found for Pacific Finance. On cross-examination, Knickerbocker revealed that "a certain Duesenberg car" that had been financed by Pacific Finance was a stolen car. The used car dealer had purchased the Duesenberg from a man named Stanton. Stanton was charged with larceny in Detroit, Michigan.[83]

Duesenberg Tax Litigation

The success of Auburn Automobile Company and its subsidiaries meant that they often had to deal with the Internal Revenue Service. There is very little tax litigation that involved Auburn Automobile Company or Duesenberg Automobile & Motors, Inc. However, one case reveals significant facts about the development of the Model J Duesenberg.

In *Duesenberg Inc. v. Commissioner*,[84] Duesenberg appealed a decision of the United States Board of Tax Appeals[85]

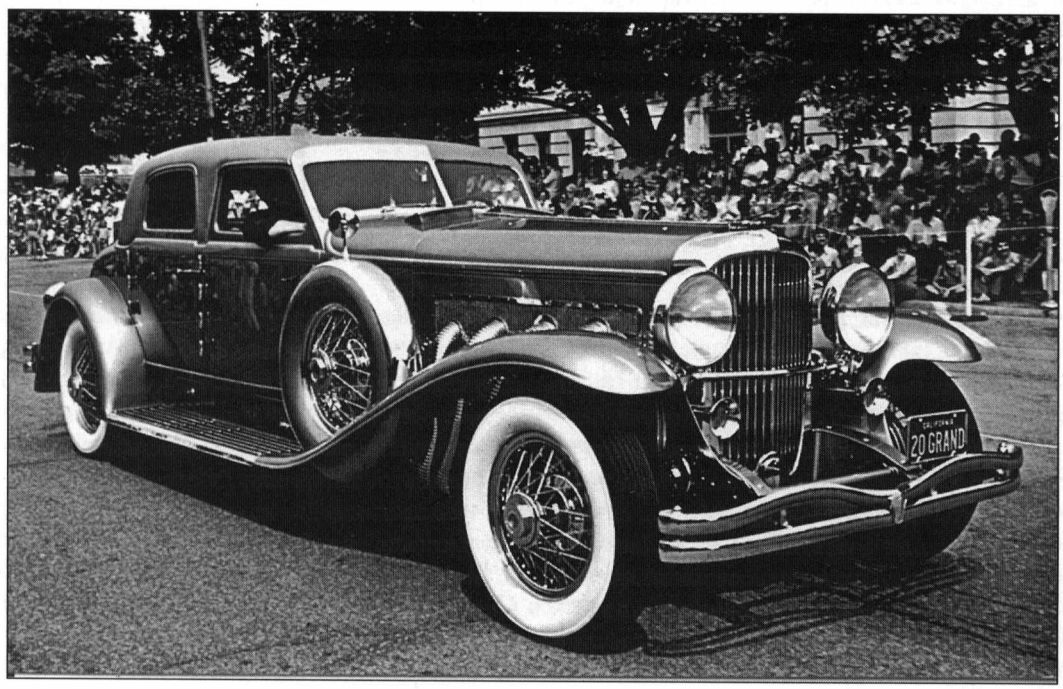


Fig. 7 – 1933 Duesenberg Model J "Twenty Grand" at the annual A-C-D parade in Auburn, Indiana.

that found Duesenberg liable for unpaid tax in the amount of $14,377.22 for the fiscal year ended November 30, 1930. The case discusses the expenses associated with the research and development of the Model J Duesenberg and the expense of registering the Duesenberg trademark in 35 foreign countries.

Duesenberg shipped cars to subsidiaries of the Dekalb Company, and the subsidiaries acted as dealers for the cars.[86] The dealers did not order the cars; rather, the Vice President and the Sales Manager of Duesenberg would make shipments to dealers based on their knowledge of the inventory of each dealer.[87] The dealers were not expected to pay for the cars until they were sold.[88]

The central issue in the case is the deductibility of the research and development expense associated with the Model J Duesenberg. In 1927, Duesenberg began work on the development and experimental work of the Model J (Fig. 7). In that year, Duesenberg spent $97,697.60 on the development of the new model. In 1928, the development expenditure was $85,233.20, and in 1929 the expenditure was $17,069.20, for a suspiciously even total of $200,000.00. Duesenberg anticipated that the production was going to be 500 model J Duesenbergs,[89] so the company accountants allocated $400 to each car for development and experimental expense.[90] Duesenberg wanted to deduct the actual development and experimental costs expended in each year, but the IRS required it to deduct the $400 expense per car as the cars were produced. Thus, Duesenberg was required to wait for its tax deductions despite the fact that it had actually spent a large sum of money in the years 1927, 1928, and 1929.

In 1930, Duesenberg paid $1,784.05 to Marks and Clerk, who were attorneys in New York City.[91] The fees were paid for the attorneys' services in connection with registering the name "Duesenberg" as a trademark in 35 foreign countries.[92] This trademark registration was almost surely done in anticipation of the production of the Model J Duesenberg and the marketing of Duesenberg automobiles outside of the United States.

The case shows the large development and experimental costs expended by Duesenberg in anticipation of the Model J. The money must have been well spent, as the car was well received and is still considered to be the ultimate American luxury car. Unfortunately, taxes were not the only problem looming on the horizon for Duesenberg.

The Fred Duesenberg Workman's Compensation Case

On July 2, 1932, Fred Duesenberg died after an automobile accident in Pennsylvania (Fig. 8). The loss of Fred Duesenberg was surely a devastating blow to the company. He was a mechanical genius and responsible for much of the engineering that made up Duesenberg automobiles.

At the time of his death, Fred Duesenberg was vice-president of Duesenberg, Inc., and earned a salary of $15,000 per year. His widow filed for benefits under the Indiana Workmen's Compensation Act. She was denied worker's compensation benefits because Fred Duesenberg was not considered an employee within the meaning of the compensation act.

In *American Mutual Liability Insurance Company of Boston v. Duesenberg*,[93] Fred Duesenberg's widow appealed the denial of workmen's compensation benefits. The legal issue of the case was whether or not Fred Duesenberg was an employee

Fig. 8 – Fred Duesenberg, c. 1929.

at the time of his death. Thus, the case discusses the duties of Fred Duesenberg. At the time, as with most of his career, Fred Duesenberg devoted his entire time to engineering and experimental work for Duesenberg, Inc. He performed many duties for the corporation that tended to show that he was an employee. However, Fred Duesenberg was also a principal of the corporation. As a principal, he derived benefits from the corporation beyond those which an employee would receive. Ultimately, the Court denied workmen's compensation benefits to Fred Duesenberg's widow because he was not an employee within the meaning of the act at the time of his death.

Fred Duesenberg's brother, Augie continued with the company and went on to refine the Duesenberg designs even further.[94] However, the loss of Fred Duesenberg was a significant blow to the company and to the entire automobile industry.

Auburn Automobile Company v. Dealers

Auburn developed and cultivated a large dealer network that allowed the cars produced by the company to be available in every part of the United States. Overall, Auburn seems to have had an excellent relationship with its dealers. Disputes between the company and its dealers were rare. There is no doubt that Auburn supplied its dealers with a superior product and served a unique market niche. Sales were promoted with an active racing program and innovative advertising campaigns. As a result, there was little for dealers to complain about.

However, the Charleston dance of the Roaring 20s soon changed to the funeral dirge of the Great Depression. During the Great Depression, Auburn became involved in litigation with one of its dealers. The dealer had fallen on hard times and was unable to meet its obligations. There were at least three reported court decisions reflecting this litigation: *Auburn Automobile Corporation v. Habig Motors Company*, *Auburn Automobile*

Company v. Namor Corporation, and *Auburn Automobile Co. v. Habig*.[95]

The following narrative is derived from these cases. Habig was the dealer in Miami, Florida, for Auburn and Cord cars. Auburn considered the ideal product mix of a dealer like Habig to be made up of seven Cords and 18 Auburns. The Cord mix was to be two Phaetons, two Cabriolets, two Sedans, and one Brougham. The Auburn mix was to consist of two 125 Phaetons, two 125 Cabriolets, two 125 Sedans, two 8-95 Phaetons, two 8-95 Cabriolets, two 8-95 Sedans, one 8-95 Brougham, two 6-85 Cabriolets, two 6-85 Sedans, and one 6-85 Brougham. This diverse inventory was considered necessary in order to give Habig a proper showing of two colors in the various models mentioned.[96] Until April 9, 1930, Habig paid Auburn cash for the cars. After April 9, Auburn financed the cars. Each car was financed under a "floor plan" arrangement under which Habig executed promissory notes to the National Bank of Miami and Auburn retained title until Habig sold the car. At that point, Habig was obligated to remit to Auburn through the Bank the sum it had agreed upon to pay Auburn for the car. Auburn frequently sent factory representatives to its dealers. When Habig learned of an impending visit from an Auburn representative, it would borrow cars it had previously sold its customers and display them on the showroom floor, giving the impression that they remained unsold (and thus that no money was yet owing Auburn). Auburn sued Habig for its unpaid promissory notes. Habig declared bankruptcy, and Auburn sought recovery of its claims from the bankruptcy receiver.

In the first reported decision, *Auburn Automobile Corporation v. Habig Motors Company*, the Florida Supreme Court heard an appeal from a Dade County circuit court decision in which the plaintiffs were part of a class action of creditors of the defendant Habig. These creditors included Auburn and Namor Corporation. Auburn had sought unsuccessfully to have its claim against Habig be declared a preferential claim and appealed the circuit court's denial. Seven creditors motioned to dismiss the appeal but the Supreme Court denied the motion and retained the matter "on the docket for disposition on its merits in due course." The second reported case represents this dispostion; in it, the Supreme Court affirmed the lower court's denial of Auburn's claim against Habig as deserving preference, observing that if there were a claim at all it was properly against the Bank and not Habig. Auburn worked with the State of Florida as they pursued criminal prosecution against Habig for theft of the automobiles. Habig successfully defended the criminal prosecution. However, Habig sued Auburn in Federal Court for malicious prosecution. Habig was awarded a judgment of $25,000 against Auburn. This judgment was eventually overturned by the Seventh Circuit Court of Appeals in the third reported case, which held that Auburn's suit against Habig for embezzlement was based upon probably cause, but the litigation in Florida and Federal Court must have been expensive for Auburn to pursue and defend, especially in the economic climate of the Great Depression.[97]

Customers v. Dealers

It is almost inevitable that disputes will develop between automobile dealers and their customers. A car is typically the second most expensive purchase that a family makes. Also, anything that is mechanical is subject to maintenance and repairs. When these two factors are mixed with dealers having to face the reality of the Great Depression and struggling to survive, the formula for litigation is apparent.

The cases demonstrate that Auburn dealers were desperate to make sales during the 1930s and were struggling to generate cash. There are the typical breach of warranty suits and lawsuits brought by dealers for unpaid promissory notes. However, some dealers were so hungry for cash that they were willing to take money that did not belong to them, and, in one case, engage in outright fraud.

Lindsey v. Butte[98] involved a Duesenberg that was financed by a dealer in 1923. On October 19, 1923, E. L. Butler and John Lindsey entered into a conditional sales contract where Lindsey agreed to pay $5,000 for a Duesenberg. Lindsey had paid $2,000 down and financed the balance of $3,000. Butler assigned the note to a bank and Lindsey defaulted. Under this arrangement, dealers would enter into contracts with customers and then assign them to various banks. The assignment was made with limited recourse, which means that if the customer did not pay the bank, the dealer was expected to assist in the collection efforts.[99]

The case shows that dealers offered financing packages to customers in order to assist sales. In-house financing was recognized early in the automotive industry as essential to the operation of a dealership. The technique is still used today as modern dealerships use extensive financing and leasing departments to induce customers to purchase automobiles.[100]

In *Maier v. Meyers*,[101] John Maier sued the Meyers Auburn Company. Meyers Auburn was a dealer of Auburn and Cord automobiles in Ann Arbor, Michigan. Meyers Auburn advised Maier that the Auburn Automobile Company was going to market a new model Cord sedan at a cheaper price than the current model Cord that Maier owned.[102]

As a result, Maier decided that he would like to replace his current model Cord sedan with a new model, and he arranged for Meyers Auburn to attempt to sell his old Cord for him in anticipation of receiving a new model when it became available. So, on June 19, 1930, Maier delivered his Cord to Meyers Auburn.[103] A few weeks later, Meyers Auburn was able to sell the car for $2,761.00. When Maier learned of the sale, he went to Meyers Auburn to collect his money. However, Meyers Auburn was not able to pay Maier for the car.

The dealership explained that the money had been used in the operations of the dealership. William Meyers, the owner of the dealership, explained to Maier that he was "good for it" and would pay for the car. Maier was skeptical and demanded that the dealership sign a promissory note agreeing to pay for the car within 30 days. The promissory note was never paid because Meyers Auburn declared bankruptcy and went out of business. It is unlikely that the dealer intentionally absconded with the money. More likely, the dealer was desperate for cash and hoped to work out of the cash flow problem within 30 days. However, the dealer did take money that did not belong to him and used it for his own purposes.

The most dishonest act that a dealer was responsible for was the intentional fraud perpetrated in the next case.

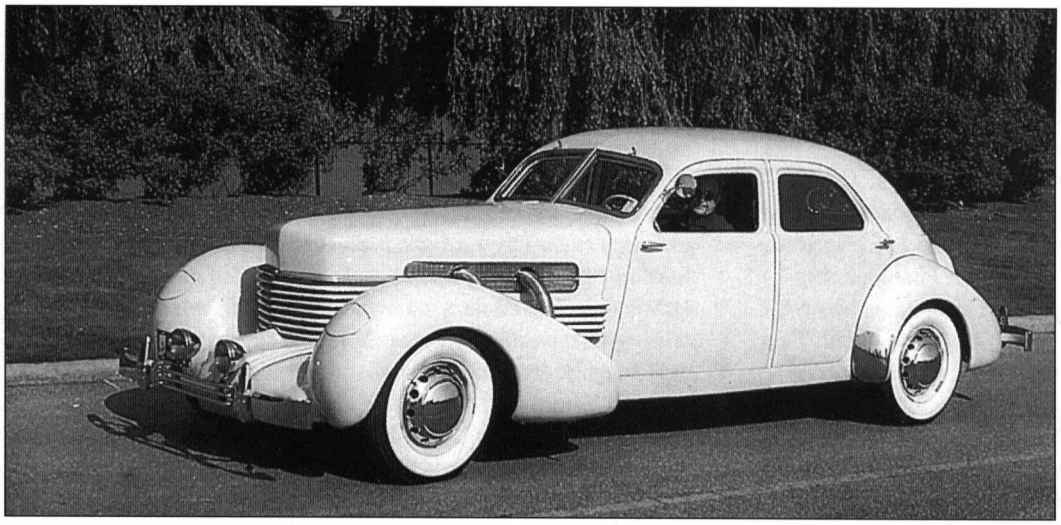


Fig. 9 – 1937 Supercharged Cord 812.

In *Lufty v. Roper & Sons Motor Company*,[104] a customer sued a Cord Dealer. Louis Lufty owned a 1936 Cord and decided to trade it in on a 1937 Cord Sedan. So, Lufty went to Roper & Sons Motor Company in Phoenix, Arizona, to obtain a 1937 Cord.[105] At the dealership, Lufty was shown several new model Cords. Lufty agreed to purchase a Cord sedan for $2,410.[106] The contract of sale did not specify the model year of the car, but merely referred to the vehicle as a "Model 810." Numbers were used to designate the yearly models of the Cord and the particular year of manufacture did not appear on the car or the purchase agreement. Model 810 meant a 1936 model, and model 812 meant a 1937 model (Fig. 9).

Thus, Lufty accepted delivery of a 1936 810 Cord thinking that it was a 1937 model. Lufty drove the Cord for about four weeks before he learned from a mechanic servicing the car that the number 810 meant that the Cord was a 1936 model. The dealer refused to reimburse him for the difference in price between a 1936 model and a 1937. Consequently, Lufty sued Roper for the difference in price.

The testimony showed, and the jury found, that the dealer had misrepresented the car as a 1937 model when it was a 1936. Later, on August 9, 1937, Lufty obtained a supercharged 1937 Cord by trading in the 1936 model that Roper had sold him.[107] The case demonstrates the lengths that Auburn dealers would go to during the Great Depression to induce sales. Surely, there must have been dishonest dealers before the Great Depression, but there are no reported cases involving them.[108]

E. L. Cord Tax Litigation

By 1932, the effects of the Great Depression were taking their toll on Auburn Automobile Company.[109] The stock price had fallen dramatically, and there was no end in sight to the economic crisis. Not one known for being sentimental, E. L. Cord could have easily concluded that the time had come to liquidate his holdings in Auburn and invest in other securities (Fig. 10).

With that in mind, Cord and his advisors implemented a plan to liquidate their Auburn stock while minimizing their losses. The facts in *E. L. Cord v. Commissioner*,[110] shows that Cord formed a stock syndicate on June 2, 1932.[111] The Internal Revenue Service sued Cord and other members of the syndicate, alleging that the syndicate was an association that was taxable like a corporation. The case reveals important facts about the makeup of the Cord empire and how E. L. Cord manipulated stocks.

The stated purpose of the syndicate was to liquidate its investment in the automobile industry and to increase its investment in the aviation industry. At the time, the market value of Auburn Automobile Company was $31-$32 per share. The price of the stock had fallen like other stocks, but its fluctuation had been more violent than that of the average stock. Cord had paid about $55 per share for about half of the stock and $67.50 per share for the rest. Therefore, E. L. Cord was faced with the reality of taking a substantial loss on the stock as Cord Corporation divested itself of the stock.

On August 20, 1932, Cord entered into another syndicate agreement with ten other people that was substantially similar to

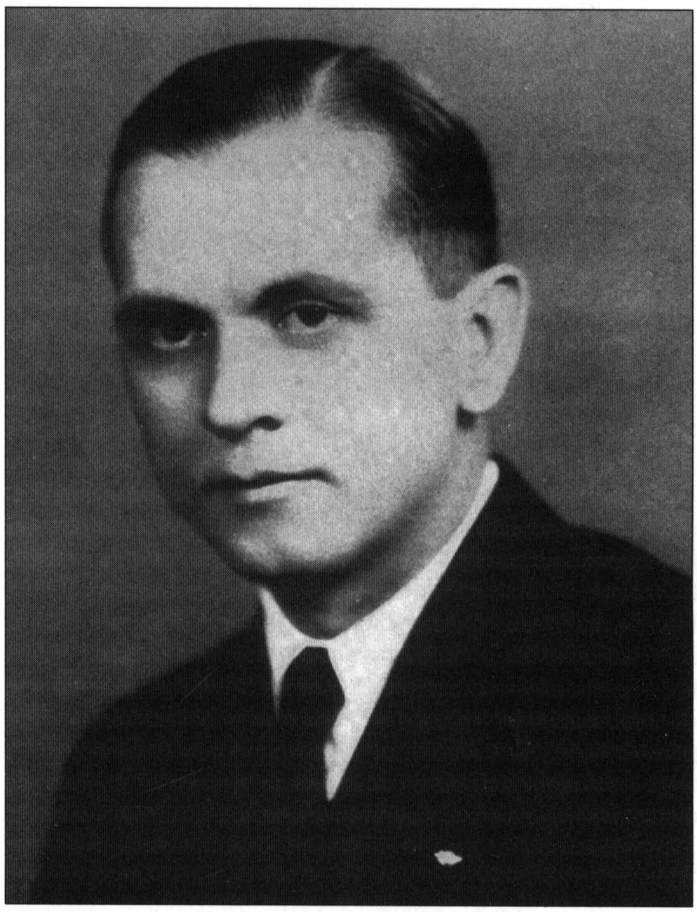


Fig. 10 – E. L. Cord, 1929.

the first syndicate. After that, the two syndicates engaged in a series of transactions whereby they bought and sold the stock of Auburn Automobile Company from each other. Presumably, the intent of E. L. Cord was to raise the price of stock by stimulating artificial demand before liquidating his investment.[112]

E. L. Cord's plan worked, because on October 1, 1932, the price of Auburn stock had risen to $54 per share. At the time, this insider trading was perfectly legal. The Securities and Exchange Commission was not formed until 1933. Until then, America had accepted and even encouraged the manipulation of stocks by the wealthy. There is every indication that Cord played by the rules at the time and never engaged in any illegal activity. However, Cord had turned his back on Auburn and the company would never be able to recover.[113]

Auburn Automobile Company Bankruptcy Litigation

After this, it was only a matter of time before Auburn became another casualty of the Great Depression. Cord was the financial genius that was responsible for the company's success. Without E. L. Cord, the company lacked the management expertise to survive.

The bankruptcy records of Auburn Automobile Company are voluminous.[114] The records are like a snapshot in time that shows the status of the company when it finally threw in the towel. At the time, Lycoming Manufacturing Company, was a subsidiary of Auburn.[115] In December of 1937, both Auburn and Lycoming filed bankruptcy petitions in the United States District Court for the Northern District of Indiana.

When Auburn filed for bankruptcy, it was doing well enough to meet its current obligations to merchandise creditors and employees. However, it did not have enough money to meet payments on its outstanding debentures, or on its liability as guarantor of Lycoming's preferred stock. In addition, Auburn did not have any means of borrowing funds to pay these obligations.

The court approved a reorganization plan, but the terms of it are not disclosed by the opinion. The original reorganization plan called for extensive claims against Cord Corporation and its officers. The opinion states that the claims were "a result of representations made by [Cord Corporation and its officers] in order to stimulate public interest in the sale of Auburn's stocks and debentures." E. L. Cord was generally not intimidated by risk; however, the original reorganization plan that attached personal liability to E. L. Cord must have concerned him.

E. L. Cord did not have to worry for long. On November 30, 1939, a stipulation was entered into between the parties that amended the original reorganization plan. In exchange for this arrangement, Cord Corporation and its past and present officers were absolved from all liability.[116] This amended reorganization plan was surely the result of bargaining by the Cord Corporation attorneys to avoid personal liability for the officers of Cord Corporation. It shows the skill of E. L. Cord and his team of advisors. Cord made money in everything he did. Even when there were hard times, Cord always managed to come out on top.

Conclusion

When looked at in its totality, the litigation of Auburn Automobile Company shows that legal resources should not be overlooked when conducting historical research. Legal disputes yield important information about the relationship between parties and how those parties interact with each other. A researcher does not have to be an attorney in order to find legal opinions and other public records useful. Legal opinions may be considered trustworthy information on which a historian may rely. Many of the cases used in this article contain invoices and actual correspondence between parties that were introduced as exhibits. These exhibits are often valuable historical documents that reveal first hand facts.

The litigation of Auburn demonstrates the relationships between the people and the companies that designed, manufactured, sold, bought, and drove Auburns, Cords, and Duesenbergs. These relationships make up the mystique of what some have labeled the Auburn Cord Duesenberg experience. The saga of Auburn Cord Duesenberg continues and will certainly continue well into the 21st century.[117]

Endnotes

[1]Borgeson, Griffith, *Errett Lobban Cord: His Empire, His Motor Cars: Auburn Cord Duesenberg*, (1984), p. 30.

[2]Approximately 250,000 people attend the annual Auburn Cord Duesenberg Festival in Auburn, Indiana.

[3]See Borgeson, *supra* note 1; Smith, John Martin, *History of DeKalb County 1837-1987* at 1006-1039 (1987); Butler, Don, *Auburn Cord Duesenberg* (1992); Malks, Josh B., *Cord 810/812* (1995).

[4]See *infra* note 65.

[5]Three different sources were used to research this article. First, books written about Auburn Automobile Company and about the cars produced by it were used. Second, the Dekalb County Circuit Court Records provided a wealth of information. Dekalb County Court records are generally available from 1913 to the present. In 1913, a fire destroyed the offices of the Dekalb County Clerk, Recorder, Sheriff, and Courtroom, so most records prior to 1913 have been lost. Smith, *supra* note 3 at 1255; *see infra* note 36 and accompanying text. Many of these court records are on file in the archives at the Auburn Cord Duesenberg Museum in Auburn, Indiana. Others are on file with the author of this article. Many states, including Indiana, retain transcripts of all trials. Third, computerized legal databases were used. The two leading legal databases are LEXIS and WESTLAW. Almost any attorney has access to one of these two databases or can direct a researcher to someone who does. The legal databases contain virtually every reported opinion in the United States from the late 1700s to the present.

[6]Smith, *supra* note 3 at 1021.

[7]Borgeson, *supra* note 1 at 22. It was probably the interest of the young Morris Eckhart in the up and coming horseless carriage industry that led to the founding of the Auburn Automobile Company.

[8]The company was incorporated on August 22, 1903 "to manufacture and sell automobiles and self propelling carriages and wagons. Later the company extensively used the slogan "Established 1900."

[9]The W. H. Kiblinger Company was also an early manufacturer of automobiles in Auburn, Indiana. The name of the company was changed to the W. H. McIntyre Company in

1908. No litigation involving the Kiblinger Company was discovered as part of this research.

[10]Borgeson, *supra* note 1 at 24. The investors included A.P. Kemp (earlier vice president of the H. H. Franklin Manufacturing Company), J. I. Farley, H.H. Hitchcock, F.B. Hitchcock, Ralph A. Bard, E. A. Johnson, J. H. Rose (former judge of the Dekalb County Indiana Circuit Court), and Wm. Wrigley, Jr. (founder of Wrigley's Chewing Gum Company).

[11]700 is generally used as the number of unsold cars that were in inventory at the time. However, there are indications that the number may have been closer to 1,500.

[12]E. L. Cord was only thirty years old when he was hired to turn around the Auburn Automobile Company. He was born on July 20, 1894. Borgeson, *supra* note 1 at 14.

[13]Malks, *supra* note 3 at 13.

[14]Borgeson, *supra* note 1 at 28. The actual terms of the agreement are hard to decipher because sources have reported them differently. However, it is generally accepted that E. L. Cord was not given a salary and that he was allowed to gain control of the company.

[15]Borgeson, *supra* note 1 at 42-43.

[16]*Id.*

[17]*Id.* One famous car was appropriately dubbed "The Twenty Grand."

[18]Malks, *supra* note 3 at 15.

[19]*Id.* The major holdings of Cord Corporation included Auburn Automobile Company, Duesenberg, Lycoming, Stinson Aircraft, Century Airlines, and Aviation Company (AVCO).

[20]*Id.*

[21]163 Ill. App. 552 (1911).

[22]82 N.E. 391 (Ill. 1907).

[23]No. 9700 (Dekalb Cty. Ind. Cir. Court, July 28, 1913) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum). One frustration for the researcher, if not the reader, is that unpublished pleadings do not contain a copy of the disposition of the case.

[24]No. 9720 (Dekalb Cty. Ind. Cir. Court, May 5, 1913) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum).

[25]No. 9898 (Dekalb Cty. Ind. Cir. Court, Mar. 29, 1914) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum).

[26]No. 9937 (Dekalb Cty. Ind. Cir. Court, May 20, 1914) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum).

[27]No. 9942 (Dekalb Cty. Ind. Cir. Court, May 23, 1914) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum).

[28]No. 9956 (Dekalb Cty. Ind. Cir. Court, June 13, 1914) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum).

[29]No. 9972 (Dekalb Cty. Ind. Cir. Court, June 29, 1914) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum).

[30]No. 9975 (Dekalb Cty. Ind. Cir. Court, June 30, 1914) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum).

[31]No. 10114 (Dekalb Cty. Ind. Cir. Court, Dec. 18, 1914) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum).

[32]No. 10084 (Dekalb Cty. Cir. Court, Nov. 19, 1914) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum).

[33]No. 10001 (Dekalb Cty. Ind. Cir. Court, Aug. 20, 1914) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum).

[34]Smith, *supra* note 3 at 1040.

[35]*Id.*

[36]*Id.* at 1255. The factory building was where the Dekalb County Courthouse records were being stored while the new (and present) Dekalb County Indiana Courthouse was being built. In 1908, a lawsuit was filed by the Success Motor Buggy Company for patent infringement, but no primary sources concerning this litigation have been located. *Id.* at 1033.

[37]Smith, *supra* note 4 at 1039.

[38]*Id.*

[39]*Id.*

[40]No. 10587 (Dekalb Cty. Ind. Cir. Court, June 1,1916) (Unpublished pleadings on file with the author).

[41]No. 9737 (Dekalb Cty. Ind. Cir. Court, Sept. 17, 1913) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum).

[42]No. 10824 (Dekalb Cty. Ind. Cir. Court, Jan. 4, 1917) (unpublished pleadings on file with the author).

[43]*Id.*

[44]*Id.*

[45]Smith, *supra* note 4 at 1039. The Eckhart Carriage Company purchased the buggy manufacturing portion of the business in 1914. Auburn Automobile Company purchased the automobile manufacturing portion of the business in about 1915.

[46]*Id.*

[47]*Id.* at 1025.

[48]No. 9738 (Dekalb Cty. Ind. Cir. Ct., Sept. 17, 1913) (unpublished pleadings on file in the archives at the Auburn Cord Duesenberg Museum).

[49]No. 13491 (Dekalb Cty. Ind. Cir. Ct., May 22, 1925) (unpublished pleadings on file with the author).

[50]No. 12765 (Dekalb Cty. Ind. Cir. Court, June 6, 1923) (unpublished pleadings on file with the author).

[51]The service building of Auburn Automobile Company is now a part of the National Automotive and Truck Museum of the United States. The museum is dedicated to the preservation of this building that played a crucial role in the history of Auburn Automobile Company.

[52]Borgeson, *supra* note 2 at 40-46.

[53]*Id.* at 43.

[54]Butler, *supra* note 3 at 76.

[55]16 F.2d 859 (3rd Cir. 1926).

[56]The French design was a 16-cylinder Bugatti aircraft engine, commonly known as the King-Bugatti. Butler, *supra* note 3.

[57]The plant that was acquired was the Fiat plant. Butler, *supra* note 3 at 83. It was purchased on or about February 1, 1918.

[58]*Ohio Savings*, 16 F.2d at 859.

[59]*Id.* The Duesenberg modified V-16 King-Bugatti was a mammoth engine. Butler, *supra* note 3 at 84. The crankcase was nearly 86 inches long. The engine developed 800 horsepower at 1,800 RPM. The Duesenberg engine was never proven in flight because no airplane was ever developed to handle the brute force of the engine. The engine was probably too heavy for aircraft of this era.

[60]*Ohio Savings*, 16 F.2d at 860.

[61]*Id.*

[62]The original corporate record book of Duesenberg Automobile & Motors Co., Inc. is on file in the archives at the Auburn Cord Duesenberg Museum. The new corporation was formed in 1920. The record book has been stamped "Defendant's Exhibit A." Research has failed to reveal in what case this record book was introduced into evidence. Thus, it is likely that another case exists that involved Duesenberg Automobile & Motors Co., Inc.

[63]78 Ct. Cl. 608 (United States Ct. of Claims 1934).

[64]*Morse*, 78 Ct. Cl. at 611.

[65]*Id.* at 611-37. The original Morse engine was filed with the court as well as oil-evacuating and oil supply pumps used in the Liberty Engine. Also, many manuals, drawings, and specifications were introduced as exhibits.

[66]*Id.* at 637. Another Duesenberg case that was unearthed was *Cool v. Duesenberg Automobile & Motors Co., Inc.*, 210 A.D. 807, 205 N.Y.S. 918 (N.Y. App. Div. 1924). There is no reported opinion for this case. The citation is merely a denial of an application. The name of Auburn Automobile Company appears in one other patent case. *Borg and Beck Co. v. Commissioner*, 24 B.T.A. 995 (United States Bd. of Tax Appeals 1931) reveals that in 1914, Auburn Automobile Company was buying clutches from the Borg & Beck Company.

[67]Butler, *supra* note 3 at 27.

[68]No. 16151 (Dekalb Cty. Ind. Cir. Ct., Feb. 29, 1932) (unpublished pleadings on file with the author).

[69]No. 18409 (Dekalb Cty. Cir. Ct., Nov. 18, 1937) (unpublished pleadings on file with the author).

[70]Eggeman, Reed, & Cleland, Fort Wayne, Indiana were the attorneys for Auburn Automobile Sales Corporation. .

[71]The case was dismissed after Auburn Automobile Company had filed for bankruptcy relief. More than likely, the plaintiff gave up hope of ever collecting a judgment against Auburn Automobile Company.

[72]No. 14033 (Dekalb Cty. Ind. Cir. Ct., Dec. 17,1926) (unpublished pleadings on file with the author).

[73]54 P.2d 8 (Cal. 1936).

[74]175 A. 394 (Pa. 1934).

[75]77 P.2d 1059 (Cal. 1938).

[76]197 N.E. 424 (Ohio Ct. App. 1935).

[77]20 N.E.2d 729 (Ohio Ct. App. 1937).

[78]183 N.E. 462 (Ill. 1932).

[79]*Forgan*, 183 N.E. at 463.

[80]137 A. 599 (Pa. 1927).

[81]*Id.* The court held that the finance company had title to the car because the financing documents were executed after the car came into existence. In contrast, the purchase of the Auburn at the time of the order was an executory contract because it was entered into before the car was manufactured.

[82]37 F.Supp. 527 (S.D. N.Y. 1941).

[83]It is unclear from the opinion whether or not Stanton was charged with theft of the Duesenberg or theft of some other car. In any event, the context of the opinion indicates that Stanton was known to be a car thief. Another case that concerned an at least questionable transaction concerning a Duesenberg is *Laursen v. Lowe*, 197 N.E. 597 Ohio Ct. App. 1935). In *Laursen*, a sales representative needed a car that would be more presentable when meeting with rubber company officials. At the time, the Duesenberg Motor Car Company was in the hands of a receiver. A Duesenberg was secured by trading in an old Cadillac, the payment of $2,000 cash, the purchase of some cut-over timberland for $640, and a fictitious mortgage to a "dummy" for $3,200. The court characterized this transaction as "exceedingly questionable." The mortgage was never paid. .

[84]84 F.2d 921 (7th Cir. 1936).

[85]*Duesenberg v. Commissioner*, 31 B.T.A. 922 (United States Bd. of Tax App. 1934).

[86]The cars in question were shipped during the fiscal year ended November 30, 1930. Thirty-one Duesenbergs were shipped during that year.

[87]C. L. Bush, treasurer of Duesenberg, Inc. testified on behalf of the company. .

[88]The legal issue in the case was whether or not Duesenberg had sold the vehicles to the dealers upon shipment despite not receiving payment. If so, Duesenberg would be responsible for the tax associated with the sale. The court held that the cars were sold to the dealers upon shipment.

[89]Duesenberg fell short of its goal as only 480 Model J Duesenbergs were ever produced. Smith, *supra* note 3 at 1030. The car was discontinued in 1937. A high percentage of Duesenbergs survive because they were such magnificent automobiles.

[90]The Model J Duesenberg was introduced in 1928 at the New York Automobile show and achieved instant fame. Smith, *supra* note 3 at 1029. Model J Duesenbergs were fantastic cars with a straight-eight engine that developed 265 horsepower.

[91]31 B.T.A. at 924.

[92]The legal issue in regard to the trademark registration was whether or not the expense of trademark registration could be deducted in a single year when the benefits to be derived from that registration would be derived in future years. The court held that if the registration was for a fixed period of time, then the expense must be deducted over those years. However, if the registration is for an indefinite period of time, the deduction may be taken in one year because it is impossible to determine the future benefits of the trademark registration.

[93]*Amer. Mutual Liability Ins. Co. of Boston v. Duesenberg*, 14 N.E.2d 919 (Ind. 1938).

[94]Smith, *supra* note 3 at 1029.

[95]Respectively 143 So. 6004 (Fla. 1932); 149 So. 801 (Fla. 1933); 84 F.2d 54 (7th Cir. 1936).

[96]The text of several letters of correspondence is included within the opinion.

[97]*Fletcher v. Auburn Automobile Co.*, No. 13425 (Dekalb Cty. Ind. Cir. Ct., 1927) was also discovered in the course of the research for this article. Little is known about the case because it was transferred to the Whitley County, Indiana Circuit Court.

William H. Fletcher, Receiver of the Weidely Motor Company, brought the case against Auburn .

[98]274 P. 428 (Cal. Ct. App. 1929).

[99]Another case involving litigation between a Auburn dealer and a customer is *Sniff v. Wright*, 15 Ohio L. Abs. 427 (Ohio Ct. App. 1933). In Sniff, a customer ordered an "automobile of Auburn make" which was to have "a special finish" and "special upholstery." When the car arrived, the customer refused delivery. The dealer offered to put steel tire covers on the car if the customer would accept it. The customer refused, and the dealer sold the car to someone else. After that, the customer returned to the dealership and indicated that he would accept the vehicle. Upon learning that the car had been sold, he initiated suit against the dealership for the return of his $200 deposit. The court found in favor of the dealership.

[100]Another case involving the financing of a new Auburn Automobile is *David v. Gilbert*, 274 P. 821 (Colo. 1929). In that case, a customer entered into a contract with a dealer for a new Auburn Automobile. The dealer was unable to deliver the car. Accordingly, the customer sued the dealer for refund of the $750 deposit he had paid. R. H. David was the name of the dealer, and his dealership was located in Rio Grande County, Colorado.

[101]22 N.W.2d 869 (Mich. 1946).

[102]Maier testified that "On June 18th Mr. Meyers called me up. He phoned and asked me if I still got this car on the floor. I said yes, and he said, 'You better get rid of it.' I asked him why. He said, 'There is going to be a new model coming out pretty soon; the price is going to be dropped; the car is going to be ready to change; and you will have a big loss if you don't sell it as soon as you can.' And he said, 'Bring it down to me. I got a prospect for the car, and I can sell it for you."

[103]The receipt issued by Meyers Auburn lists the car as a "Cord Sedan; Serial #2,925,653, Motor #641."

[104]115 P.2d 161 (Ariz. 1941).

[105]Roper & Sons Motor Company was located at 541 West Adams Street, Phoenix, Arizona. *Id.*

[106]The transaction consisted of $1,110 credit for the trade in of an Oldsmobile, $800 in cash, and the remaining $500 in 11 monthly installments of $47.40 each.

[107]Lufty paid $3,400 for the 1937 supercharged Cord and was allowed $1,800.87 in trade for his 1936 Cord. The 1937 Cord was purchased from a Cord dealer in Los Angeles, California.

[108]One other case was discovered concerning a dealer and a dispute with a customer. In *Jamison v. Niel Mohr Automobile Co.*, 234 P. 695 (Colo. 1925) a customer bought a Duesenberg from the Niel Mohr Automobile Company and then became dissatisfied with the purchase. The customer experienced mechanical problems and sued for breach of an oral warranty but the Court affirmed a lower court decision disallowing the claim as there had been no breach of the written warranty and affirming a judgment granting the dealer's counterclaim for the balance of the purchase price.

[109]Borgeson, *supra* note 2 at 166-74.

[110]38 B.T.A. 1372 (Bd. of Tax Appeals 1938).

[111]The syndicate included E. L. Cord, Margaret B. Chamberlain, Edna I. Cord, Julia Frische, Ida I. Cord, Lillian B. Montgomery, Norma Frische, Florence H. Pruitt, A. J. Pruitt, Virginia Kirk Cord, Katherine W. Manning, R. S. Pruitt, Cord Corporation, Manning & Co., and L. B. Manning.

[112]In an interview with newspaper reporters on January 13, 1932, E. L. Cord was asked if there was any "pool" among his associates to buy and sell the stock of Auburn Automobile Company. *The New York Times*, Jan. 13, 1932. Cord denied the allegation. This statement was made six months before the syndicate involved in this litigation was formed.

[113]For extensive coverage of the financial operations of E. L. Cord see Borgeson, *supra* note 2 at 166-174. E. L. Cord was involved in extensive investigation by the Securities and Exchange Commission, but was never found guilty of any wrongdoing. These investigations were administrative proceedings and beyond the scope of this article.

[114]The bankruptcy records of Auburn Automobile Company span over 4,000 pages.

[115]*American Central Man. Corp. v. Commissioner*, 8 T.C.M. (CCH) 368; T. C. Mem. (P-H) 49091 (United States Tax Court 1949). Lycoming was able to reorganize and survive the depression. It still exists today, manufacturing aircraft engines.

[116]*Id.* The amended reorganization plan states:

> In consideration of the agreements herein, the debtor as reorganized hereby releases and discharges [Cord Corporation], its subsidiary and affiliated companies and their past and present officers and directors from any claim or demand of any kind or character whatsoever, which the debtor may have had or may now have against any or all of them. Nothing contained herein however, shall in any wise affect the validity of or allowance of claims filed in the reorganization proceedings of the Auburn Automobile Company the debtor, and the Lycoming Manufacturing Company as subsidiary debtor, or the dispositions thereof according to the terms of existing or proposed plans or reorganization.

[117]Auburns, Cords, and Duesenbergs are still involved in litigation from time to time. See *Lutgert v. Lutgert*, 362 So.2d 58 (Fla. Ct. App. 1978) (divorce settlement concerning which spouse receives a classic automobile collection, including a Duesenberg); *Harrah's Club v. United States*, 48 A.F.T.R.2d (P-H) 5133 (United States Ct. of Claims 1981) (whether restoration costs of a Duesenberg are tax deductible); *Shaver Motors, Inc. v. Mills*, 111 Bankr, 186 (N.D. Ind. 1988 (bankruptcy of a manufacturer of replica Auburns); *Woosley v. California*, 838 P.2d 758 (Cal. 1992 (class action involving exorbitant license fees in California with the lead plaintiff a registrant of a 1936 Auburn), and *Hoffman v. Sprinchorn*, 1997 U.S. Dist, LEXIS 3130 (W.D. N.Y. 1997) (breach of contract for the sale of a 1933 Duesenberg J Murphy convertible coupe, serial number 2435 J413).

Auburn At-A-Glance

1900 Auburn Automobile Company established, capitalized at $2,500
Owned by Frank and Morris Eckhart of the Eckhart Carriage Company (founded 1874)
Experimental car — single cylinder, solid tire, tiller steering

1902 First year that cars were manufactured, produced for local market

1903 First national showing at Chicago Auto Show
Chain drive Runabout, Pneumatic tires, 78-inch wheelbase, tiller steering, 6 hp, single cylinder, weight 1,150 lbs., Price $800
Options — oil lamps, front lantern type "search-light," horn

904 Fifty of the above cars were produced

1905 Car became 2 cylinder, 12 horsepower, Price $1,250
Water tank under hood, had fenders and running boards, called "pleasure car", capacity — five adults

1909 New car introduced
4 cylinder, 25-30 horsepower, Rutenber motor, 2 forward speeds, Price, $1,150-$1,650, available in three body styles — Touring, Roadster, Delivery Wagon

1910 Windshields, tops, headlights became standard on 4 cylinder and 6 cylinder models

1911 2 cylinder replaced by a small 4 cylinder

1912 6 cylinder model introduced - Model 6-50
135-inch wheelbase, 37-inch tires, billed, "The Satisfying Car", Price, $3,000

4 cylinder, 26-32 hp., Price, $1,100-$1,750

1918 Eckhart Carriage Company discontinued

1919 Controlling interest of Auburn sold to a group of Chicago financiers headed by Ralph Austin Bard, including William Wrigley, Jr.
Morris Eckhart retained as president; Auburn Beauty-SIX introduced

1919-1922 Disappointing - only 15,717 cars were sold

1923 Roy Faulkner made president in hope of increasing sales

1924 Factory only making 6 cars per day
Errett Lobban Cord became general manager, sold 700 touring cars which had been standing in factory parking lot - netted $500,000, paid Auburn's debts and became vice-president

1925 Sales doubled over last year
8-63 introduced - straight-eight, L-head Lycoming engine

1926 E.L. Cord became president of Auburn Automobile Company at age 32
1,189 cars exported

1927 Popular roadster introduced
2 tone color, wire wheels, sloping windshield, rumble seat with door, Price $1,695

Over 2,000 cars exported, rank rose from 40th to 11th in U.S. auto exporters

1928 Factory site comprised 12 city blocks of Auburn
Boattail speedster introduced for both 88 and 115 chassis
V-type windshield, golf bag locker, high raked doors, 180 inches long, 56 inches high, side mounts, disappearing top

1929 22,000 cars sold, 1000 percent increase since 1924
Prices —
8 cylinder — $1,795-$2,145 $1,395-$1,695
6 cylinder — · 995-$1,095
4 cylinder — discontinued after 1927
Slogan used, "Once an Owner, Always a Friend."
Cord Corporation formed as holding company for Auburn, Lycoming Motors, Duesenberg, and others
L-29 Cord introduced, Model J Duesenberg introduced, Auburn net income, $3,500,000

1930 Sales fell to 13,700; Net income fell to $1,000,000

1931 Sales rose to 28,103
1,000 new Auburn dealerships established
Auburn rose from 23 to 14 in retail sales (U.S. companies
Power, weight, and speed rated 8-98 with highest priced cars by insurance companies

1932 V-12 introduced, same body as 8, stronger components
Price, 2 passenger coupe, $975; 391 cubic inch, 160 bhp; 11,000 cars produced
Company lost $974,751

1933 6,000 cars produced

1934 Low priced 6 cylinder car introduced
8 cylinder reduced from 10 to 7 models
Auburn dropped to 21 in national standings
Cord placed L.B. Manning in charge of empire
Harold Ames (President, Duesenberg) became vice-president of Auburn
August Duesenberg became chief engineer
Gordon Buehrig became chief designer

1935 851 introduced
Supercharged; 115 hp at 3,500 rpm; 150 hp at 4,000 rpm; dual ratio rear axle and three speed transmission combined to produce 6 forward speeds

Speedster
127 inch wheelbase; 500 built; Price $2,245
Hundreds of dollars lost with each model sold; Speedster was hoped to boost sales of all Auburns

6 cylinder Auburns sold for around $795
Sales rose 20 percent, no profit realized

1936 851 became 852
Cord resumed active management
852, 4 door convertible; Price $1,800
From January to October 4,830 cars produced, last cars made

1937 In August, Cord sold holdings to Emanuel & Co., Schroder, Rockefeller and Co., and to a group of associates headed by Manning
Manning became president of Auburn
In October, a Wall Street source announced no more Auburns would be produced

1938 In June, Auburn Automobile Corporation service and production inventories along with Auburn Administration Building sold to Dallas Winslow, Inc.

Credit: Auburn-Cord-Duesenberg Mueseum

If Only in Another Time... The Story of The DeVaux-Hall Motors Corporation

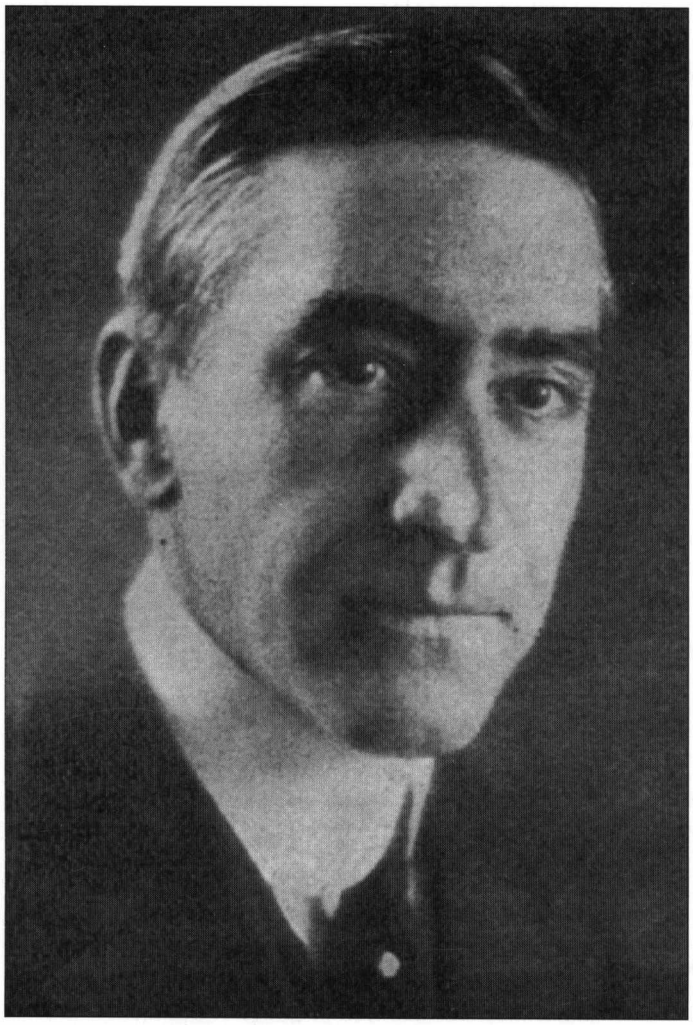
by Keith R. Jones

In the middle of 1930, at the beginning of the worst economic depression this country has ever known, two men of impeccable business, engineering, marketing and manufacturing pedigree set out to create a company and an automobile that would take the motoring world by storm. The company was the DeVaux-Hall Motors Corporation. The automobile was the DeVaux. This is their story.

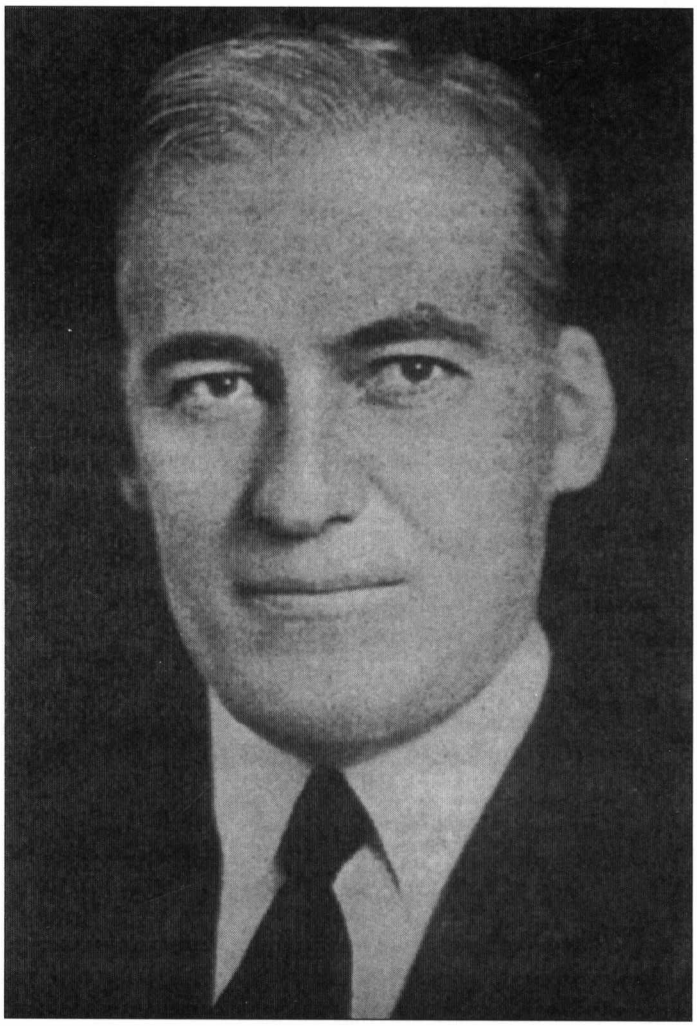
Norman de Vaux

Born on December 3, 1876, in Louisville, Ohio, Norman de Vaux was seemingly successful in every venture. His first great accomplishment was in 1896, when he set the transcontinental bicycle record by riding from New York to San Francisco in 47 days.

De Vaux's first experience in the automotive industry was selling single-cylinder Cadillacs in 1903. He then had stints as a factory representative, then a west coast distributor for Buick. It was during this time that he forged his relationship with William C. Durant, founder of General Motors. Later de Vaux was made northern California distributor for the Auburn automobile and West Coast distributor for the Reo Company and would eventually become the head of the Reo Pacific Company. De Vaux became the northern California distributor for Chevrolet, which, at the time, was a relatively new brand without much sales history. De Vaux was so successful in selling Chevrolets in California that Durant built an assembly plant in Oakland, California, to supply the new demand. When that plant opened for production in 1916, de Vaux was President, General Manager and half-owner of the Chevrolet Motor Company of California. The Oakland plant manufactured cars for all markets west of the Rocky Mountains and all Pacific export markets. In 1921, de Vaux sold his interest in the Chevrolet Motor Company



Norman de Vaux



Col. Elbert J. Hall

of California to General Motors for $4,000,000. He retained his title of President and General Manager and earned a substantial salary, until he resigned in 1922. After being ousted from General Motors a second time, in 1920, Billy Durant founded Durant Motors in 1921. Durant once again turned to his old colleague deVaux and awarded him the exclusive distributorship for the Star automobile in the seven Pacific coast states. After three very successful years in this venture he was named President of the Durant Motor Company of California. It was this title he held until he decided to manufacture arid market his own car with esteemed engineer Colonel Elbert J. Hall.

Colonel Elbert J. Hall

Shortly after the turn of the century, Elbert J. Hall became known in the San Francisco area as a specialist in motor car repair. This interest in automobiles evolved into a desire to design and build his own cars. By 1907, he was building Sunset racing cars, which were some of the fastest vehicles of the time. It was the convention of the day to build large racing cars with large piston displacement, low revolutions-per-minute engines. Hall scoffed at convention by building extremely light, nimble cars that were powered by small, high-revving engines. Hall's Sunset cars were so successful that they were eventually made illegal on the race tracks and labeled as specialty autos.

In 1908, a Stanford University student by the name of Bert Scott requested that Hall build an automobile for him. Scott was so impressed that the two formed the Hall-Scott Motor Company, which later produced marine engines. These engines were used by the United States Coast Guard and regarded as the finest in their fleet. Hall-Scott engines also became widely used in the aviation industry. In 1910 Hall designed and built a gasoline engine for the railroad industry. He also designed and built engines for the Holt Tractor Company, which later became the Caterpillar Tractor Company.

At the beginning of World War I, Hall was drafted into military service and commissioned as a colonel. He was charged with designing an advanced engine for military aircraft. He, along with Col. J. G. Vincent, designed what came to be known as the "Liberty" aircraft engine. The development of this engine led to Hall being awarded The Distinguished Service Medal by Congress.

Hall served as consulting engineer to Henry Ford during 1920 and 1921. He then designed a new six-cylinder engine for Buick. In June of 1930, he was serving on the committee of the American Car and Foundry Corporation, a builder of rail cars, when Norman de Vaux contacted him with a proposal to start their own automobile company.

The Economy of the Time

The worst economic period in the history of the United States began on October 29, 1929, when the New York Stock Exchange crashed. This set off an economic depression that was felt around the globe. The Great Depression bridged the gap between the "Roaring 20s" and the Second World War.

The Depression took an exceptionally hard toll on the automotive industry. During this time many well-established companies went by the wayside, including: Gardner, Roamer, Moon, Durant, duPont and American Rolls-Royce. The Big Three also took a stranglehold on the American market by capturing a 90-percent combined share.

It was at the beginning of The Great Depression that Norman de Vaux decided to take a risk on his dream.

Formation of the DeVaux-Hall Motors Corporation

In June of 1930, Norman de Vaux contacted Col. Elbert Hall to propose the two industry veterans design, build and market an automobile that would be "an exceptional motor car" in the low-priced field. According to company literature,[1] Hall accepted almost immediately. He also bought a large number of shares of the newly formed company's stock. The new company was named the DeVaux-Hall Motors Corporation.

Hall quickly went about designing the company's first product. In December 1930, de Vaux purchased control of the Durant Motor Company of California, which basically consisted of the Oakland assembly plant mentioned above, and immediately ceased producing cars in Durant's name. Instead, the assembly plant in Oakland would be used as the western production center for the car Hall was designing. Grand Rapids Michigan, was chosen as the company's headquarters and its eastern center of production, due to its being the home of the Hayes Body Corporation, its proximity to Continental Motors Corporation's Muskegon, Michigan, plant and, reportedly, due to "an adequate number of skilled workmen available and workmen of the steady type, who owned their own homes. There did not exist in Grand Rapids the drifting element found in other industrial centers."[2] De Vaux negotiated a lease of an existing Hayes plant and a contract for Hayes to supply the bodies for the new DeVaux-Hall product. This plant was located directly across the street from the main Hayes facility. Both the Oakland and Grand Rapids plants were ready for production within four months of the formation of the company, a blink of the eye by today's standards.

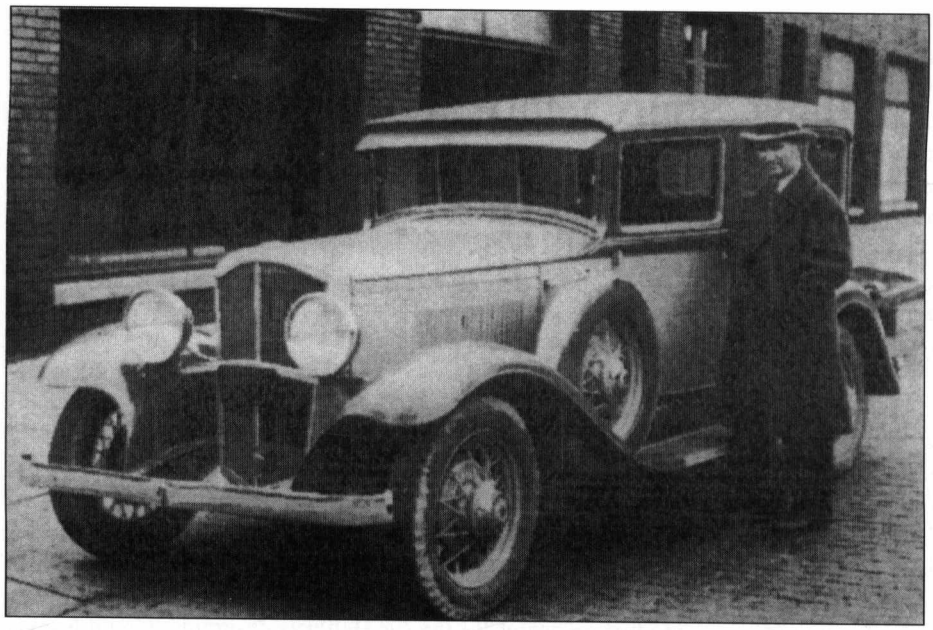
Development and Pre-production of the DeVaux 6-75

Hall and his chief engineer, R. Leon Smith, spent the second half of 1930 developing the DeVaux-Hall Motors Corporation's first product, to become known as the DeVaux 6-75. The body of the DeVaux was designed by Count Alexis De Sakhnoffsky, art director for Hayes Body Corporation.

De Sakhnoffsky was reportedly disappointed with the end result of his work, feeling Hall and Smith had constrained him too much by the "stubby" length of the car.[3] Despite De Sakhnoffsky's objections, "The car was attractive enough, with pleasing, if not advanced styling, highlighted by the 'Vee' radiator grille."[4] The car was tested by Earl Cooper, who had gained fame on the race tracks, driving for the Stutz team and for a Durant team in 1922-23.

Cooper, a lifelong friend of Hall's, had been made chief testing engineer.

According to company documents, the first DeVaux ran on December 29, 1930, on which date de Vaux and Hall themselves tested the car. This test drive revealed capabilities of their new car "beyond anything we have experienced in any price class".[5] On January 12, 1931, the first cars were shown at the Chicago Auto Show, with showings to follow two weeks later at the Los Angeles Auto Show.



Earl Cooper with a prototype 1931 Custom sedan

Company-published literature[6] suggests that distributors and dealers were licking their chops to get a piece of the DeVaux pie. This literature reported that more than 1,100 applications for sales territories were received before the first production vehicle rolled off the line. One of those awarded with sales territories, George W. Browne, reportedly camped at the Grand Rapids site. awaiting the first production vehicle, which he then drove to his home territory of Milwaukee so that his dealers could use it as a demonstration vehicle.

Production of the DeVaux

On April 6, 1931, production was launched at the Grand Rapids site, with 8,000 orders already having been placed. By April 25, 1931, Grand Rapids was producing 65 units per day.[7] According to the company, material shortages, not inefficiencies or lack of orders, were constraining production. On April 15, 1931, production began at the Oakland site. By late May, 1931, the Grand Rapids site was producing 125 units per day, while the Oakland site was producing 50 units per day.[8]

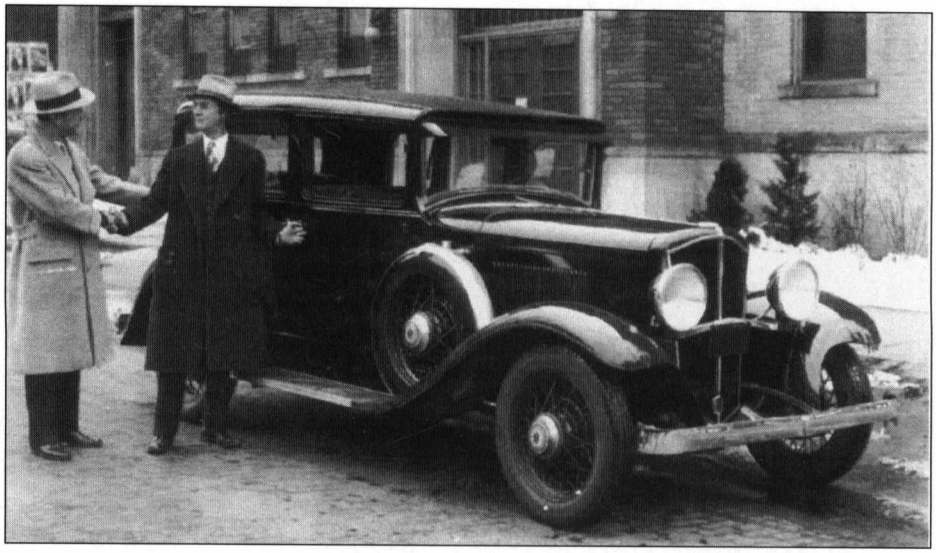
A "Fall Series" DeVaux 6-75 was introduced by the end of the summer of 1931. A model year 1932 DeVaux 6-80 was also introduced. A substantial list of improvements was made for both of these new models, including "free-wheeling" beginning with the "Fall Series." It was not uncommon in that time for there to be many improvements necessary shortly after introduction, but, in this case, these changes might also have been a signal that sales, and margins, were not what the company had expected, or required to survive.

The Demise of the DeVaux

On September 25, 1931, DeVaux's sales manager sent a letter to his dealers that hinted that the end of the "Exceptional Motor Car" was drawing near, less than five months after it was born. This letter, which opened by introducing the "Fall Series" and all the improvements contained therein, continued to blame low production volumes on material shortages. It also contained an enclosure which detailed price increases for all models, except the four-door sedan, which had a wholesale price increase, but not one in retail price. The letter went on to announce that the cost of operating two production sites was "far too great." Production would immediately cease at the Oakland site. The Oakland site was to recommence production on January 1, 1932. This day came and went, but no DeVaux was ever assembled in Oakland. The letter concluded by saying that the advertising budget had been increased to $40 per unit. At more than four percent of retail price, that advertising budget would be daunting even by today's standards.[10]

By the end of 1931, only 4,315 DeVaux automobiles had been assembled. That placed them 24th out of 28 American automakers in sales. The only manufacturers behind them, Pierce-Arrow, Franklin, Cord and Lincoln, were all up-scale models. This was not good news for the DeVaux, which was priced just above the "Big Three." The sales figures for 1932 were gaunt, even in comparison with 1931. DeVaux had slipped to 28th, ahead of only Cord, which ended production during the year, selling only 1,239 vehicles.[11]

On February 13, 1932, the DeVaux-Hall Motors Corporation found itself unable to pay its creditors and officially went into receivership. One of its creditors, Continental Motors Corporation, bought the Michigan-based assets of the company,



Distributor George W. Browne with a 1931 Custom Sedan

but not the company itself. On April 1, 1932, in an attempt to generate some cash out of the existing material inventories, Continental resumed production of the DeVaux 6-80. Having no more success at producing and selling the DeVaux than did its creators, Continental permanently ceased production of the DeVaux at the end of the 1932 model year but would continue to build its Continental Ace, Flyer, and Beacon into 1934.

Norman deVaux after the Fall

Norman de Vaux was a financially broken man after the fall of his company and the car bearing his name. He had invested seventeen million dollars in the corporation. After its fall, he was left with nothing.[12]

While de Vaux was broken financially, his spirit was still very much alive. In 1936, he announced the formation of the De-Vo Motor Car Corporation. This company was to manufacture a five-passenger sedan with a Continental four-cylinder engine, which would attempt to compete, as did the DeVaux, in the low-priced field. Only a pilot De-Vo was ever built (more or less a Continental Beacon) and not much of the company was heard after the formation announcement. The single De-Vo surfaced in South Africa many years later.

In 1938, de Vaux convinced Hupp Motor Car Corporation that the styling of the 1936-37 810/812 Cord, which had been produced by Auburn Automobile Company, could be successful with a powertrain that was less expensive than the complex one which Auburn had implemented. De Vaux, acting as an agent for Hupp, purchased the body dies and tooling. Hupp was to use the equipment and parts to manufacture a rear-drive entrant in the mid-price field, the Hupp Skylark. The Skylark was never mass produced by Hupp. Production was later taken over by the Graham-Paige Motors Corporation, which produced both the Hupp Skylark and the nearly identical Graham Hollywood. After producing less than 2,200 Skylarks/Hollywoods, Graham Paige ceased production of the platform in the fall of 1940. The death of the Skylark marked the end of de Vaux's career in the automobile industry.

In the 1940's, de Vaux had one last financial success when a venture he led discovered copper ore in Arizona. He then took his mining earnings and purchased a ghost silver mine outside of Superior, Arizona. There "he and his wife—she who had set a table of engraved silver and rare china in her own mansion—lived like hermits in an unpainted shack in a hot, barren canyon."[13]

In July, 1964, Norman de Vaux died in Gainesville, Florida at his daughter's house, where he spent the last three months of his life.

If Only in Another Time

Could the DeVaux-Hall Motors Corporation have survived, or even thrived, in better economic times? This question can never be answered, though conventional wisdom would tell you that it certainly would have had a better opportunity. Ironically, the automobile industry's success in the late 1920s magnified its failure in the early 1930s, in that over five million cars and trucks were sold in 1929 alone. This produced a saturated market. Those few people who could afford new automobiles in 1931-32 were, most likely, able to purchase a product priced far above the DeVaux and with a more established reputation. For those who actually needed a car, but could not afford a new vehicle, there were plenty of used cars available.

One also has to wonder if the pride and confidence of the two founders of the company might also have led to the demise. Company sales literature boasted that the venture was completely financed by its founders.[14] Offering stock in the company to the public might have raised the capital necessary to withstand the hard financial times of 1931-32.

Acknowledgement

The bulk of the information in this paper was obtained from the private research collection of noted DeVaux authority Howard E. Reinke, who authored "The DeVaux-Hall Independent" column for Durant's Standard *magazine from August 1992 until February 1996. Howard also provided the inspiration for this paper as his love for, and knowledge of, the DeVaux is unmatched. The author provided the illustrations for this article.*

Footnotes

[1]*The Men Behind the DeVaux* was published June 6, 1931 by the DeVaux-Hall. Motors Corporation.

[2]"Why Grand Rapids?" *The Grand Rapids Press, Extra Addition*, March 19, 1931.

[3]Richard Larrowe, "The DeVaux Automobile," *Antique Automobile*, March-April, 1972.

[4]J.I. Godshall, "DeVaux—Continental," *Autoenthusiasts International*, January-February, 1970.

[5]Howard E. Reinke, "DeVaux—Hall Independent," *Durant's Standard*, May, 1993.

[6]See footnote 1.

[7]Godshall, op. cit.

[8]Godshall, op. cit.

[9]"Free Wheeling" was a feature that allowed the transmission not to be engaged when the foot was removed from the accelerator, which was to improve gas mileage by allowing the car to coast.

[10]Howard E. Reinke, "DeVaux-Hall Independent," *Durant's Standard*, August, 1995.

[11]Keith Marvin, "The Tragedy of the DeVaux," *The Upper Hudson Valley Automobilist*, June, 1965.

[12]Id.

[13]Don Dedera, "Better to have Lived and Lived," *The Arizona Republic*, August 13, 1964.

[14]See footnote 1.

Fiat as a German Manufacturer

by Peter Engelhard

Introduction

Today, Fiat is the embodiment of Italian auto manufacturing. However, for quite a long time, Fiat was also considered to be a domestic manufacturer in Germany. For 40 years—from 1929 until 1969—the Turin-based company maintained a production plant at Heilbronn, Germany. Fiat S.p.A. founded NSU-Automobil-AG in January 1929 to acquire the facilities of the ailing NSU company. Until the late 1960s, passenger car production was maintained there under the NSU-Fiat brand, which later became Neckar.

Around 1906, Emile Mathis of Strassburg (Strasbourg after 1918), later the manufacturer of the Mathis car, obtained a monopoly on selling Fiat in Germany, Switzerland and Luxembourg. In 1914, Deutsche Fiat GmbH Berlin was formed, with Mathis as the chief executive officer. After World War I, the Bayerische Fiat-Vertriebs GmbH, München, was founded in 1920 to import Fiats, changing its name in 1922 to Deutsche Fiat-Automobil-Verkaufs AG ("Deutsche Fiat").

Thus, for many years Fiat was represented in Germany not only by products built by a Fiat-owned subsidiary but also by cars imported from Italy by an independent source.

The German automotive industry in the 1920s

In the late 1920s, Germany was only on the verge of large-scale motorization while the United States already had developed into a highly motorized society. In the USA, the automotive industry had become a powerful part of the economy due to the success of Ford and General Motors in building up mass production. In Germany, on the contrary, manufacture of motor vehicles still obeyed more or less the principles of craftsmanship. Output predominantly consisted of high-quality vehicles in small quantities.

In the early 1920s, barriers of trade protected German manufacturers from cheaper imported cars. In addition, general economic conditions in Germany adversely affected the development of a modern style production of automobiles. The industry faced the huge task of transformation from war to civilian production. Reparation payments to the victorious powers of World War I had a negative effect on German prosperity. The once buoyant middle class was severely impoverished by hyperinflation during the early postwar years.

Only in the second half of the 1920s, the so-called "Roaring 20s," did economic recovery gain pace. German production of passenger cars grew by an impressive 165 percent from 1925 to 1926, peaking at over 101,000 units in 1928 (total passenger car registrations in Germany rose from 171,445 in 1925 to 342,784 in 1928). Even in 1929, production maintained a relatively high level of over 92,000—despite the emerging worldwide economic crisis. Compared to the contemporary annual output of American manufacturers, those were very modest volumes. However, the foundations of German mass motorization were laid in these years of the late 1920s.

Numerous new manufacturers pushed into the market, trying to profit from the emerging prosperity by offering low-priced products. Most of those attempts were rather short-lived. But also the first serious moves towards mass production in Germany occured in the mid-1920s. For instance, Hanomag can be considered to be one of the first domestic volume-makers of passenger cars. Hanomag launched its simple, but sturdy and affordable model 2/10 HP in 1925, thus contributing significantly to the motorization of the revived German middle class.

However, most German attempts to set up mass production in the mid-1920s relied on foreign assistance. Starting in 1924, Opel produced the 4 HP model ("Laubfrosch"), almost a copy of the 5CV Citroën. When production of this model ceased in 1931, it added up to a total of 120,000 units—a huge success under German conditions at that time. In terms of volume, Opel became the largest German manufacturer. In 1928-29, when the German market began to slip, Opel was taken over by General Motors. In the medium- and long-term perspective, this turned out to be very favorable. Owing to the steady refinement of modern principles of mass production, Opel kept its position as German market leader until World War II.

One event was an overly important trigger for the modernization of the German automotive industry. Import duties were lowered significantly in 1925. Although barriers to trade still remained relatively high, imported cars suddenly gained a large share of the domestic market. Consequently, German manufacturers were forced to substantially rationalize production processes.

In addition, it became attractive for foreign manufacturers to set up facilities in Germany, assembling imported complete knock-down (CKD) kits. Not many of these ventures were of lasting significance. However, one of the few exceptions to this rule was Ford. From modest beginnings, a fully integrated domestic production emerged at Cologne in the early 1930s. Also Ford became one of the protagonists of German mass motorization.

Fiat in Germany

Fiat pursued a more modest, however lasting, approach in Germany. Deutsche Fiat had imported and sold Fiat cars in Germany since the early '20s. In 1925 the models 509 and 509A reached the German market, promoting Fiat as a popular brand among domestic drivers.

In 1928, Fiat envisaged the opportunity to establish itself more firmly in Germany by acquiring manufacturing facilities. Due to the hazardous speculation of its owner Jacob Shapiro, NSU Vereinigte Fahrzeugwerke AG began to experience financial troubles in 1928. As a consequence, the Dresdner Bank took over 51 percent of the company's capital. The remainder was offered to Deutsche Fiat AG.

NSU was originally based at Neckarsulm. However, it erected a brand new factory near Heilbronn in 1925 to produce

Fig. 1 – NSU Fiat 1000 (around 1935)

NSU cars. This plant was acquired by Fiat S.p.A., and operated under the name NSU Automobil AG.

The Heilbronn plant produced a fairly unsuccessful model, the NSU 7/34 HP, until 1931. That car was replaced by a completely new vehicle, which reached the market as "NSU 10/52 HP License FIAT." Complete Fiat 522 chassis were imported from Italy, and bodies were added in Germany: sedans by Weinsberg and convertibles by Drauz. Sales of the NSU-Fiat 2500 as it was called from 1932, however, turned out to be unsatisfactory. The main customer was the Berlin-based cab company Kraftag, which had been established by Fiat itself in order absorb the production of the hapless 7/34 HP.

Separately, Fiat acquired Dresdner Bank's 51 percent of NSU in 1929, so that the company was now owned by both Fiat of Italy and Deutsche Fiat. NSU's Neckarsulm plant turned out to be particularly inefficient, resulting in Deutsche Fiat's sale of its 49 percent of NSU to the Deutsche Bank in 1932. Car production was abandoned at Neckarsulm soon after. Instead, NSU concentrated on manufacturing motorcycles. The NSU brand was exclusively used by the Heilbronn based NSU Automobil AG, 51 per cent of which was still owned by Fiat.

As the world wide Depression bottomed out, German market conditions began to recover in 1934. Fiat also recognized better prospects for sales. Thus, the Heilbronn factory was furnished to assemble the small Fiat 508 Balilla. This model had already been a success in Italy and was introduced to the German public as the NSU-Fiat 1000 in February 1934 (Fig. 1). In the first year, about 1,100 cars were sold. The NSU-Fiat 1000 remained in production until 1938 when it was replaced by the modernized NSU-Fiat 1100.

In 1936, the mid-sized NSU-Fiat 1500 sedan was added to the German-built program, remaining in production until 1941 (an attractive Gläser-bodied convertible was also offered). In 1937, the Heilbronn plant began deliveries of the small NSU-Fiat 500—its first model which really had the potential to become a genuine mass market product (Fig. 2). Also part of the lineup was the Fiat 500 Spider Sport, with a steel body by Weinsberg (Fig. 3).

Fig. 2 – 1938 NSU Fiat 500

Sales Deutsche Fiat AG 1937-1940

(estimated values)

FIAT 500, NSU-FIAT 500	1937-(1941)	7.400
NSU-FIAT 1000	1934-1937	6.400
NSU-FIAT 1100	1938-(1941)	5.300
NSU-FIAT 1500	1936-(1941)	4.200
Total		23.300

Table 1

In Italy, the Fiat 500—nicknamed "Topolino" (also the affectionate name for Disney's Mickey Mouse)—was already a success. In Germany, however, due to preparations for war, acquiring raw materials began to be a bottleneck for passenger car production. This obstructed the launch of the NSU-Fiat 500. For example, the originally planned all-steel body had to be replaced by an inferior structure of plywood coated with

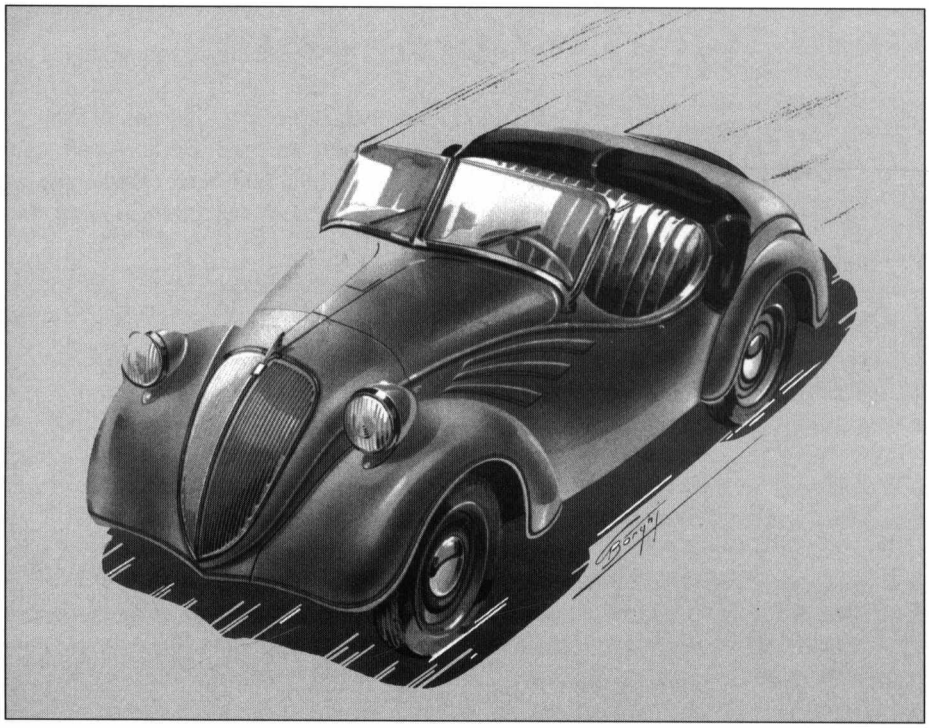


Fig. 3 – 1937 NSU Fiat 500 sport spider, body by Weinsberg

synthetic leather. By the end of 1941, manufacturing of civilian passenger cars had stopped entirely at the Heilbronn plant—as it was the case for most German manufacturers at that time.

Towards the end of the 1930s, NSU-Fiat had acquired a relatively stable position in the German market. Market share hovered between 2.1 percent and 3.3 percent, while the average of the years 1931 to 1938 reached 2.5 percent of new passenger car registrations. From today's point of view, this appears to be a far too small volume in order to justify a fully integrated domestic production.

However, this was sustainable for NSU-Fiat at that time. NSU-Fiat's market share still ranked ahead of Hansa/Borgward, another prominent domestic manufacturer specializing in the lower- and middle-price segments. Both NSU-Fiat and Hansa/Borgward managed to survive the Second World War and to play their role in the German automotive business well into the 1960s.

With the introduction of the NSU-Fiat 500 in 1937, the company's market share clearly was on the rise. Due to World War II, the 500 could never realize its potential in Germany. Large scale motorization clearly gained momentum in the late 1930s, manifested in the success of volume manufacturers such as Opel and Auto Union's DKW. And the 500 definitely was a player in Europe—Fiat's assembly lines churned out a total of approximately 120,000 Topolinos between 1936 and 1948 which was considered quite a success under European conditions of that time. Being affordable and economical, it is very likely that it would have found its acceptance in the fast growing German market, too, if there had not been the disruptive events of World War II.

NSU-FIAT after World War II

After World War II, Deutsche Fiat AG resumed production at the Heilbronn plant in 1950. The first cars coming off the line were NSU-Fiat 500Cs. The 500C was the successor of the Italian 500B, an interim model which had replaced the pre-war 500 "Topolino."

The 500C was introduced to the European public at the Geneva Salon in 1949. It was quite a solid little car. Compared to many other contemporary vehicles in the small car segment it certainly was a superior offering. Nevertheless, output at the Heilbronn plant remained modest in the early 1950s. In 1952, it peaked at 4,275 units. This corresponded to approximately 2.1 percent of total passenger car production in Western Germany. However, the production volume of the 500C again was quite comparable to other smaller German marquees of the time, e.g., Borgward's Goliath 700/900. Unique to Germany, the coupe Weinsberg 500 was offered (Fig. 4).

In 1953, NSU-Fiat introduced an all-new mid-sized car, the 1100, which was developed by FIAT in Turin. The 1100 was updated six times and remained in the Heilbronn product line-up until 1968. Beginning in 1956, it was offered under the brand name NSU-Fiat Neckar. Fiat of Italy worked carefully on

Fig. 4 – NSU Weinserg 500 coupe

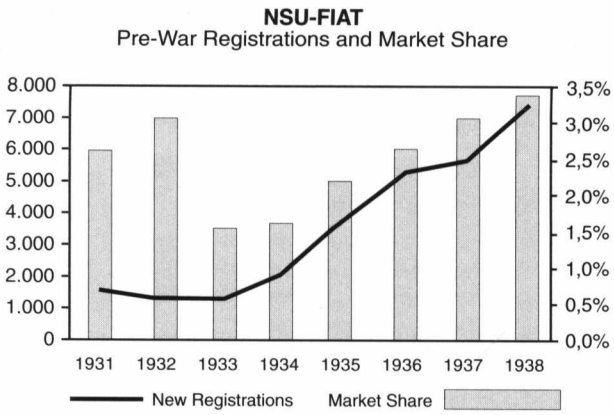


Table 2

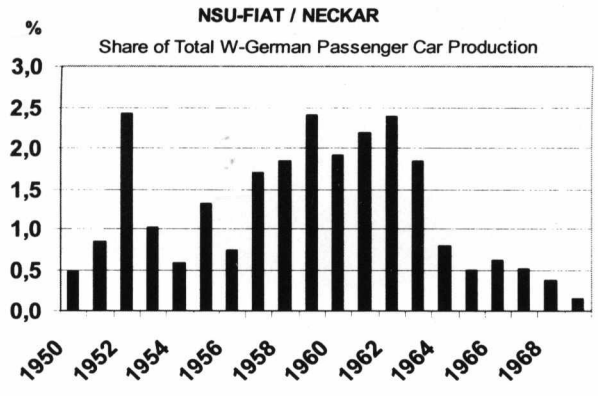


Table 3

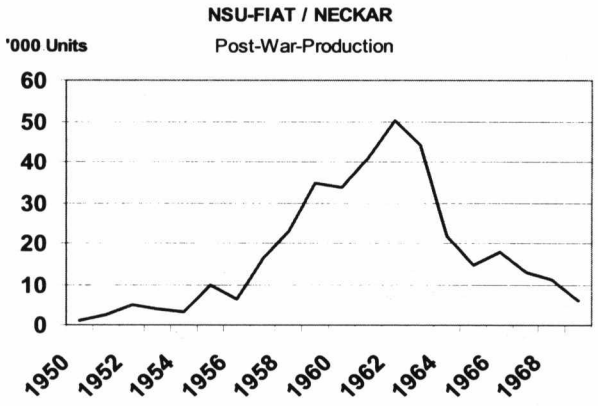


Table 4

model policy and NSU-Fiat benefited from that. Thus, the 1100/Neckar was a competitive offering until it was taken out of production (Fig. 5).

In the small car segment, the 500C was replaced by the NSU-Fiat Jagst in 1956 (Fig. 6). Launched by Fiat Turin one year before as the 600, the car was considered to be a completely new product of high originality. In Germany, it first came off the line equipped with a 633 cc four-cylinder engine. In 1960, engine size was increased to 767 cc. With this displacement the vehicle was sold until 1964 as the NSU-Fiat Jagst 770 (Fig. 7). It was replaced by the slightly modified Jagst 2 which was part of the Heilbronn-built program until 1969. That year production of the original model Fiat 600 stopped in Turin, too. For Fiat, the 600 was something like its first world car. Besides Germany, it was also manufactured at Fiat's branch plants in South America. Licenses were assigned among others to the Spanish SEAT and the Yugoslav Zastava works. Thus, to a large extent the 600 contributed to the motorization of the Balkans and the Iberian peninsula. Worldwide production of the 600 totalled 2.5 million units between 1955 and 1969. In Yugoslavia its production continued until 1981. In Germany this car proved to be so popular that there was a demand for it on the local market even after 1969. Thus, until 1973, 600s were imported from the Spanish manufacturer SEAT.

Until 1955, postwar manufacturing at NSU-Fiat Heilbronn mostly hovered around a modest 1 percent of the entire West German annual production volume. The situation somewhat changed with the introduction of the NSU-Fiat Jagst and a reworked version of the 1100 Neckar in 1955-56. In 1957, total passenger car production at NSU-Fiat reached 16,000 units and peaked in 1962 at more than 50,000 units. Between 1959 and 1963 there were even beginnings of its own model policy when the Weinsberg body works equipped small quantities of the imported new Fiat 500 small car with distinct, sporty body shells.

Fig. 5 – NSU Neckar sedan, early 1960s

Fig. 6 – NSU Jagst

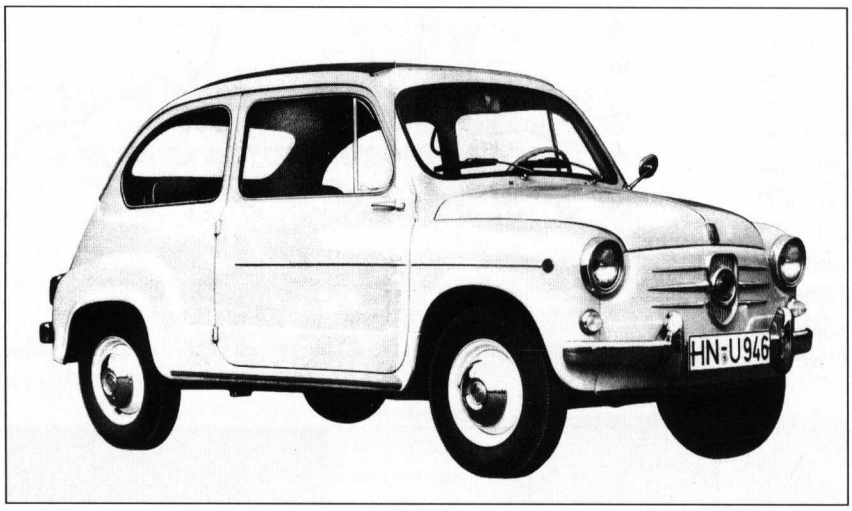


Fig. 7 – NSU Jagst 770. Note relocation of parking lamps.

In 1958, Neckarsulm NSU took up again the manufacture of passenger cars which it had abandoned in the early 1930s. As a consequence, Deutsche Fiat AG considered it to be inappropriate to use the NSU-Fiat label anymore. Instead, Fiat cars built at the Heilbronn plant would be marketed under the "Neckar" brand. However, production of Fiat vehicles in Germany reached its zenith in 1962. In 1964, production volume was half that of the previous year and eroded steadily over the following years. In 1968, production of the mid-sized Neckar 1100 was abandoned; in 1969, the Jagst/770 line was shut down, too. Until 1973, Complete knock-down (CKD) kits of the Fiat 124, 125 and 128 sedans were still assembled at the Heilbronn plant. Then, the factory was converted into repair facilities of the Deutsche Fiat AG.

Two factors caused the demise of NSU-Fiat/Neckar. First of all, minimum volumes for economical car production steadily rose on the 1960s. It was a time of consolidation for the German automotive industry which saw several manufacturers either leaving the marketplace or being taken over by larger competitors (e.g. the Borgward group, DKW, Glas). Thus, the limited capacities at the Heilbronn plant turned out to be no longer economically feasible.

Second, barriers of trade were successively removed in postwar Europe and the integration of markets steadily moved ahead. Finally, the owner of the Heilbronn plant, Deutsche Fiat AG, always had been the German importer of Italian-built Fiat vehicles, too. A total of about 300,000 Fiat 600/770 Jagst were sold in Germany, about 178,000 of them built in Heilbronn. When barriers of trade came down in the European Union, a separate German production site made less and less sense to Fiat. Costs of transport being relatively low, economies of scale could be better realized by concentrating production in Turin. The German market could be served from Italy as well.

Generally, the cars built in Heilbronn enjoyed a good reputation as modern and economical vehicles. But in terms of feasible marketing, the parallel existence of two brands, Fiat and NSU-Fiat/Neckar, with overlapping model portfolios turned out to be increasingly impractical. The traditional trademark NSU-Fiat was given up in 1958 and replaced by the rather generic Neckar trade mark but the two brands were more or less the same.

In any event, NSU-Fiat and Neckar cars always were a more or less marginal phenomenon in the German postwar market. Even when output peaked in 1962, this corresponded to only 2.4 percent of the West German total production. Thus, in terms of volume NSU-Fiat/Neckar lagged far behind other German manufacturers. Facing accelerated concentration of the automotive industry, this proved to be rather dysfunctional. Already in the course of the 1950s, a number of smallish German manufacturers had disappeared. The 1960s, however, saw a large-scale demise of medium-sized manufacturers. It began in 1962 when the Borgward group collapsed. Production of all three Borgward brands (Borgward,

NSU-FIAT / NECKAR

Relative Manufacturing Performance

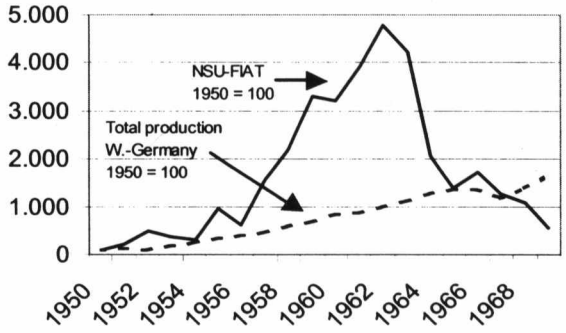


Table 5

NSU and NSU-FIAT

1923 Jacob Shapiro acquires majority of Neckarsulmer Fahrzeugwerke AG (NSU)

1926 Merger of Neckarsulmer Fahrzeugwerke AG (NSU) with Schebera Automobilwerke AG } NSU Vereinigte Fahrzeugwerke AG, Neckarsulm

1927/28 Completion of a new plant at Heilbronn

1928 Dresdner Bank acquires 51 % of NSU Vereinigte Fahrzeugwerke AG, Neckarsulm; Deutsche Fiat AG 49 %.

1929 Deutsche Fiat AG acquires Heilbronn plant from NSU Vereinigte Fahrzeugwerke AG } Creation of NSU Automobil-AG, Heilbronn; owner: Deutsche Fiat AG

↓

NSU-FIAT

↓

1932 Deutsche Fiat AG sells its stake in NSU Vereinigte Fahrzeugwerke AG, Neckarsulm, to Deutsche Bank AG

NSU Vereinigte Fahrzeugwerke AG gives up production of passenger cars

1937 NSU Vereinigte Fahrzeugwerke AG, Neckarsulm renamed into NSU-Werke AG

↓

1958 NSU-Werke AG takes up passenger car production again.

NSU Automobil-AG, Heilbronn, renamed into Neckar Automobil-AG

↓

1969 Volkswagen acquires NSU-Werke AG, merges NSU-Werke AG and Auto Union GmbH into Audi NSU Auto Union AG.

Production of Neckar cars terminated

↓

1973

Assembly of Fiat-Cars at Heilbronn plant terminated

↓

1977 Production of NSU-cars terminated

Goliath and Lloyd) peaked in 1959 at 90,000 units (n.b., peak volume of NSU-Fiat was about 50,000 units in 1962). The same year, Volkswagen turned out 575,000 units of the Beetle, Opel produced nearly 312,000 units (allocated on three model lines), and Ford 130,000 (two model lines). Even Mercedes-Benz produced 108,000 up-market passenger cars. In 1965, Auto Union DKW was bought by Volkswagen and transformed into Audi. Volkswagen also swallowed the Neckarsulm NSU works in 1969. Bavarian manufacturer Hans Glas GmbH, which had taken up passenger car production as late as 1959, was taken over by BMW in 1966.

However, it is an interesting fact that in relative terms, in the postwar years, NSU-Fiat was far more dynamic than the German automotive industry as a whole although total volumes remained small.

Nevertheless, overall conditions turned out to be increasingly adverse for the existence of NSU-Fiat/Neckar. It had a chance as long as the German market for passenger cars remained protected by barriers of trade. Thus, NSU-Fiat in a way was an offspring of European protectionism. As long as this regime prevailed, Fiat had a strong interest in keeping its foot in the German market by being present as a domestic manufacturer. But NSU-Fiat always remained a marginal player. However, its products had a good reputation for quality and solid design. And, after all, NSU-Fiat lasted longer on the German market than other medium-sized domestic manufacturers such as Borgward and Glas.

Technical specifications of the models discussed will be found on page 57.

The Fabulous Club de Mer: An In-depth Look at the Most Exotic Pontiac of the 1950s

By Don Keefe

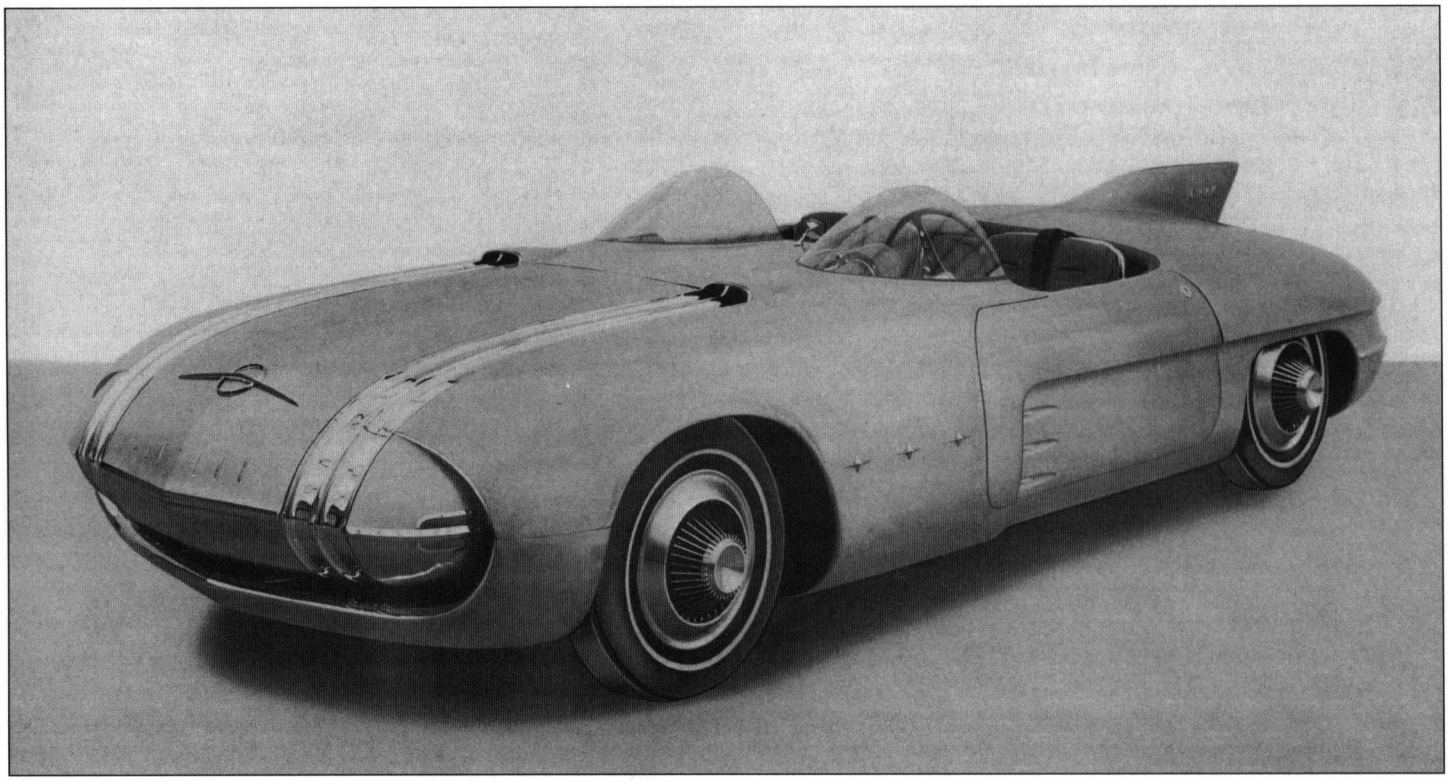


Fig. 1 – The 1956 Pontiac Club de Mer.

Following the lead of the Corvette-like 1954 Bonneville Special, Pontiac debuted its second two-seat showcar, the Club de Mer, at the Waldorf-Astoria in New York, for the 1956 Motorama season. Like the Bonneville Special two years before, this radical two-seater gave showgoers a glimpse of an exciting new future envisioned for Pontiac, one that stressed forward-thinking design and engineering (Fig. 1).

Consider this: a 300+ horsepower V8 engine, a rear-mounted transaxle, 4-wheel independent suspension, inboard rear brakes, lightweight aerodynamic body panels, and an advanced engine heat management system. You'd think that we're describing an upcoming 21st century sports car design, but these were features of the Club de Mer, which was designed and built over 45 years ago! There was no doubt that Pontiac was setting the wheels in motion to revamp its stodgy image. The Club de Mer, along with a new generation of high-performance production Pontiacs, would totally change the way people looked at the division and its products within a few short years.

Radical Styling

Clearly, the Club de Mer's styling was like nothing before—or since. Designed by Paul Gillan and his team under direction of then-GM styling Vice-President Harley Earl (Fig. 2), the Club de Mer encompassed a number of innovative styling cues that found their way onto later production cars, even non-Pontiacs.

The first thing one noticed about the Club de Mer was its size. By 1950s standards, it was very small. Perched on a 104-inch wheelbase, the Club de Mer was just 180.06 inches from nose to tail and stood a scant 38.4 inches from the pavement to the tops of the twin windshields. The top plane of the hood and rear deck were scarcely taller than the tires themselves.

Front and rear track measured 56 and 54 inches, respectively. Compared with a 1956 Corvette, the Club de Mer had a 2-inch-longer wheelbase and was just over a foot longer overall. The Corvette's track measured 1 inch wider in front and 5 inches wider at the rear, indicating that Pontiac's Wide-Track era had not yet begun.

The most visible difference however, was in height. The Club de Mer almost looked as though it could drive under a Corvette. Road clearance, at just 5 inches, further contributed to the Club de Mer's racy stance (Fig. 3).

How did the Club de Mer's radical styling come into being? In a 1995 phone interview, the late Paul Gillan, who in

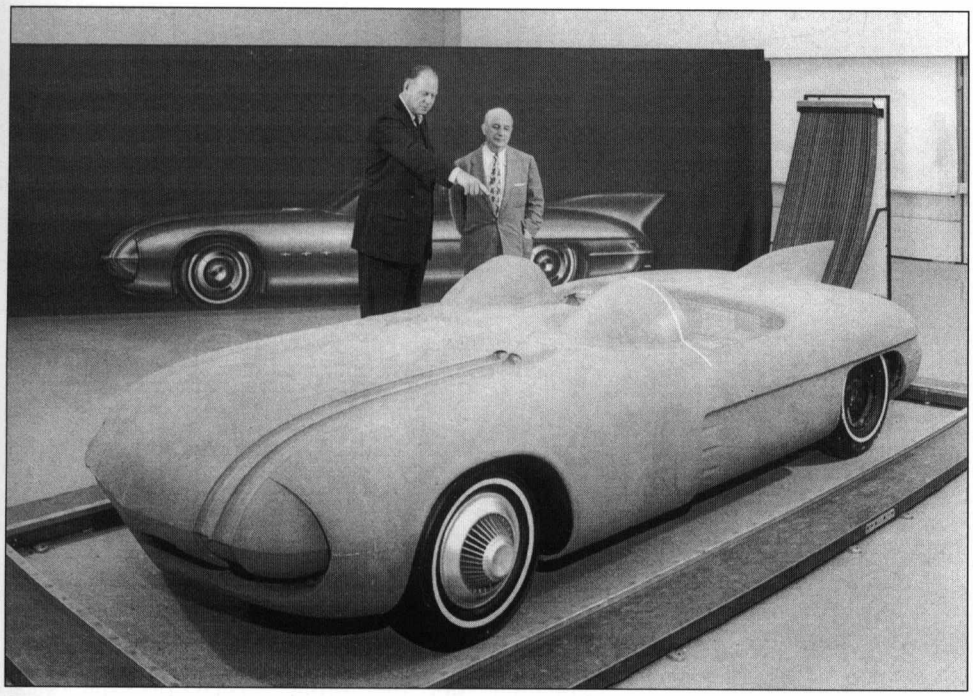


Fig. 2 – GM Styling Chief Harley Earl shows the finer points of the nearly completed Club de Mer clay model. A full-scale mural of the Dream Car is in the background.

1956 was Pontiac's Chief Designer, revealed that the inspiration came from a request from Mr. Earl himself.

"At the time, our staff was quite small," Gillan recalled. "We designed the production cars as well as the Motorama cars. Harley Earl wanted a car that was very, very different, something with exaggerated lines that would look like nothing else. And it had to be on a 104-inch wheelbase. I sketched up what became the Club de Mer, but the front end was much longer and more graceful—not as stubby-looking. I thought it looked better, but Harley said that it made the car too long. He wanted a shorter overall length, so I went back and redid it."

Gillan and his staff certainly achieved their goals. The Club de Mer was an extremely radical, cutting-edge vehicle that owed little to any previous automotive design. Rather, it was a 4-wheeled interpretation of the many space-age design cues that were capturing the imagination of a public weaned on "Buck Rogers" and "The Forbidden Planet."

The choice and use of aluminum body panels was quite unusual for a GM Motorama car, as fiberglass was usually the medium of choice. Fiberglass was relatively easy to work with and also inexpensive. Since full-sized clay models were usually sculpted to finalize the shape of a car, it was a fairly simple procedure to use them as a plug and pull a mold directly from the clay. The Club de Mer however, was different.

"Harley wanted a brushed surface," said Gillan, "so fiberglass was ruled out. We did the Club de Mer in aluminum, which presented some problems when it came time to weld the panels together. We had to be very careful not to let the heat discolor the aluminum, because any discoloration would show through the finish."

The Club de Mer's exterior finish was another innovative feature. The aluminum body panels featured a brushed finish and were clear-anodized for protection. They were then painted with a tinted clear lacquer. According to Gillan, the anodizing was used only to protect the aluminum; the lacquer actually provided the color. The color chosen was Cerulean Blue, a light blue that imparted a silvery sheen to the brushed aluminum panels.

"We also had to be careful with the brushing process," Gillan added. "Since the body had so many compound curves, we had to make sure the brushes followed the body in a uniform fashion to avoid squiggly lines. The end result, though, was definitely worth the added effort."

Indeed it was. Up front, Gillan's revised design featured a rounded theme with a slightly pointed nose. Block lettering spelling out "Pontiac" adorned the clamshell hood, as did a familiar 1950s-era Pontiac insignia and an exaggerated set of the Silver Streak "suspenders" that had been on every Pontiac in one form or another since 1935. The chrome Streaks led to a pair of fresh-air scoops ahead of the cowl.

Air entered the engine compartment through an innovative, chrome-lined slot arrangement that made up the lower half of the Club de Mer's nose. The intake slot, which did

Fig. 3 – In this full-on front shot, the Club de Mer almost looks like a flying saucer with a steering wheel. Front-end details, such as the chrome-lined cooling slot, Pontiac crest and "Silver Streaks" are clearly evident. This view with the model to the side gives a good idea of the Club de Mer's height. Note how she towers over the car.

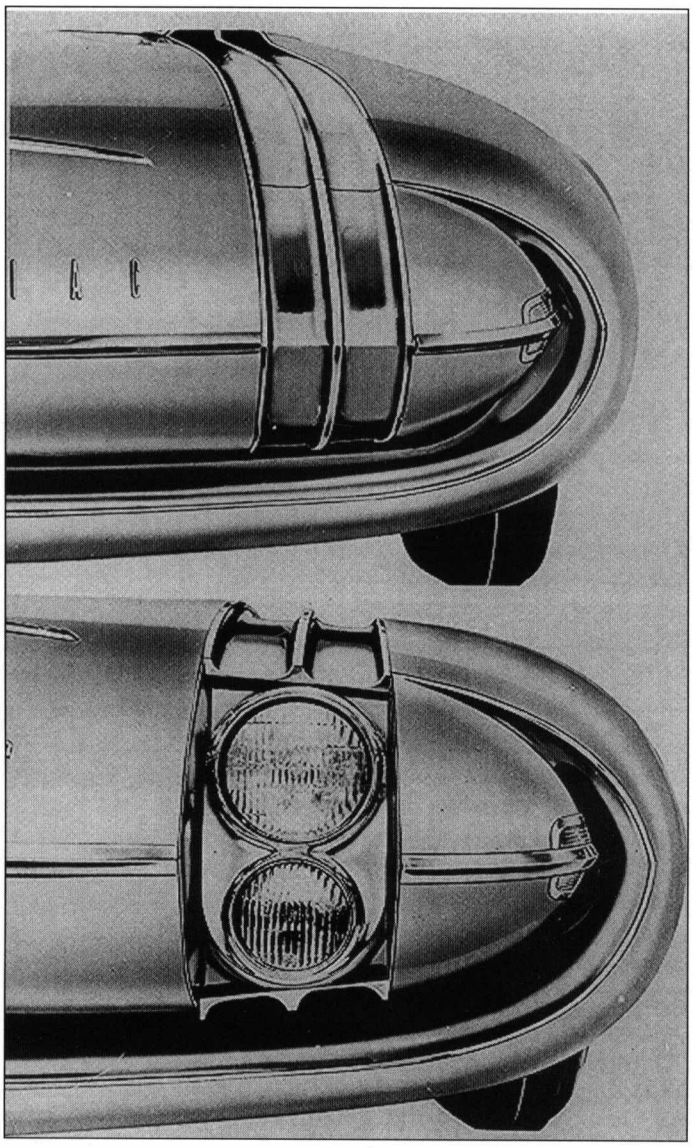


Fig. 4 – This rare publicity shot shows the operation of the disappearing headlamps. The "Silver Streaks" completely hid the headlamp assemblies, making it look like they were left off altogether.

not use a grille, also housed a hideaway headlamp arrangement. The headlamps were mounted over the parking lights, and both would revolve and disappear into the body when not in use (Fig. 4). This gave the front end a clean look and didn't offer a hint that the Club de Mer even had headlamps. In lieu of a front bumper, a very thin chrome strip brightened the leading edge of the nose.

Moving from front to rear, the Club de Mer featured fully open front wheel wells, with three chrome stars lined up on the fender behind them, and, of course, the twin bubble windscreens. A small rear-view mirror was mounted on the cowl just between them.

The doors were cut in a more rounded fashion than those of American production cars of that era, and incorporated into them were engine-compartment cooling vents decorated with a trio of chrome hash marks. The vertical line formed by these vents followed a graceful 90° curve and then extended horizontally to the rear deck, where the line again curved down to shroud the slotted taillamps.

A thin strip of a rear bumper was accented by separate vertical nerf bars. The license plate was tastefully sunk into the tail section, which was formed by the meeting of the rear deck and the full belly pan. "Pontiac" block letters matching those on the nose were installed above the license-plate recess. Dual exhaust splitters exited through the tail section, putting an accent on performance and also calling to mind that dual exhaust could for the first time be ordered on a production Pontiac.

Without a doubt, though, it was the large dorsal fin on the Club de Mer's rear deck that was the car's most dramatic styling cue. It gave a very shark-like quality to the squat two-seater, most fitting for a car whose name is French for "beach club" or "beach exclusive," depending on usage. A "Club de Mer" script was fastened to either side of the fin (Fig. 5). "Earl named it," Gillan said, adding that the Styling VP had a penchant for French names, citing the La Salle II Motorama cars from the year before. "If it had a French name, then Harley figured it had to be good," Gillan added with a chuckle.

Rounding out the strong visual package were experimental U.S. Royal 14-inch tires that had a thin white stripe on the sidewall and, interestingly, another in the center of the tread surface. Wheelcovers were likewise one-off units and hint at the design of the famous 8-lug integral wheel-and-drum setup that became a Pontiac trademark four years later. Patents for these wheelcovers' design, as well as one for the car itself, were held by General Motors in Gillan's name.

More Than Just a Pretty Face

The Club de Mer was by no means a full-size static model or an engineless "pushmobile." Under the Club de Mer's low-profile hood was an uprated version of Pontiac's top

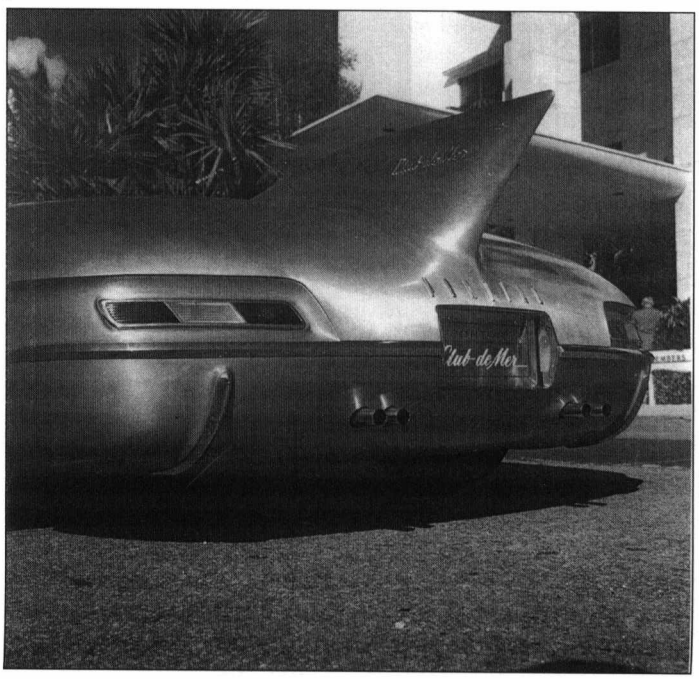


Fig. 5 – Rear view is highlighted by the large shark-like dorsal fin that gave the Club de Mer a 1950s-style high-tech look.

optional engine for 1956, a 316.6-cubic-inch dual-quad V-8 designed for NASCAR competition use. It was the very first high-performance incarnation of the Pontiac V8.

Pontiac's "Strato-Streak" V8, as it was called, had a bore of 3.94 inches and a stroke of 3.25 inches. It differed from the standard passenger-car engines by virtue of its milled 10:1-compression cylinder heads, longer valve stems (for correct valvetrain geometry), hotter hydraulic camshaft (with 289/298 degrees of duration and .406-inch lift), and, of course the #523554 dual-quad intake, on which was mounted a pair of Rochester 4-barrel carburetors, topped off with a delta-wing-shaped oil-bath air cleaner. In stock form, the 316 kicked out an impressive 285 hp at 5,100 rpm, with 330 lb-ft of torque at 3,600.

As mentioned, the Club de Mer's engine was an uprated version of the Strato-Streak, but not necessarily an upgraded version. Published horsepower figures range from 300 to 305 horsepower, yet there is no mention of the rpm level at which maximum power was attained, nor are there any torque specs. Retired Pontiac Engineer Malcolm "Mac" McKellar speculates that there may not have been any actual engine modifications.

"About the only thing that could have been added at the time was an Iskenderian camshaft," McKellar recalls. "At that point the 285-horse V8 had all of the good pieces already on it."

While it is true that the stock oil-bath air cleaner would not have cleared the Club de Mer's low hoodline, it is doubtful that a lower-profile replacement would have boosted the power at all. McKellar explained that in those days, gross horsepower was calculated without air cleaners or other power-robbing accessories. In any event, no record of any specific modifications to the engine are known to exist, so it may never be known for sure if the engine received anything more than the stroke of a PR writer's pen.

The Strato-Streak V8 was hooked to a prototype rear-mounted 3-speed manual transaxle by way of a driveshaft housed in a serrated torque-tube assembly that passed right through the passenger compartment. It was not a driveshaft hump; the tube passed between the driver and passenger like a floating console, and the floorboards themselves were flat. The torque tube also housed the shifter, as well as controls for the radio and other gadgetry.

Custom Chassis

While many Motorama cars hid a stock or slightly modified chassis and drivetrain under their sleek and curvaceous bodies, the Club de Mer's beauty was much more than skin-deep. The car's undercarriage was as radical and innovative as its styling would suggest.

Rather than attempting to modify an existing chassis, GM designers started with a clean sheet of paper. They designed and constructed a custom steel-tube chassis that would fulfill their objectives precisely. The 104-inch wheelbase platform was designed to accept the experimental 3-speed manual transaxle, which mounted solidly to the rear of the frame. This arrangement allowed for more even front-to-rear weight distribution and helped the Club de Mer very nearly reach the perfect 50/50 figure.

The front suspension consisted primarily of production Pontiac components. In fact, the only deviation from stock was a shortening of the upper and lower control arms to facilitate their use in this smaller platform. The rear suspension, however, was quite was another story.

The Club de Mer sported a custom-designed De Dion rear suspension that even more than 45 years later is still technologically ahead of many systems used on automobiles today. The De Dion system, popular with many "specials" and sports cars of the 1950s-era, provided the optimal camber settings and excellent handling of a conventional independent rear suspension (IRS) with the predictability of a solid rear axle. Positive camber, which plagued the early swing-axle Corvairs and Tempests, is easily controlled with a De Dion tube.

A De Dion system is similar to a conventional Corvette or Jaguar IRS, except that a large tube, connecting to the hub carriers of both rear wheels at either end, is suspended from the frame, often with coil-over shocks, but sometimes by regular coil springs or even leaf springs. In effect, it acts like a solid axle, but with the superior camber settings. In the case of the Club de Mer, the De Dion setup used coil springs and, interestingly, inboard drum brakes, which—like the inboard discs later used in the Jaguar XKE—reduced unsprung weight. Although no data exists as to the Club de Mer's handling prowess, it would be safe to assume that its low center of gravity, near-perfect weight distribution, and sophisticated suspension would have provided performance similar to that of several competition cars of the period.

The Club de Mer's interior was a little more subdued that the rest of the car, although it was still very much state-of-the-art for 1956. The twin bubble windscreens for driver and passenger gave a twin-cockpit feel to the car.

An undished, 3-spoke steering wheel greeted the driver and was set off by a large 3-element cluster with a large speedometer in the center and one smaller housing on either side of it. On the left was a clock and on the right, the fuel and water temperature gauges. In the interest of safety, the steering wheel and dash panels were free of sharp or pointed surfaces, and the whole cockpit rim was padded.

Twin bucket seats were finished in crushed-grain vermilion leather and featured competition lap and shoulder belts. Additional controls were set into the driver's door, and the floor was covered in a matching vermilion carpeting.

It soon became apparent to those on the project that the seat height was too high for the car, and the passengers appeared out of scale. The problem was, the original design called for taller windscreens, but smaller ones were used for a more racy appearance. As a result, the windscreens would not actually protect the driver or passenger.

To resolve the situation, the seats were cleverly remounted on rubber diaphragms so that the weight of the occupants would drop down the height of the seat, restoring the proper stance. The heavier one was, the more the diaphragms would compress, giving both small and large persons the same approximate height in relation to the top of the windscreens. Gillan recalled that although that arrangement would not have been suitable for street use, it worked great in a show setting.

Two Debuts

In addition to the Club de Mer's debut at the Waldorf-Astoria in New York at the 1956 Motorama opening, a quarter-scale model of the Club de Mer was unveiled in Miami before the Motorama opening at The Bath Club, a popular nightclub that featured shows and other attractions. "Mr. Earl wanted the Club de Mer to be introduced in the most positive of settings," Gillan recalled, "so he sent myself and Jack Dideon, who worked on the GM Futurliner buses [and led the show section of GM Styling's Product and Exhibit Studio], down to Miami in a company plane with our wives and the quarter-scale Club de Mer. He also sent his grandson 'Tiger' and the boy's parents, as well as Ralph Wilson [now the owner of the Buffalo Bills football team]. Bob Emerick of Pontiac PR and Pontiac General Manager Robert Critchfield also flew with us on a DC-3, and we stayed in Key Biscayne."

"Harley had the quarter-scale built for Tiger. He was crazy about that kid. Everyone thinks that the quarter-scale was built for Bill Mitchell's grandson, but it was actually Mr. Earl's grandson. Anyway, we purchased a motorized Corvette kiddie car, removed the body, and used the chassis under the quarter-scale body we built. We had it so it looked just like the real car."

"The Bath Club was a very popular spot back then. People from all over the world would come to see the shows at the theater there. The idea was to have Tiger drive the car onto the stage while the announcer told all about the Club de Mer. People were expecting to see the real car, and when the little kid came out driving the small one, they were quite surprised. It went over very well. The funny thing about it was, the quarter-scale was used because the full-sized car couldn't be brought inside. As it turned out, we needed a hoist to get the quarter-scale over an open doorway in the building, because it was too large to fit through!"

As we all know, when the Club de Mer opened in the New York show, it was a huge success and continued to astound showgoers at every stop on the Motorama tour, sometimes even being shown with the quarter-scale alongside it. People couldn't get over the car's ultra-racy stance and aggressive styling. It captivated a generation of showgoers and stands as one of the greatest examples of a 1950s-style "look into the future." While that particular future never came to be, it nonetheless shows us today what the people of that era saw as cutting edge and what it was they wanted from the future.

Where Is It Now?

The ultimate fate of the Club de Mer has baffled enthusiasts for more than 40 years and still remains one of the great mysteries of automotive history. No one seems to know whether this carefully crafted aluminum masterpiece was unceremoniously crushed or quietly removed from GM by some sympathetic person who knew it would be destroyed if allowed to remain there. If anyone does know what happened to it, he or she has not come forth with even a sliver of information.

The trail is indeed a cold one. The last time the Club de Mer is known to have been seen was in 1959, in a warehouse in Warren, Michigan, where it had been sent after its tour of duty was over. Bruce Berghoff, who managed the traveling Motorama shows from 1955-61 and is also the author of *The GM Motorama: Dream Cars of the Fifties*, remembers seeing the Club de Mer just after Harley Earl's retirement in December of 1958.

After Bill Mitchell took over later that year, a sort of "housecleaning" took place, and many older dream cars were disposed of. It has been speculated that Mitchell wanted to start anew and didn't want any of the older cars around as reminders of an era that he considered over.

While some of these masterpieces were destroyed per company edict, not all were sent to the crusher. For example, we know that both 1954 Bonneville Specials survived, as did the 1953-54 Pontiac Parisienne, the 1953 Buick Wildcat, and the 1956 Buick Centurion, among others. Even four Motorama cars that spent more than 30 years in a Detroit-area salvage yard (the 1955 Chevy Biscayne, 1956 Cadillac El Dorado Brougham Town Car, and both 1955 La Salles—roadster and sedan) are today either being restored or are actually finished. And while the Club de Mer's fate remains a mystery, no evidence of its actual demise has ever surfaced.

If so many other dream cars of the 1950s survived the dreaded crush orders, is it possible that the Club de Mer, too, slipped away unscathed? And if so, how could it have remained under wraps for so long? Well, considering the fact that the second Bonneville Special had been sitting in a Detroit-area garage for more than 30 years when it was discovered and purchased by dream car collector Joe Bortz in 1991, it is indeed possible that the Club de Mer, too, is tucked away somewhere. Interestingly, it seems that once those involved with saving the dream cars retire, pass away, or otherwise find themselves safe from real or perceived legal ramifications, the long-missing show cars find their way out of hiding.

And then there are the rumors, tantalizing, yet too vague to pinpoint anything specific. There are four rumors floating around about the current whereabouts of the Club de Mer; perhaps one of them is true or at least points toward the truth. They could also, however, be the wishful optimism of enthusiasts looking to keep alive the spirit of a dream car that stole their hearts so long ago.

Rumor 1: The Club de Mer is somewhere in Utah, perhaps Salt Lake City, in rough condition.

Rumor 2: The Club de Mer is somewhere in Oklahoma—condition not reported.

Rumor 3: The Club de Mer could be among a stash of more than 25 cars rumored to be buried in vaults in the New Mexico desert by a transport company that had been given the task of destroying the cars. Instead of crushing the vehicles, however, the company secretly buried them in steel vaults.

Rumor 4: Many of the cars buried in New Mexico were uncovered and moved to a warehouse in Los Angeles. Assuming that Rumor 3 is valid (and that is a stretch) and the Club de Mer was among the cars allegedly sent to New Mexico, it could conceivably be among those supposedly sent to L.A. Again, a mega-longshot, but who knows?

While it may well be a frivolous exercise, contemplating the Club de Mer's value in the collector-car market today is an interesting thought indeed. The car would no doubt command an astronomical sum of money, even in a

somewhat soft market. A car that rare and desirable would most likely defy any market trend, if it were somehow found in perfect or near-perfect condition. Even deteriorated remains, if authentic, would probably fetch a huge sum.

While we may never know what happened to the Club de Mer, one thing is for sure: it was a very influential vehicle and a shining example of what made the GM Motoramas such a huge success. While the futuristic sportster would never become a production car in its own right, many of its innovations did reach production on a variety of cars.

For example, the rear-mounted transaxle concept was used on the 1961-63 Pontiac Tempests, front-engined Porsches, as well as the current-generation Corvette. A very similar rear-end treatment, (with two fins instead of one) was used on the 1957-58 Series 62 Cadillac Eldorado Specials. Disappearing headlamps have been used on many foreign and domestic automobiles over the years, and red inner fender liners found their way onto the 1966-67 Pontiac LeMans and GTO. And of course, we cannot forget the brushed finish on the stainless-steel-paneled DeLorean.

Although the Club de Mer remains among the missing, the quarter-scale model is alive and well. It is now owned by Marc Bortz, owner of the Bortz Classic Dream Car Collection of Chicago. The quarter-scale has been magnificently restored and looks so authentic that from a photo one is hard-pressed to tell it's not the real thing.

Still, one of the great questions of mid-20th century automotive history has yet to be answered: What happened to the Club de Mer?

In addition to the late Paul Gillan, the author would like to thank Jeff Denison of G.M. Design Center, Floyd Joliet, Bruce Berghoff, Malcolm R. "Mac" McKellar, Walter Miller, John Sawruk, Pete McCarthy, as well as Marc and Joe Bortz of The Bortz Classic Dream Car Collection for their help with the preparation of this article. The illustrations were provided by the author.

Brief Specifications of the Models Discussed in "Fiat as a German Manufacturer" (pp. 46 - 51).

NSU Fiat 1000 (Fiat 508 Ballila)
motor: 4 cylinder, 995cc, 20 bhp/3,400 rpm
wheelbase 88.5 in.; overall length 11 ft., 3.5 in.

1500 sedan:
motor: 6 cylinder, 1,493cc, 45 bhp/4,400 rpm
wheelbase 110.25 in.; overall length 14 ft. 7.75 in.

500 2-passenger coupe:
motor: 4 cylinder, 569cc, 13 bhp/4,000 rpm
(500C motor: 570cc, 16 bhp/4,400 rpm)
wheelbase 78 in., overall length 10 ft. 6.5 in.

521/2 sedan:
motor: 6 cylinder, 2,516cc, 52 bhp/3,300 rpm
wheelbase 109.25 in.; overall length 13 ft. 10.5 in.

Neckar sedan (Fiat 1100)
motor: 4 cylinder, 1,089cc, 36 bhp/4,400 rpm
wheelbase 92 in.; overall length 12 ft. 4.5 in.

Jagst 4-passenger 2-door (Fiat 600)
motor: 4 cylinder, 633cc, 22 bhp/4,600 rpm
wheelbase 78.25 in.; overall length 10 ft. 6.25 in.

Jagst 770 4-passenger 2-door (Fiat 600):
motor: 4 cylinder, 767cc, 29 bhp/4,800 rpm
wheelbase: 78.25 in.; overall length 10 ft. 9.75 in.

Fiat/NSU sold later models of the Neckar (1100) as the Europa/Europa Spezial. Between 1951 and 1955, it also offered the Fiat 1500 but production was modest. The Primula and StTrop spider were imported from Italy, the latter the 124 Spider with a different name. The "Neckar/Puch 650 Spyder Prototyp" was the subject of a brochure, but the author does not know whether it was produced.

This information provided by the editor.

The Return of the Red Oval

by Sam Fiorani

Seventy-seven classic cars gathered in Molsheim, France, on September 7, 1990. Produced over a quarter-century, the vehicles included coupes, roadsters, and touring cars with one thing in common: a red oval badge on the radiator shell with the word "Bugatti" written in white block letters.

Ranging from the little 1913 Type 13 roadster to the sculpted 1939 Type 57s, the procession headed east from the location of their creation the next day. On Monday, September 10, a flame was ceremoniously lit at the Messier-Bugatti factory and transferred to a handmade housing mounted on the front bumper of the red and black Type 57 owned by the Bugatti Foundation's president, Roland Wagner.

The tour continued through Germany and Switzerland before entering Italy on Wednesday. Two days later, the parade made its way to the grand Gianpaolo Benedini-designed manufacturing facility in Campogalliano, a magnificent facility that unfortunately had a very short lifespan.

The torch, quite literally, passed from the former French home of this famous brand to the new home of revitalized Bugatti.

Decorated in glass and concrete, the stunning complex of buildings featured the initials of Ettore Bugatti imprinted on the walls. Another section beamed in rich French racing blue with that red oval logo reaching about three meters high.

Between 1910 and 1952, about 7,950 Bugattis rolled out of the Molsheim plant. Ettore Bugatti placed his name on a few thousand cars designed and built to his approval. A few more cars were built after his death on August 21, 1947. Had his son Jean not been killed while testing a car in 1939, the cars bearing the Bugatti would have had an heir to the creative driving force behind the name. Lacking that champion, the brand died with the men who created them.

From the sporting boat-tailed Type 35 to the luxurious Type 41 "Royale," Bugatti built some of the most desirable cars of all time. Ettore's initials and surname on the radiator shell stirs hearts of enthusiasts of cars and worldwide racing. As proof that the aura around these cars has hardly faded, when one of the six Bugatti Royales goes up for sale it brings nearly $10 million. A number of attempts for Bugatti's company to restart automobile production after Ettore's death were not successful. The company continued producing products like railcars, helicopter blades, and automotive tooling. Eventually, Bugatti settled into its role as a supplier of aeronautical equipment, primarily to aero engine manufacturer (and former automotive competitor) Hispano-Suiza.

The connection between the two companies evolved to the point where Hispano-Suiza purchased Bugatti from Ettore's heirs in 1963. Bugatti produced landing gear, most notably for the French airliners Caravelle and Concorde.

In 1968, Hispano-Suiza, including Bugatti, became a subsidiary of SNECMA (Société Nationale d'Études et de Construction de Moteurs d'Aviation), the nationalized French aerospace combine which had been founded in 1936 to take over Gnome-Rhône's aircraft engine business. The Messier division of SNECMA merged with Bugatti becoming Messier-Bugatti to consolidate SNECMA's landing gear groups. Messier-Bugatti supplied landing gear and braking systems to various aircraft including the Mirage F1 (1971), the Falcon 900 (1991), and the Rafale (1994).

So rich was the Bugatti heritage that 30 years of hibernation could hardly dilute the value of the name. Romano Artioli, and his wife Renata, took control of the name for use on an automobile in 1987. Artioli had amassed a fortune as a distributor of various brands of cars including Alfa Romeo and, in the late 1980s, was the largest distributor of Lotus cars in Europe. Being from the land of Ferrari, Maserati, and Lamborghini, the desire to build his own car flowed through his veins. After extensive discussions with Messier-Hispano-Bugatti and the French government (owner of Messier-Hispano-Bugatti), the Artiolis formed Bugatti Automobili to produce a car worthy of the name of Le Patron.

Paolo Stanzani engineered the new car and Marcello Gandini, designed the exterior (others assisting with the design were engineers Benedetti, Bevini, and Pedrazzi). Stanzani had been with Lamborghini when automobile production began in 1963 and took over the company's engineering department in 1968 where he headed the work on the Miura and Countach. Working for Bertone and on his own, Gandini designed some of the greatest Italian cars of the 1960s, 1970s, and 1980s, including models for Lamborghini (Miura, Diablo), Fiat (X1/9), Lancia (Stratos), and Alfa Romeo (Montreal). Two technical directors at Bugatti during the period 1991-95 are worth noting: Nicola Materazzi and Mauro Forghieri. They are indicative of the fact that Bugatti obtained remarkably qualified, if not renowned, personnel from the supercar industry in Modeno (Ferrari, Lamborghini, and Maserati).

One year after the France-to-Italy parade, the Artiolis planned an equally elaborate event around the introduction of the new Bugatti. In France, the car was revealed on September 14, 1991. The EB110, as the car was christened, was so named as a tribute to Ettore Bugatti on the 110th anniversary of his birth. On the date of that anniversary, September 15, 1991, the car arrived in Molsheim. Two weeks later, Campogalliano hosted the event of the "Bugatti Revival" when the EB110 was shown at the factory that would soon begin turning out these road-ripping beasts.

Styling of the new EB110 was, to be kind, polarizing. Fixed headlights at the front and a retractable wing at the rear turned around the typical formula for an exotic car. Scoops ahead of the front and rear wheels provided air to cool the massive brakes while additional scoops on the fenders, again front and rear, allowed the engine to breathe. Scissor-action doors and the numerous air openings appeared subtle enough to give the car a conservative look and make waves in the exotic car market at the same time. A simple horse-collar grille opening linked the EB110 with the pre-war Bugattis built in France.

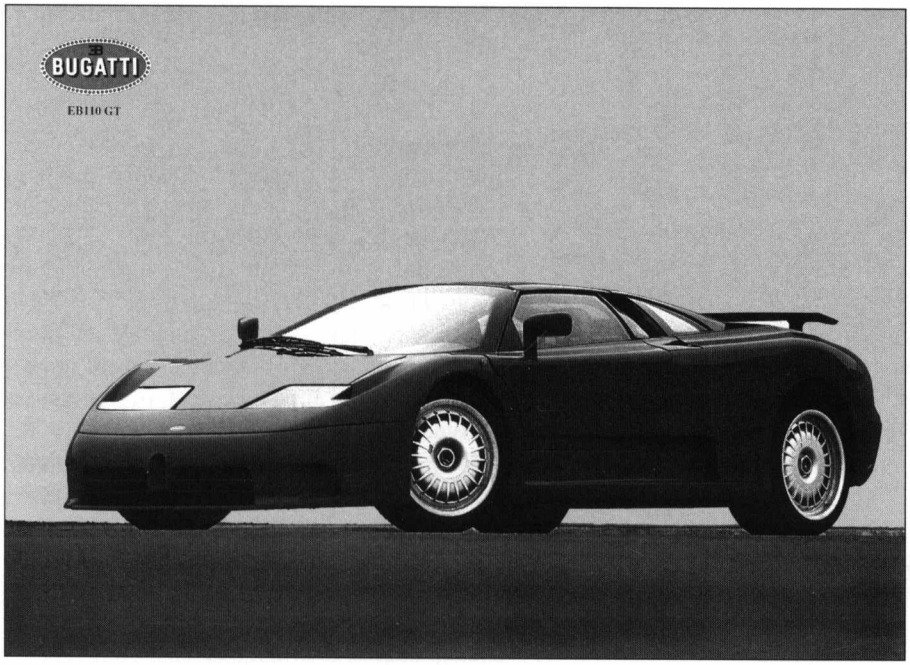


Fig. 1 – EB110GT (1992)

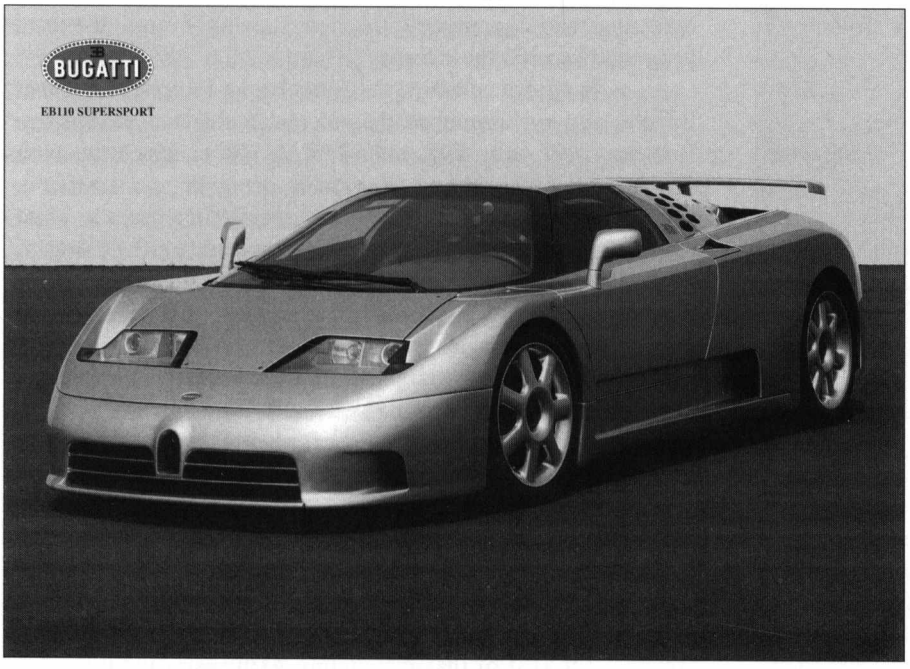


Fig. 2 – EB110S (1992)

The design of the coupe was brought to fruition with the assistance of a number of Europe's most technologically advanced companies. Aerospatiale created the light (125kg) and strong carbon fiber chassis. Messier-Bugatti supplied the oil-pneumatic suspension system for the EB110. Connecting the car to the ground were four large (245/40ZR-18 in the front, 325/30ZR-18 in the rear) Michelin MXX3 tires mounted on alloy BBS split-rim wheels designed exclusively for the EB110. Even the Competition Bio engine oil was developed by Elf and initially only offered in the Bugatti. Other firms that supplied parts for the EB110 included Mavilor, Panki (titanium connecting rods), Carbone Industie (brakes), and Frau Car (leather).

Mounted behind the seats was the heart of the car. Bugatti's own 3499cc DOHC 60-degree V12 engine sported five valves per cylinder (three intake and two exhaust) and four IHI turbochargers. The short-stroke (56.6mm) and wide bore (81.0mm) design produced 550hp (405kW) and 420 ft-lbs (569Nm) of torque. A ZF six-speed transmission and three differentials pushed that power to all four wheels. Shortly afterwards, the company announced a GT version with 611 hp (Fig. 1).

After the September reveal, the company started its rounds of the car show circuit, with its initial appearance at the 1991 Bologna show. The lightweight (544lbs less than the standard model) EB110S ("Supersport" or "Sport Stradale") with its lack of wood trim on the interior, fixed rear wing, and 600hp was unveiled at the Geneva show in March 1992 (Fig. 2).

Production was announced to be limited to 200 EB110 coupes a year and the first cars rolled off of the assembly line in September 1992. One month later, a buyer in Switzerland took delivery of the first car. Early cars lacked the active suspension planned for the car, but a five-year guarantee included factory retrofit upgrades automatically.

To further promote the new Bugatti, a team of engineers took their car to the Nardo track in Italy. On May 29, 1993, a production EB110S was put through its paces around the circuit. In the standard test from a standing start to 100 km/h (62 mph), the Bugatti took only 3.26 seconds. Traveling through 400 meters, approximately equivalent to the American quarter-mile, took only 10.90 seconds. Accelerating through the kilometer only took 19.61 seconds with a terminal velocity of 276.5 km/h (171.4 mph). In an average of six runs around the track, the car recorded an amazing 351 km/h (217 mph). Even more surprising was the fact that all tests were measured with the car running on standard production tires.

The fledgling automaker stunned the industry when General Motors sold Group Lotus of England to Bugatti International on August 26, 1993, for £30 million. The English engineering and racing firm provided the R&D necessary to keep Bugatti competitive. One of the most enticing parts of Lotus was the market reach provided by its car-making division. While Lotus sold fewer than 2,000 vehicles a year, the company maintained a dealership network throughout Europe and, probably most important of all, in North America. Lotus dealers in the United States

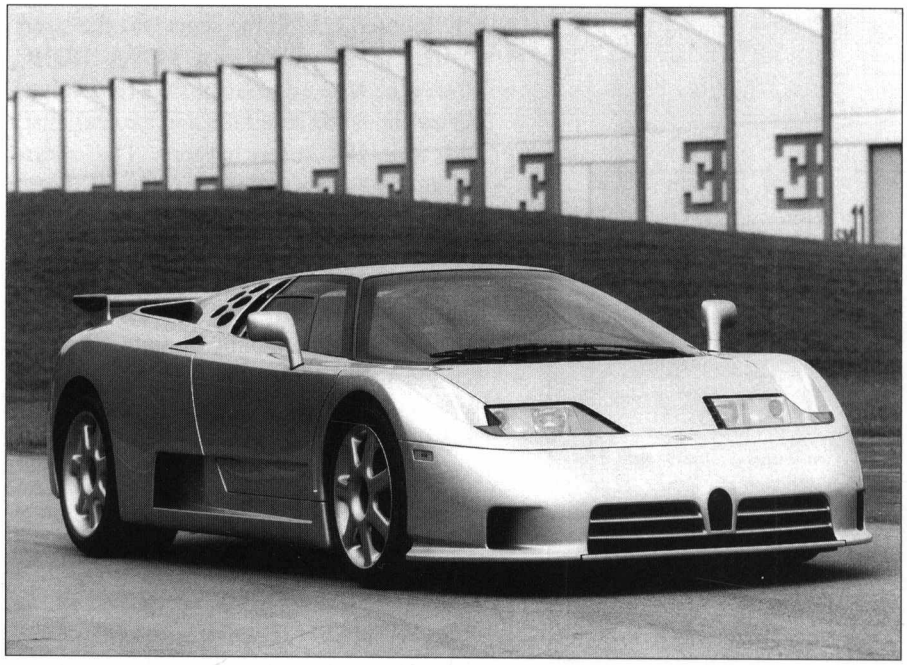


Fig. 3 – EB110 America (1995)

allowed Bugatti to get a foothold the world's single largest market.

In addition to publicly announcing the acquisition of Lotus, Bugatti showed the second step in the revival of the marque at the 1993 Geneva Auto Salon. ItalDesign's Giorgetto Giugiaro styled the EB112 four-door sedan, which featured a 5995cc (with the stroke lengthened to 86mm), non-turbocharged version of the EB110's V12 engine generating 460hp (339kW). While powering all four wheels through a 6-speed manual transmission like the EB110, the EB112 housed its 460hp engine ahead of the driver. The 5-meter sedan was announced to follow the EB110 into production.

For the first time since 1939, a Bugatti ran at the 24-hour race at Le Mans in 1994. Where the Type 57G "Tank" won the race 55 years earlier, the EB110 ran competitively with most of the field but could not keep pace with the GT class-leading Dauer Porsche cars. Working through some teething problems including a leaking fuel system, the team's chances ended when the EB110S, piloted by Alain Cudini, Eric Helary, and Jean-Christophe Bouillon, blew a tire and met the barrier on the Mulsanne Straight.

Bugattis were also raced in the American WSC GT series, the 1996 24 Hours of Daytona, and a return to Le Mans in 1996, among other races. Modern Bugattis finished no higher than a 5th place finish (in the GTS-1 class at Watkins Glen, June 1995).

Like everything Bugatti had done since 1987, the American introduction was a grand affair. Staged in various cities around the country, Bugatti invited potential buyers to the events. At the Philadelphia introduction, for example, guests were treated to an evening at the prestigious Rittenhouse Hotel where they enjoyed a wide array of hors d'oeuvres and an open bar while chamber musicians played. The Hotel's upscale décor was enhanced by the Bugatti Type 52 (the electric "baby" Bugatti from the 1930s) just behind the buffet.

After the attendees were properly fed, everyone moved to the front of the hotel where two Type 57s and a Lotus Esprit surrounded the low car shrouded in a Bugatti blue cover. Dignitaries from the local dealer and Bugatti-Lotus Group N.A., aka Lotus Cars USA, provided the brief introduction before the cover was lifted unveiling the prototype Bugatti EB110 America (Fig. 3). An amalgam of the EB110GT and EB110S, the EB110 America featured an American-specification 3.5L quad-turbo V12 producing nearly 600hp. Capable of over 200 mph, the EB110 America would go on sale, as per the announcement, in November 1994, with a price tag of $335,000. However, no EB110 Americas were actually built.

With such a grand project, questions surfaced about the financing of Bugatti. A number of suppliers provided services in exchange for equity in the venture, but these shares didn't make up a substantial percentage of the automaker. Artioli never explained the source of investment in his company, and the money stopped flowing before the cars generated significant income.

In March of 1995, the walls began to collapse around Bugatti, and by September, the automaker fell into bankruptcy. Between 1991 and 1995, only 154 EB110 coupes were built (including between 12 and 15 vehicles, depending on the report, that were in the process of being assembled when the plant closed). Artioli, ever the businessman, liquidated much of Bugatti while retaining the name and logos. Bugatti International, his company, remained based in Luxembourg. Artioli, at times, seemed to use the Bugatti cars to promote all of the other products emblazoned with the company's logos that he had for sale including clothing, leather products, watches, and wines.

On October 31, 1996, Bugatti International sold 80% of Lotus to the Malaysian automaker Perusahaan Otomobili Nasional (Proton) and its chairman Yahaya Ahmed for £51 million, which included Proton assuming £13 million of Lotus' debt.

On April 4, 1997, Modena government officials began to auction off the Bugatti properties in Italy. Jochen Dauer (the man whose cars won the 1994 Le Mans race) purchased the remains of the Bugatti plant including all the parts and the rights to produce the car. A firm called B. Engineering took possession of the plant in 1999 and in 2001 announced very limited production of the Edonis, a car suspiciously similar in design to the EB110 (a turbocharged 3,760cc V12 powering an Aerospatiale-designed carbonfibre chassis).

Germany's Volkswagen AG purchased the rights to produce a Bugatti automobile for an undisclosed amount in 1998. Under the control of Ferdinand Piëch, Volkswagen launched a buying spree of small European automakers in the 1990s. During his tenure, Piëch purchased the mass-market company Škoda Auto in the Czech Republic. Later purchases leaned toward the luxury end of the market and included England's Bentley (in a failed attempt to acquire Rolls-Royce), Italy's Automobili Lamborghini, and finally Bugatti.

Volkswagen's Bugatti was first shown at the 1998 Paris Automobile Salon. Styled by ItalDesign, the Bugatti EB118 with its aluminum chassis took many cues from the EB112 sedan, but displayed them in a 2-door form (Fig. 4). The EB112's 6.0L V12 was replaced by a Volkswagen derived 18-cylinder engine. The "W18" engine was based on the Volkswagen Lupo's three-cylinder powerplant but arranged as three banks of six cylinders each radiating out from the crankshaft measuring 120 degrees from right to left bank. The 6255cc 72-valve direct-injection engine produced 555hp (410kW) of power and 650Nm of torque (Fig. 5). Like the EB112, the EB118 pushed all of this power through all four wheels.

At the Geneva Automobile Salon in March of 1999, Volkswagen unveiled the second of its Bugatti concept cars. The EB218 took the EB118 coupe's design and stretched it over four-doors. While the EB118 itself was similar in styling to the EB112 sedan, the EB218 sedan had a more upright, formal look than the leaner EB112. Power still came from the Bugatti-exclusive 6.3L W18 engine turning an all-wheel drive system.
Again, Giorgetto Giugiaro of ItalDesign was called upon to style the next Bugatti concept. Introduced at the Frankfurt International Automobile Exhibition in October of 1999, the EB18/3 Chiron took the W18 engine from the EB118/EB218 and placed it in the middle of this low-slung Lamborghini Diablo-based supercar. Some cues, chiefly the frontal bodywork largely devoid of lateral curves, have been drawn from the Type 32 "Tank" to create this completely modern sports car. Even the car's name was taken from Bugatti history as Louis Chiron was a famous French racing driver of the 1920s and 1930s.

At the 1999 Tokyo show, Volkswagen brought out yet another Bugatti concept car. This time, the Lamborghini Diablo VT's mid-engined/all-wheel drive formula was placed in a body more curvaceous than the Chiron. Designed by Giorgetto Giugiaro's son Fabrizio and Volkswagen designer Hartmut Warkuss, the EB18/4 Veyron seemed more in tune with the exotic car crowd than the Chiron but was powered by the same 6.3L W18 concept engine. Also like the Chiron, the EB18/4 Veyron took its name from a person of Bugatti's past. Pierre Veyron raced Bugattis for the factory team prior to World War II and piloted a Bugatti Type 57G to victory in the 24-hour race at Le Mans in 1939 (Fig. 6).

Volkswagen's use of names from Bugatti's Molsheim past connects the newest iteration of the brand with the original instead of the more recent Italian company. Returning the company to France reinforced this desired connection.

Bugatti Automobiles SAS was formed on December 15, 2000. To commemorate this event, the Bugatti EB18/4 Veyron reemerged as the EB16/4 Veyron at the 2001 Geneva show (Fig. 7). Discarding the bulky W18, the new version of the Veyron harnessed the power of a new W16 engine. Instead of three banks of cylinders, the W16 used two banks of narrow-angle (15 degree) V8 engines. Based on the Volkswagen Passat's W8 and Audi A8's W12, the Bugatti's W16 displaced 7993cc, sported four turbochargers, and claimed an output measuring nearly 1,000hp (736kW or 1,001hp DIN/987hp SAE) and 1,250Nm (922 ft-lbs) of torque. All of this power was channeled through a 7-speed sequential gearbox powering all

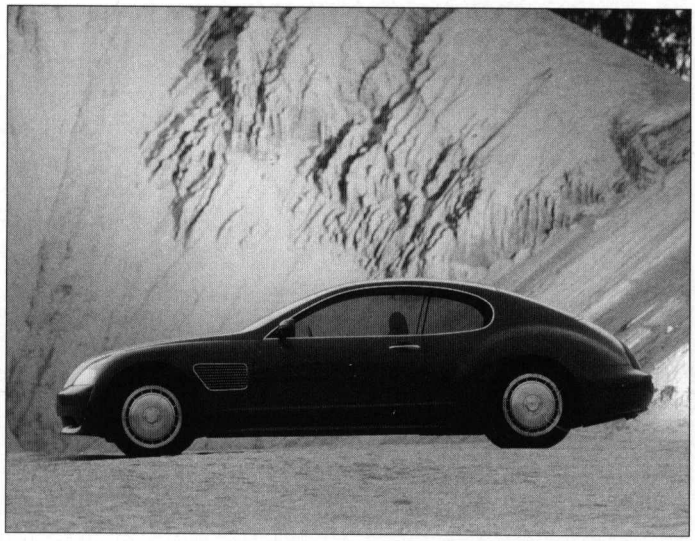


Fig. 4 – EB118 (1998)

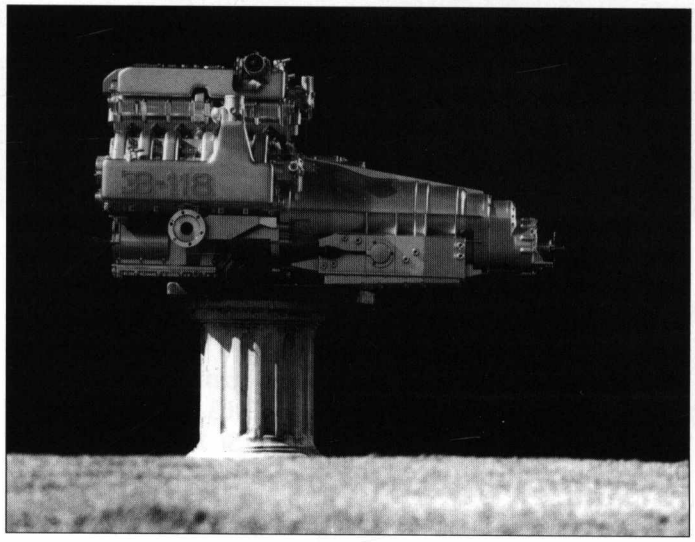


Fig. 5 – Bugatti's 18-cylinder "W" engine, intended for the EB118, EB218, 18/3 Chiron, and 18/4 Veyron.

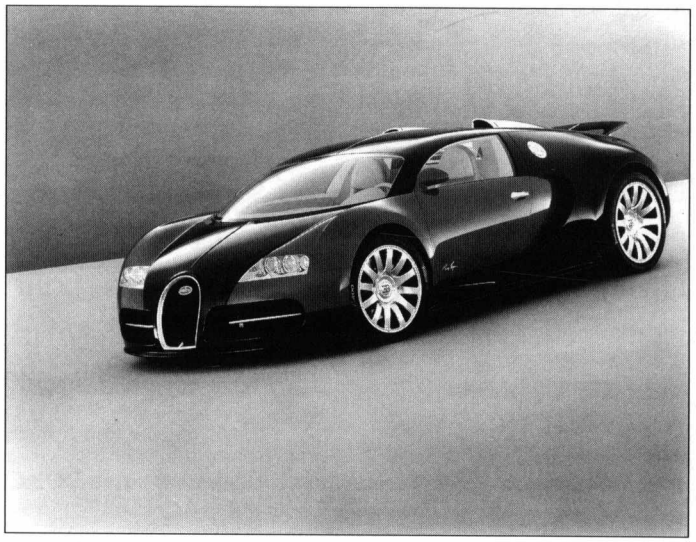


Fig. 6 – 18/4 Veyron (1999)

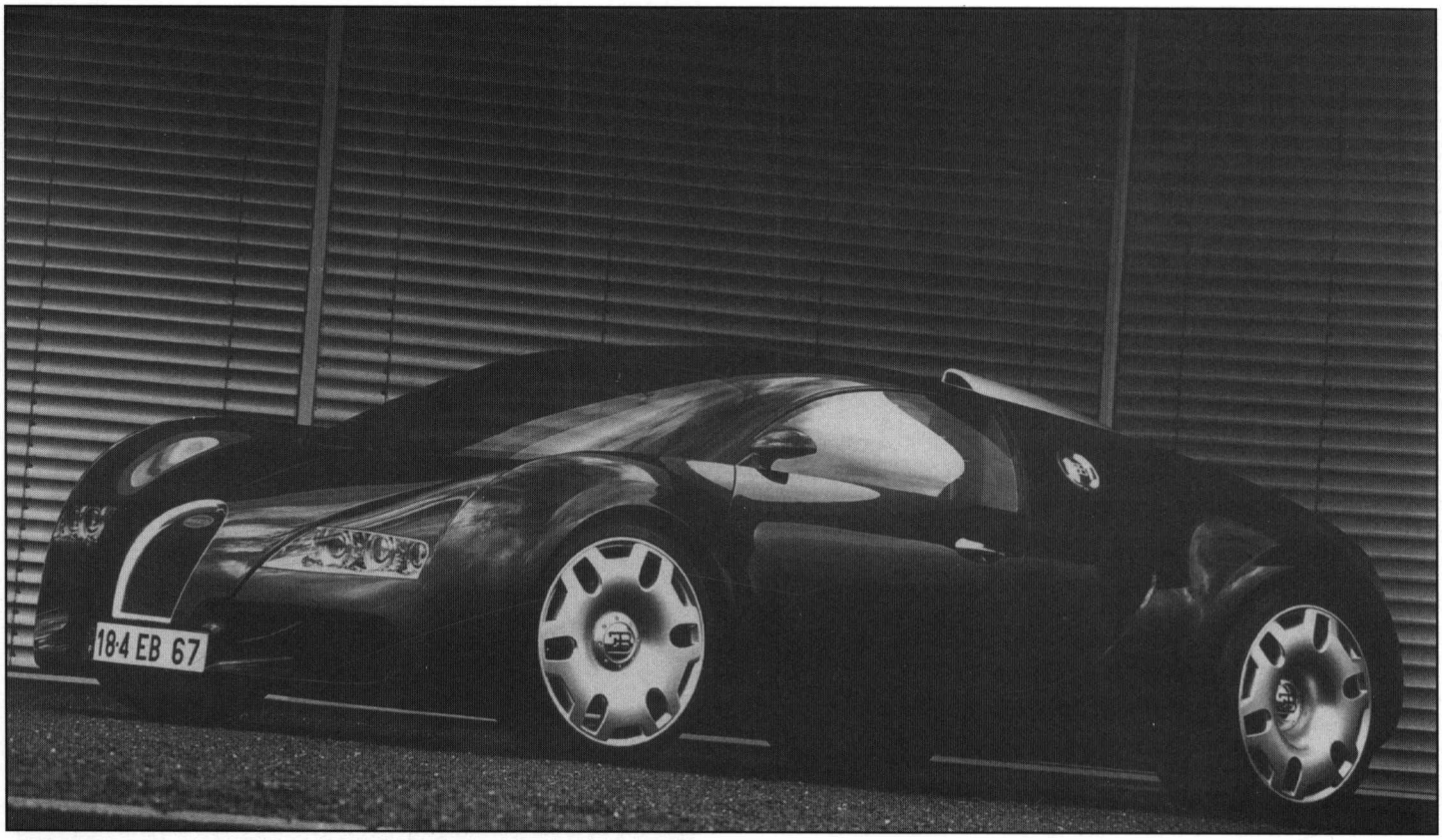


Fig. 7 – 16/4 Veyron (2001- to date), the latest production car

four wheels. Volkswagen claimed the top speed to be 253mph (406 km/h).

At the Geneva show in 2001, Bugatti announced that production of the Veyron would begin in 2003.

Volkswagen purchased the Chateau St. Jean in addition to the land next to it for a new plant. Ettore Bugatti's former home in Molsheim, France, became a welcome center for prospective Bugatti owners after the restoration of the estate was completed.

Bugatti's Volkswagen era is at its dawn and it will be years before anyone can determine whether or not the oval badge retains the sheen it once had under Ettore's leadership. From this vantage point, it seems that Bugatti is in the best position it has seen since the 1930s. That red oval badge aims to retake its well-deserved place at the head of the parade.

TABLE OF BUGATTI PROTOTYPE AND PRODUCTION CARS 1991 TO DATE

Model	Year	Engine	Power Transmission
EB110	1991	3499cc 60-valve DOHC quad-turbo V12 550hp	ZF6-speed manual
EB110GT	1992-95	Same engine and transmission as EB110 but 611hp	
EB110S/SS	1992-95	Same engine and transmission as EB110 but 650 hp	
EB110 America	1995	Same engine and transmission as EB110 but 600 hp	
EB112	1993	5995cc 60-valve DOHC V12 460hp	ZF 6-speed manual
EB118	1998	6255cc 72-valve DOHC W18 555hp	(transmission unknown)
EB218	1999	Same engine as EB118	5-speed automatic
18/3 Chiron	1999	Same engine as EB118	(transmission unknown)
18/4 Veyron	1999	Same engine and transmission as EB218	
16/4 Veyron	2001-	7993cc 60-valve DOHC quad-turbo W12 987hp	7-speed sequential. Car to be manufactured.

Review No. 38 (Winter 2002)
The Effect of the Magosix on the Hungarian Market

There was mentioned C. C. Freise [as a body manufacturer, p. 29]. As this was something new to me, I e-mailed Pal Negesyi who said that Friese was a car racing driver and not a coachbuilder. And there was no "Neuschlosser-Lichtig" but "Neuschloss-Lichtig."

Márian Šuman-Hreblay
Slovakia

The Soviet Auto Industry 1917 to 1953

[The "L" in] ZIL [does not stand for Lenin but for] Likachev [who] was one of the first red general directors of ZIS works. Likachev was a trusted person for the Bolsheviks as he was a member of the NKVD (early version of KGB). Directors who were not NKVD were not trusted and simply sent to Siberia (the fate of GAZ bosses).

Robert Przybylski
Poland

I am pleased to send you some photos of ZIL 112S racing cars as well as ZIS 510RT from before the War, and 112 model from 1951(Figs. 1-4).

Jan Tulis
Czech Republic

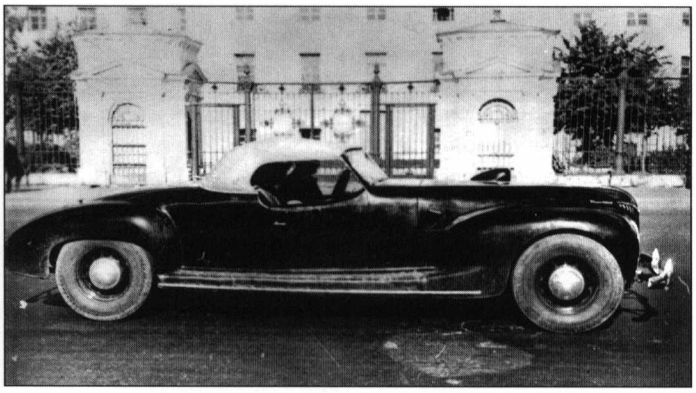


Fig. 1 – ZIS 510RT (1938)

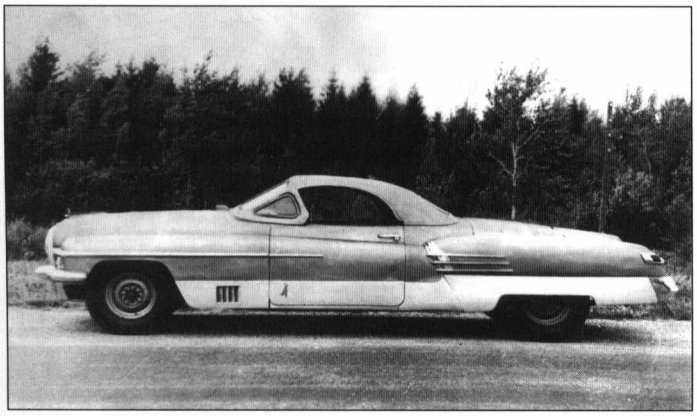


Fig. 2 – ZIS 112 (1951)

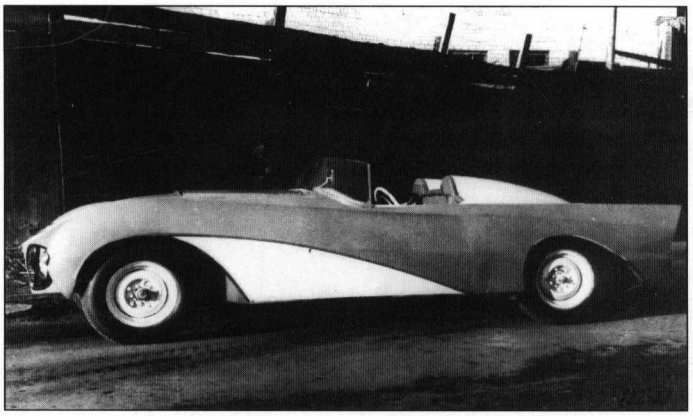


Fig. 3 – ZIL 112S (1958)

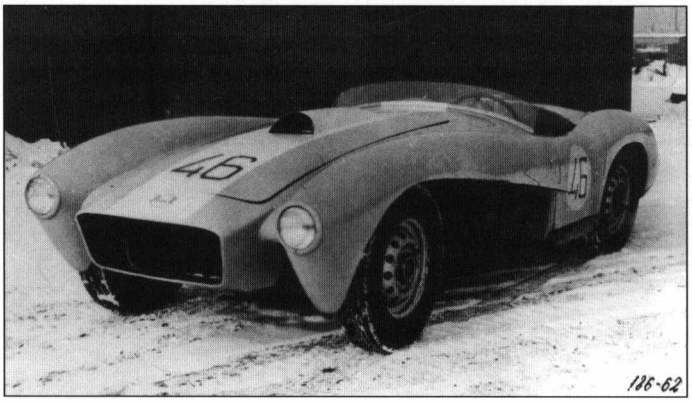


Fig. 4 – ZIL 112S (1960)

Review No. 39 (Fall 2002):
The Luxury Car Market in the 1920s:
Competition, Efficiency, and the Case of Stearns-Knight.

I had two errors in Table 6 (p. 15). The errors are as follows:

— The ROE (Return on Equity) for 1924 should have been stated as 0% (not 14.8% as originally reported).

— The ROE (Return on Equity) for 1927 should have been stated as 16% (not 496% as originally reported).

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Ohio, USA

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