



Part II: The Automobile *Cars in My Life— 40 Horsepower to 400*

by Arthur D. Delagrange, *Massachusetts Beta '64*

i BEGAN WORKING ON CARS before I had my driver's license, partly successfully. Getting my own car was certainly one of the milestones in my young life. My love of cars has since diminished only in proportion to my ability to drive them and work on them. I have been fortunate to own many outstanding cars, both good and bad. Had I always been able to keep what I had in good condition, I would have quite a collection—but I drove these cars daily, often to the point of exhaustion, and usually had to sell one to buy another.

My personal memories constitute a good cross-section of the modern American automobile. Much of what I would like to have owned, but didn't, some friend did. Read and re-live the days of growing up with cars, and marvel that I am here to tell about it!

First Car: 1941 Mercury

With World War II obviously approaching, my father decided to produce me and buy a car. The car was a good idea, although it gave him trouble too. He bought a 1941 Mercury; production ceased for the war shortly into 1942. This was to be our only car for the next 17 years.

It is interesting to review the technology involved, now 60 years old, as the car would be quite usable on today's highways. It had Ford's *flathead* (valve-in-block) V-8, 90 hp. The car still had a place for a hand crank, but we didn't have one; any sane person would opt for a push start in emergency. Antifreeze was methanol. It was not permanent, but slowly boiled off, because the cooling system ran

with little or no pressure. Dad kept a running sample in a bottle outside; when it froze, he added more methanol. It had a DC generator with a mechanical (relay) regulator and a six-volt system. Idling or in heavy traffic the battery would run down, but you kept the headlights on during a long trip to avoid overcharging. Starting in cold weather was iffy. It had a manual choke to enrich the mixture for starting. It also had an auxiliary hand throttle, a poor-man's cruise control. The oil filter, an option, was not full-flow. Pollution controls were zero. Top speed was above 90, quite a thrill on cotton-cord tires.

Transmission was a manual three-speed. Rear axle was *live* (unsprung differential) with a single transverse leaf spring. Force was transmitted through a *torque tube* around the drive shaft. Front suspension was *beam axle*, a solid axle between the wheels, again with a single transverse leaf spring. There were no anti-sway bars. The car leaned so badly on turns you instinctively pulled your arm back inside. (It was *cool*, both literally and figuratively, to drive with your arm out the window. It actually helped to keep you in place, as there were no bucket seats or seatbelts.)

It had both heater and defroster—probably an option. Hot air was drawn from around the exhaust pipe and available almost instantly. The air vent was a flap that raised on the cowl in front of the windshield, a high-pressure area. If you were moving (and it wasn't raining) the blast of air made even a hot day livable. The radio was vacuum-tube, AM only. It picked up only ignition noise until our county got a radio station. In fact, the ignition noise was so bad (pre-resistor-wiring) that our friends would always meet us at the door when we visited; the Merc wiped out their TV picture from a block away. The antenna went through the

CARS THE AUTHOR HAS OWNED

1941 Mercury
1956 Ford/supercharged Corvette
1963 Ford Econoline street rod/
rear V-8
1964 Ford 427/SOHC
1965 AC-Shelby Cobra
7 VWs, including:
Formula Vee,
trike,
buggies,
street rod
4 Jeeps
3 Pontiacs
2 Subarus
1981 Eagle Wagon/Jeep V-8
1988 Dodge minivan
1992 Ford F-150 pickup
1992 Eagle Talon AWD
1994 Dodge Viper
2000 Dodge Durango SUV

WE USED OUR RUNNING BOARD:

One day mother made the mistake of parking the car in neutral on our inclined driveway at the top of a hill. The parking brake (then called the *emergency brake*, because there was no dual-brake system) was set—partially. She looked back to see the car going down the driveway. I looked up to see it disappearing down the field across the road. Mother was standing on the running board, reaching through the open window, and pulling on the hand brake, which fortunately was on the left side of the dash. Having no better idea, I waited. Eventually the car reappeared with mother at the wheel. She had a very sore arm.

roof and was lowered by hand. After we forgot a few times, it was bent enough to go into the garage, but reception was even worse. Windshield wipers were vacuum operated. This allowed continuously variable speed, but they quit during full-throttle operation. Headlights were dimmed by a pushbutton in the floor. It could not have been on the lever for the turn signals because there was none.

All glass was flat; reflection of the sun from an oncoming windshield could nearly blind you. The windshield was safety glass (laminated glass and plastic), untinted. After a few years it would become cloudy around the edges and fail inspection, but a new one could be cut at the local glass shop. The fenders were distinct entities which basically just covered the wheels. The seams caught dirt and salt and rusted horribly, hence the expression “fenders falling off.” Between the front and rear fenders was a *running board*, originally a board where a footman could stand while the vehicle was running. Upholstery was cotton cloth, which didn’t last long.

It is unnerving to see how many features were changed, only to be changed back later! Claims of progress become dubious when you live long enough to find yourself back where you started. *Stick shift* later regained popularity not only on economy models but on performance cars. A new feature on ours was column shift, but this eventually went back in the floor. The fenders, which soon merged with the running board before vanishing altogether, returned later as fender flares on custom vans, complete with—what else—running boards! The key switch moved to the dash, losing the capability of locking the steering column, which had to be restored when crime increased. The hood hinges were later moved to the front—until it was noted that in a crash the hood often was forced up and through the windshield, decapitating the occupants. The hand brake changed to pedal-operated, but it reappeared in the new center consoles. When front-wheel drive was introduced, the front beam axle reappeared at the rear. When turned backwards, the inside door handles on the Merc slid bars into the door frame like a bank vault. Not only was this nearly impossible to jimmy, but it helped to retain the door in a crash. With the current emphasis on accident safety, this is being discussed again.

I became the owner of the car for \$1 at 200,000 miles when I moved off-campus. I did all I could for it, and it ran and looked a lot better, but it was like giving a face lift to a coronary patient. A gas-station owner looked it over and commented, “I used to own one of these deathtraps.” When I was able to buy a used car, still 15 years newer, Dad bought it back for \$1, and I learned a valuable lesson about negative profit. He managed to get \$100 on a trade-in, and the dealer managed to resell it.

1958 Edsel

In 1957, I was told I could have perfect teeth or the family could have a new car. Our one car was 16 years old. I opted for the car. Dad had bought the Merc against much advice, the Marque being only two years old at the time, because many thought it wouldn’t last. Ford was again introducing a new brand, and again Dad bit. This time he was not so lucky.

Edsel turned out to be one of the biggest business disasters ever, entering the vocabulary as a synonym for a bad idea. It was the product of the most extensive market research program to date, but the retort was, “On which planet?” The idea sounded good: GM had five brand names to Ford’s three, three “intermediates” to Ford’s one. The Edsel was an attempt to draw buyers from GM. In practice, it drew from Ford and Mercury (like Dad). Worse yet, facilities, parts, and workers were drawn from Ford and Mercury, basically cannibalism, damaging the company. Corporate infighting probably doomed the car before it appeared. Quality control and documentation were terrible; the car had to be fixed frequently, and often the parts on the car did not match those in the book. Edsel dealers were not allowed to sell anything else, and they failed rapidly.

The styling bombed! Compared to the other makes of that year, the Edsel was relatively modest, but the grill had a vertical ovoid center section that was unceremoniously dubbed the *flying toilet seat*. (Actually, it was closer to a horse collar.) The motif of a vertical center section flanked by horizontal lines was later used by several other makes, but the damage was done. The taillights looked like huge glowing eyebrows. The following year, rather than standing firm, Edsel muted all its prominent features and added a six-cylinder engine to the highest-rated V-8s available, probably turning a retreat into a rout. A mild recession hit, and the buyers' attention turned to the new compacts being introduced. The third year, Edsel was just a modified Ford; the firm built few cars before ceasing production forever. Ford took a loss of \$350M, the biggest corporate loss to date.

The car was full of gadgets, most of which gave trouble. The automatic transmission was controlled by pushbuttons in the center of the steering wheel, which soon quit. Heating/cooling/ventilation was selected by one huge knob. Although a precursor to today's controls, it was mechanical rather than vacuum, and it soon gave trouble. The speedometer was a rotating horizontal wheel, like some compasses. The damping fluid leaked out, leaving it to spin wildly. The wheel rims were made from sections; the joints rusted and leaked. The lower radiator connection leaked persistently until we took it out and found that the lower tube had been smashed flat on the bottom.

Aside from the constant repairs, we liked the car. Performance was good; in fact, it seemed great until we found out the speedometer read 17% high. Dad, being an engineer, patched and put up with problems, but the general public didn't.

1956 Ford Convertible

When I made enough money working as a co-op student to buy my own car, I knew what I thought I wanted, a T-Bird (Thunderbird). When I found that T-Birds (used) were going for three times as much as ordinary Ford convertibles, I lowered my standards. I found a Ford with all four fenders banged up. The story was—the man had bought it for his wife, but the previous young male owner “had done some work on the engine,” and his wife was unable to control the car. It was indeed much faster than a couple of similar ones I inspected. Body work and a paint job were included in the price, and I took it.

I enjoyed the car, but it soon developed a leak at the engine rear-main seal. The dealer installed a new seal, but told me that the engine design wasn't strong enough to hold. He was right. (The design was abandoned after four years.) As the car soon neared 100,000 miles, it was leaking oil from other locations and had developed a banging noise which sounded serious, which led to an experiment (next section).



The first car the author bought on his own, a 1956 Ford Fairlane Sunliner.

SATURN

General Motors launched the Saturn in a similar manner, but it didn't make the same mistakes.

Although the Saturn dealers sell nothing else, the car was a complete new design, built by newly recruited workers in a new plant. Buying a new car for the first time in decades, my brother-in-law opted for a Saturn and has had no problems.



Homemade VW buggy, airborne.

1962 Corvette V-8 Engine

I never had a Corvette, but I did have a Corvette engine. There was obviously no point in trying to rebuild the engine in my Ford. I found a mechanic who would adapt a different engine. I wanted the new big Ford engine, then 406 cu. in. and 400 hp. He wasn't sure he could fit it, and favored the smaller Chevrolet engine, then 327 cu. in. rated at 360 hp. in fuel-injected form in the Corvette. I decided I could live with that, although when I found out that fuel-injection required a 50% surcharge, I settled for one four-barrel carburetor and 20 fewer hp.

It turned out that Ford and Chevy did nearly everything in opposite fashion. I had to chop the oil pan sump because that's where the Ford steering rods were, and the engine would lose oil pressure under hard braking. But between the two of us we got it working, and it surprised a lot of people, including the Chevrolet dealer who adjusted the valves (and left the rocker arm covers loose, creating a cloud of burning oil smoke as I drove away). After reducing the insides of a stock transmission to what the mechanic said looked like "a bag of peanuts," I converted to a Packard transmission.

Eventually the car started to overheat. I figured if I couldn't drive it far, I might as well do a quarter-mile at a time (drag racing). I added a GMC Rootes-type supercharger. Just about the time I got everything working, the engine seized. The excess heat had been from a failing bearing. I had too much else going on, so I sold the car. By that time, I had two other cars that were faster, anyway.

Postscript: I learned later that the T-Bird had the engine set back and the oil pan reversed; the Corvette engine would probably have fit nicely in one of those. The big Ford engine would also have fit in my car easily.

1963 Air-cooled Volkswagen

Dad's next bite was a VW, a novelty in Appalachia. (A billboard for the local dealer had it spelled *Volkswagon*.) I teased him, but wound up eating my words, eventually owning that car, another VW he bought, and several others.

The Volks-wagen (translation: people's car) was the product of possibly the oddest association ever—the engineering genius of Dr. Ferry Porsche and the political genius of Adolph Hitler. The story goes that Hitler was embarrassed by pictures of fine German cars disabled along the Autobahn, really not surprising because there was no speed limit and many simply drove their cars to exhaustion. He wanted a car that could be driven all day wide open, be air-cooled with no radiator to boil over, have the engine in the rear for good traction in mountain snows, and be affordable to the common man. In 1934, Porsche was assigned the task, apparently similar to a car he was already designing, and the first VW was produced in 1936. The "Beetle" (supposedly the inspiration for the original shape, now a trademark) was produced in similar form into the 1990s, achieving the longest production run and the most units sold, surpassing Ford's Model T.

Understandably, the American manufacturers laughed when two of these little curiosities were imported in 1949. They shouldn't have; VW eventually took 5% of *their* market. The car ran completely counter to the current trend: it was small (four-passenger), light (1,600 lbs.), underpowered (1,100 cc/36 hp.), and offered no instruments other than speedometer. A red light indicated no charging; a green light indicated no oil pressure. (We said they meant *replace generator* and *replace engine*, respectively.) It offered virtually no options—a real anachronism. It used no head gaskets and no cam bearings (the cam rode directly in the crankcase halves). It retained the six-volt generator sys-



Formula Vee race car—VW running gear.

tem long after the Americans switched to 12-volt alternator, and it had such oddities as mechanical turn signals (little arms flipped out from the sides of the car) and a roller in place of a gas pedal. But therein lay the appeal to a small but growing market segment. It was so ugly it was cute. It was a challenge to drive, i.e., fun! It would go 300 miles on its little 10-gallon tank.

It managed to acquire a reputation for quality, not totally deserved. VW claimed it would junk a car for one defect. Aside from that being patently absurd, Dad's was delivered with not one, but three. Individually the parts appeared well-engineered, but together they were a nightmare. Step 1, to change the generator, was to "remove the engine from car"—a two-person job, mainly because the bolt heads were accessible from below and the nuts from above. It was unnecessary; I modified mine so I could remove the engine by myself (using hand tools and a floor jack), and later so I could change the generator without moving the engine. The car also had a reputation for parts interchangeability, again not warranted. I had 1965 and 1967 engines, and few parts interchanged. The engine was rather light, small, and mostly alloy and, having no water jacket, was cooled by air directly and by an oil cooler. Drivers on long-distance rallies often carried a complete spare engine in the back seat. It used no head gaskets. Cylinders were separate from the crankcase, so the engine could be totally rebuilt by an amateur like me.

The car had a number of other novel features, which led to alternative usages. The entire front suspension was a unit held on by four bolts. The engine was mounted to the transaxle by four bolts, which in turn with the rear suspension was mounted to the body by about a dozen. The rear torsion bars could be readjusted for a lighter body, and one of a pair of front bars could be removed. Virtually all the running gear was mounted to a floor pan which was strengthened by a large tunnel down the center and two smaller rails along the sides, although it could survive with the latter completely rusted through. Attachment of the upper body made a strong unit, but that wasn't necessary either—a soft-top version was offered. With addition of mounts for steering column, switches, and gas tank, the floor pan could be driven by itself!

This led to the *buggy*. Bruce Meyers made a cute fiberglass *tub*, or open-top body, which bolted to the VW pan. A patent was refused, and he watched as other companies marketed bodies ranging from copies of his to copies of race cars.

Another popular creation was the *trike*, a three-wheeler consisting of a motorcycle (preferably Harley-Davidson) front end and a VW rear end. Since the entire VW drive train was in the rear, it was an easy conversion. With the engine behind the axle, it had great traction. It was also dangerous. The front wheel had inadequate grip for steering, especially when it was up in the air due to hard acceleration. It would not steer like a car, nor could it be leaned like a motorcycle. In fact, it leaned the wrong direction, because the VW had little roll stiffness in the rear, and adding an anti-sway bar was inadvisable as it aggravated the poor geometry, all rather disconcerting. I had a Kawasaki 400 with a failed engine and a VW with a completely rusted body. The surviving parts made a nice trike, which I called a Karmannkazi (Karmann being a bodyworks VW used).

A single-seat open-wheel racer based on VW components was built for the Formula Junior class in Sports Car Club of America (SCCA) racing. It was not competitive, but it was so cute that its own class was created, and *Formula Vee* is still one of the most popular and competitive classes today. I enjoyed racing one for several years. The car weighed 825 lbs. (without me). Engine, transmission, brakes, and much of the suspension were nearly stock and quite reliable. On a typical hot summer day while drivers of front engine cars were being reduced to puddles of perspiration, I was having a pleasant, cool Sunday drive in my little rear-engine car. It was content with leaded regular gas, and not much of that!



VW/Kawasaki "trike," possibly the world's only five-wheel vehicle.



1964 Ford Galaxie with stock car engine, shocks, wheels, and tires.



Ford 427 SOHC engine with overhead roller cam, hemi heads, four-bolt mains, forged-steel crank, and 600+ hp.

1964 Ford 427

In 1965 I got my *big block* in the form of a year-old Ford convertible with the 427 cu. in. NASCAR engine, double four-barrel carburetors, rated at *about* 425 hp. I bought it against much advice; the engine, which existed for the primary purpose in life of running 500 miles wide open, was not available with automatic transmission, power steering, power brakes, or air conditioning and did not carry the usual warranty. It did have some serious equipment, such as sodium-filled valves, a forged-steel crankshaft, and cross-bolted main-bearing caps.

The car was well designed, except that the shock absorbers were somewhat inadequate and the wheels and tires were totally inadequate. At full throttle, the right rear wheel would spin all the way through first gear and partway through second. I eventually used stock-car racing components.

I finally had to replace the engine after 150,000 miles, but only because the starter died and it was buried (no pun) under the massive exhaust headers that were thoroughly rusted in place by this time. I was able to obtain one of the special single-overhead-cam (SOHC) hemi-head 427s that Ford had built to dominate NASCAR (which did, and were promptly handicapped out of contention). It was a thing of beauty, with huge cast aluminum valve covers over the cam and opposed valves and a huge cover across the front over the timing chains. The manual said it produced “in excess of 600 hp” with one four-barrel; I converted mine to two. This was probably the most brutal engine ever produced for a passenger car. I had to run the ignition at fixed 34 degrees advance to get it to idle. I was concerned whether the starter would be able to crank it, but the cam was so radical (360 degrees) there was little cylinder pressure at idle. With such a cam and the strange geometry of a roller cam, the cam lobes were dumbbell shaped. The original NASCAR carburetor did not work well below 3,000 rpm; fortunately, the dual carbs were tamer. Even so, the engine missed below 60 mph. Redline on such a massive engine? 7,500 rpm with 1,000 more over-rev space. It got eight mpg on the interstate. I sold it when the gas crisis hit and I couldn’t find premium fuel, a necessity with 12.5:1 compression ratio.

1965 AC-Shelby-Ford Cobra

In 1967, I had a chance to buy a two-year-old Cobra and became a three-car (bachelor) family, owning more than 1,000 stock hp. Nearly unknown then except to racers, *Cobra* has since become a household word, the original story now lost in the multitude of models and replicas using the name.

Carroll Shelby, a world-class race driver who had retired with a weak heart, set out to produce a world-class American sports car. Corvette was a good car, but heavy, and GM clearly was not going to offer the support necessary to compete with foreign factory-backed teams. Shelby wanted to put an American V-8 into a European chassis. He found a willing partner in Ford, which no longer had a competitor to the Corvette. Ford had a new V-8, similar to Chevrolet’s but smaller and less potent. Shelby soon remedied the latter with hotrodding tricks. It had the highest oversquare ratio (4.00” bore and 2.87” stroke) and the biggest valves available at the time. It produced well over one hp/cu. in. with carburetors. For a chassis he obtained the British AC (for AutoCarrier) Ace, which had been using a six-cylinder engine. It was reasonably sturdy, and, with some modifications and beefing-up, proved reliable. It was somewhat outdated, but did have rack-and-pinion steering, four-wheel disc brakes, and independent rear suspension. The suspension used single transverse leaf springs, which also served as the

upper control arm—not the best geometry, but it was so stiff it didn't matter much. With a tube frame and aluminum skin, its weight was but two-thirds that of a Corvette. It consequently was quicker, although it sold for about twice as much.

The first ones in 1963 did not offer air conditioning, power brakes, power steering, automatic transmission, roll-up windows, door handles, radio, or heater. (Mine, fortunately, had the last two, and later at least one was fitted with an automatic for a handicapped person.) But when you stepped on the gas, there was no time to worry about such details.

Cobras were winning most of their races, but Corvette was about to offer its new big-block semi-hemi motor. Never content, Shelby redesigned the Cobra. The frame was strengthened and widened to accept the 427 engine. The suspension was replaced with double-wishbone type. Front discs were vented. Wheels were changed from wire, spline-drive, to wider alloy, pin-drive. An oil cooler was added, and the radiator was enlarged. The transmission was changed to the new heavy-duty Ford. This is the car that, now in production again after 30 years (Shelby had never finished the original production run), sells for \$250,000. This is also the car that is copied by about a dozen vendors, who are now being sued by Shelby. The *Cobra* trademark was taken over by Ford, applied to a variety of models, and is still in use.

1972 Jeep CJ-5 V-8

After WWII many of the ubiquitous Army *Jeeps* fell into the hands of civilians. Willys-Overland redesigned it into a slightly more civilized form and sold it as the *CJ*, for *Civilian Jeep*. American Motors Corp. (AMC), which eventually acquired Jeep, refined it marginally. As one magazine reviewer said, the dashboard was “tastefully decorated in hex-head bolts.” It became so popular that in 1972 AMC added its V-8 engine. This was now a vehicle that weighed only 50% more than a VW Beetle, had a wheelbase a foot shorter, sat considerably higher, and had twice as many cylinders and four times the horsepower! Not surprisingly, they tipped over rather easily, and in fact came from the factory with a roll bar. I got a *slightly used* one before discovering a new front wheel and tire, new windshield, new paint over much body putty, and scrape marks on the side of the roll bar. All the warnings from safety experts didn't hurt sales; word was that the V-8 Jeep was keeping AMC afloat financially. Mine still runs, but the rust is so serious that what is left of the body is no longer firmly attached to the frame.

1975 Chevrolet Vega Showroom Stock

When GM debuted the Vega in 1971, some predicted a repeat of the Corvair experience. They were right. The Vega had a radically new engine, competing against cars built with proven designs. It was overhead cam, at the time associated with racing engines, but it was underpowered. The block was aluminum, but the head was still cast iron, the reverse of most mixed engines. (The head weighed more than the block!) Aluminum has a coefficient of expansion more than twice that of cast iron. Furthermore, at different places the head gasket must seal against water, oil, and compression. This is a designer's nightmare, and leaks were common. The pistons rode directly in the aluminum, which was specially treated. This worked under normal conditions, but would not tolerate loss of coolant (see leaks, above), which ruined the engine. Worse yet, early models had no coolant-overflow recovery tank and no low-coolant warning light.

It had an electric fuel pump, wired through the oil pressure switch so it would shut off if the engine stopped, as in a crash. However, old engines would not develop enough oil pressure at cranking speed to close



1963 Ford Econoline with rear-mounted 1972 Jeep power train.



1975 Chevrolet Vega showroom stock racer.

CHEVROLET MONZA

The Monza was basically a Vega underneath, but it was introduced later after most bugs were worked out and managed to avoid the bad reputation. Oddly, it offered a four-cylinder or a V-8 engine (which the author had). It was fancier and more expensive and never found the niche that it probably deserved.

FORD PINTO

While Vega was having its problems, its chief rival, the Pinto, was having one of its own. The gas tank was prone to *explode* (catch fire, really) in a rear-end collision. Ford had achieved its goal of producing a car weighing less than 2,000 lbs. for less than \$2,000, but some safety had to be sacrificed. It was questionable how much protection occupants of a compact car with no frame should expect, but an internal memo was found stating that it would be cheaper to pay the *human cost* (read lawsuits) than to fix the problems. A sympathetic jury found Ford negligent and gave the biggest damage award yet, \$128M.

the switch, so if the engine didn't start with the residual fuel in the carburetor, it could not be started.

The unibody had no frame and, in fact, had no heavy metal at all. Where thickness was required, several layers were sandwiched together. The cracks trapped water, mud, and salt and rusted quickly. I have seen rust holes in Vegas three-years old.

I had a 1975 model, in which GM had corrected many of the deficiencies, and it was a good car. I bought a race car and converted it to street use, the reverse of what normal people do. The class was *showroom stock*, in which cars in street condition with no modifications other than safety gear are raced on road courses. (Many were driven to the track!) This car raced four years with several drivers and finished every race, an enviable record. It finished with cracked wheels, steel cords hanging from the tires, brakes smoking, and missing first and second gears, but it finished. The manufacturers were keenly interested in what broke, and many failures were fixed under warranty. Racing does improve the breed.

At the end of its eligibility, I bought the car from its owner (you *can* rent a race car!) and used it to drive to work in a four-person car pool, intimidating the other commuters with my name and car number on the side. Then one day along the interstate, the crankshaft broke in half. (It broke crosswise, halves effectively locked together. I made it halfway home until the wobbling front pulley destroyed the timing belt.) I replaced the four-cylinder engine with a V-8 and commuted some more. It went through three more owners before it finally succumbed to terminal rust.

GM later redesigned the rear suspension, the weakest point in racing. The final car was quite nice, but it never overcame its reputation and was dropped.

1998 Dodge Minivan

Before its 1984 introduction, a Chrysler executive took a prototype of a new small van home to try out on his family. His kids loved it. He went back to work and gave instructions to double the planned production. Even that turned out to be inadequate. The *minivan* became the vehicle of choice for what would become known as *soccer moms*, flooding the streets of suburbia as a sort of personal school bus. It was modified by young singles with curtains and other accessories as the *love van*; some living in them. The older generation got in on the act with *custom vans*, typically identified by raised tops, wide fenders and running boards, and having such amenities as game tables, TVs, and wet bars.

The minivan became a big money-maker for Chrysler, especially since development cost was surprisingly low for such a new idea. It was built on the existing *K-car* (Aries/Reliant/Le Baron) platform, the front-wheel drive powertrain adapting readily. One might question the wisdom of building a light truck on components of a car that was not particularly outstanding to start with. But this time the industry did a good job, possibly learning from a previous bad experience; earlier *microvans* had been developed from compact cars. These were under-designed and had a tendency to assume an inverted position, and most didn't last long.

The minivan replaced the station wagon as the family utility vehicle. It had more room, more seating, and more adaptability, all in the same footprint. Its weak points were handling, styling (a box), air drag (again, a box), and crash safety (no extended nose or tail to absorb impact). But for a trip to the schoolyard or the convenience store, who cared? Ours just passed 200,000 miles, making strange but apparently acceptable noises.

1992 Eagle Talon All-Wheel Drive

As I was approaching retirement, my wife faced the prospect of driving to work by herself, 30 miles each way, in a region where you might go to work with the windows open and come home in a blizzard. For the first time in our lives, we decided to buy a new car. I wanted a sporty performance car. She wanted a car that could haul us and her twin sister and her husband, if necessary. It had to have four-wheel drive and get good gas mileage. A tall order, but we agreed on an Eagle Talon (marketed by Chrysler, designed by Mitsubishi).

Two things impress me about this car. First, how much it resembles some race cars that I watched not too many years ago: low profile, sloping front and rear glass, chopped-off rear (Kamm effect), four-wheel disc brakes, four-wheel independent suspension, rack-and-pinion steering, double-overhead-cam engine, five-speed transmission, big (16" x 7") mag wheels, and tires that look remarkably similar to the rain racing tires I used to have. Plus it has a turbocharger and all-wheel drive! Indeed, I have had the car on a road-racing course, and it is impressive. One negative is the MacPherson strut front suspension, probably necessary because the engine is mounted transversely.

On the other hand, all the usual creature comforts and gadgets are jammed in somehow. The down side is that even with a shop manual, it is difficult to repair. It has made it past 100,000 miles with no warranty work other than two factory recalls. There are a number of annoying problems I choose to ignore, but I have spent less than \$50 in actual repairs!

1992 Ford F-150

For many years the most popular single model of car was a truck—the Ford 1/2-ton (standard size) pickup. Now another dubious suburban icon, it was originally a farmer's vehicle. The average family at mid-century could afford only one vehicle. The small-farm owner had to be able to haul both his family and fertilizer; there was no choice of vehicle. A nicety like a heater was an aftermarket item, not always purchased by frugal families accustomed to unheated bedrooms and outdoor plumbing.

But as everyone's standard of living shot up after WWII, the manufacturers realized that the cab need not be much different from the front seat of a car. And as car interiors became more durable and truck interiors became more comfortable, the two merged. In deference to actual use, an optional cab was extended to seat-and-a-half to accommodate 2.5 children, at the expense of a somewhat shorter bed or just a longer vehicle. As everything became bigger and stronger, the real capacity of pickups came to equal that of honest-to-goodness trucks of the pre-war era.

I needed a vehicle that would plow snow, haul 4' x 8' sheets of building material, tow a car trailer, or simply act as a spare car. I bought my first pickup with some reluctance, but I am now addicted. In addition to meeting my basic needs, the vehicle handles and rides surprisingly well. In a pinch it can haul four adults and/or a ton of cargo for a reasonable distance. It is a tribute to America's *can-do* engineering. The truck has passed 100,000 miles with no huge repairs, but my list of little things that have failed or never worked properly is up to 36 items.



1992 Eagle Talon AWD—with a paint job and a big number, it could pass for a race car of two decades earlier.

Some “tricks” from hotrodding and racing that have found their way into American production vehicles:

- Tall, wide, one-piece alloy wheels
- Wide, low-profile tires
- Dual braking systems
- Disc brakes, ventilated, four-wheel
- Double shock absorbers
- Independent rear suspension
- Rear anti-sway bars
- All-wheel drive
- Locking differentials
- Front spoilers and rear wings
- Streamlining (wind tunnel test)
- Automatic transmission fluid in standard gearboxes
- Synthetic oil
- Bucket (individual) seats
- Seat belts
- Rollover bars
- Halogen headlights
- Battery voltmeter
- Tachometer
- Electronic ignition
- Electric fuel pumps
- Electric radiator fans
- Fuel injection
- Wide fan belts
- Oil coolers
- Roller camshafts
- Supercharging
- Engine compartment vents
- Tube exhaust headers
- Ram induction



1994 Dodge Viper—one horsepower and 400 horsepower.

1994 Dodge Viper

In 1992, I placed a deposit (constituting a significant part of my life savings) on a car I had never been in, knowing it might never be delivered. Why?

In 1989, Dodge had presented a show car, a sports car, something the *minivan company* had never done. The response was incredible. In spite of the caveat that no production was planned, enthusiasts sent the factory orders and even deposits (which were returned). However, Dodge judiciously had built a working prototype (many show cars are nothing more than stage mockups) out of more-or-less available parts. (The engine was borrowed—the only existing prototype from the V-10 truck program.) Soon Chrysler announced that not only would it build the car, but that the car would be as advertised and would be available in 30 months, a record short design cycle. There was much skepticism on all counts, but the company made good.

Why the furor? In an age of *smaller and techier is better* the car seemed a step backwards. It had the biggest engine, biggest brakes, and biggest wheels and tires available on a car—and the smallest carrying capacity. It would not be available with highly technical gadgets, which meant not only variable suspension and automatic brake system (ABS), but cruise control, automatic transmission, retractile top, or even roll-up windows and door handles! Actually, I wanted one partly because it did not rely on gadgets, but good solid engineering. (It appears from the shop manual that I can work on everything but the computer-controlled EFI.) It was billed as *successor to the Cobra*, and indeed Carroll Shelby was involved in the initial planning until he had to stop for a heart transplant.

Editorial opinions ranged from, “Nobody wants this car!” to, “Nobody should be allowed to have this car!” These probably helped sales; Viper has had a two-year backlog ever since. Proponents said that a car/driver combination capable of surviving nearly 200 mph would be very safe at 70; the real problem was combinations that were already marginal at 70. When people asked me why I needed so much horsepower, I pointed out that the engine in their commuter car produced more power than was considered necessary in 1950. That’s progress!

Dodge produced 285 Vipers in 1992, not exactly mass production.

But it was purposely a test bed for new ideas, and some didn't work. The hood was the largest piece of fiberglass ever made for a car, and the initial reject rate was 50%. But the cars started arriving at the showrooms—and stayed there. The dealers were in no hurry to sell a car that attracted attention like they'd never seen before, and they were demanding double the list price. Upset that few appeared on the road, Dodge decreed that the next batch of orders would all go to private owners. I ordered one. Something big was happening, and I was going to be part of it, success or flop.

I finally received a 1994 Viper—wrong color and no A/C. The dealer graciously offered to keep it for himself, and I not-so-graciously refused his offer.

Am I happy with the car? Suffice it to say that it resides in a locked garage with the alarm system on and the keys hidden. I didn't realize that there were no cupholders until it was pointed out to me. It is not a Cobra, but I knew that would be impossible under the present regulatory climate. Given the restrictions, it is nothing short of a miracle. (Mine has side exhaust, since outlawed.) There is little on the road that can match the performance of my seven-year-old car, certainly not at the price (\$50K). I have had it on a road-racing course, and the main limitation was the driver. (With 400hp. and 450 ft.-lb. of torque, you steer with the accelerator more than the steering wheel.)

The styling, now 10 years old, still attracts attention. The grill design permeates the Chrysler lineup, even the lowly minivan. The huge *gills* (air vents) on the side of the hood are a trademark. I impress people with the size of the front tires, then point out that the rears are 25% wider and that the tread wear indicators are disappearing at 13,000 miles.

Viper is one of those cars that became an instant legend. This was helped somewhat by a second-rate TV show where the car performed such nonsense as changing into an off-road vehicle. (The cars in the show had neither Viper engines nor transmissions.)

Thanks to modern technology and careful engineering, the car meets a widely disparate set of goals—a Superman/Clark Kent with a little bit of Lois Lane. It will pin you in the seat with 0.6g forward acceleration (limited mostly by wheelspin) or throw you out with 1.0g in the other three directions. (The federally mandated triangle belt is woefully inadequate; fortunately, mounting points are provided for a 5-way racing harness, which I have.) It can be driven, somewhat grudgingly, in traffic. It is plenty comfortable for a 500-mile jaunt. I have measured 25 mpg on interstates. You can put the top and windows in the trunk—OR you can carry some luggage. There is a space-saver spare; a damaged tire will fit in the trunk (lid up), but the luggage must then be left behind.

What more could one want? When Team Viper posed the question to the convened owners, the answer was, "More power!" And we're going to get it. That's progress.

Epilogue: 2000 Dodge Durango

Preparing to enter the next century, I once again had need of reliable transportation, having none with less than 100,000 miles (the Viper and street rod are not transportation). I needed a vehicle that could replace either truck, van, or AWD car, depending on which expired first. No choice. I bought a specimen of the latest craze: a Sport-Utility Vehicle (SUV), a contradiction in terms. These are now available in most brands, ranging from economy (*economy* being the price of my West Virginia house) to luxury. Mine came standard with such off-road necessities as overhead-cam V-8, automatic transmission with overdrive, cruise control, power windows, and door locks. These hybrids are typically built on a modified light truck chassis, usually 4WD, but with little sacrifice on the passenger car interior.



Viper V-10 engine with 400 honest horsepower, 450 ft-lbs of torque, and \$16,500.

Ford GT40 Markk IV—Lemans winner and Ford 427 NASCAR power.





Arthur D. Delagrance, Massachusetts Beta '61, is holding a 1,200cc. air-cooled VW engine.

He received a B.S. and M.S. from the Massachusetts Institute of Technology in 1962 and a Ph.D. from the University of Maryland in 1974, all in electrical engineering. He worked at the Naval Surface Warfare Center in Silver Spring, MD, (now closed) during 1959-94. Since retiring, Art has done consulting as a free lance and for Advanced Technology & Research, Burtonsville, MD. He and his wife Janice live near Mt. Airy, MD, which is on the Old National Pike.

Art has authored 68 governmental reports, 22 articles in trade magazines, and one chapter in *The Art and Science of Analog Design*, edited by Jim Williams (Butterworth-Heinemann).

He has written articles on the C&O Canal (THE BENT, Fall 1999) and on the B&O Railroad (THE BENT, Spring 2000). Art holds nine patents, and his hobbies include electronics, audio, music, cars, water-skiing, and cycling. He has been interested in cars as long as he can remember.

Evaluation: Too soon to tell, although some annoyances have popped up, such as a headlight pattern with a black hole in the middle. These aside, it seems to be a remarkable compromise between security and comfort.

Postscript: Ford GT-40 Mark IV

If I could have any car in the world, no questions asked, the choice would be easy, and it would be a 33-year-old car! Ford wanted to win the prestigious 24-hour Le Mans race. The original Cobras had no chance on a high-speed track (200+ mph on straights); a Cobra with a special streamlined body (Daytona Coupe) was still unlikely. So Ford commissioned a real race car, the GT-40. When it became apparent the race still would be a tight one, Ford replaced the small-block engine with the NASCAR 427. When asked why they didn't use the SOHC engine, the engineers replied that they didn't need it! They were right. The only questions were: (1) Would it stay together? (2) Could it be kept on the track? (3) Would it collect one of the slower cars (all others) in the grill? The answers were yes, yes, and fortunately no.

The drivers were Dan Gurney and A.J.Foyt. Gurney was known as experienced and conservative, but Foyt was new to this particular game and had a reputation for a hot temper. Indeed, the initial pace the car set caused some to think its purpose was just to goad the competition into too fast a pace. But it never slowed down. The Americans won it, with American equipment, in American style. After the race it was found that the engine could have continued easily; it was producing slightly more horsepower than when it started.

Recall also that, according to the rules, this was a car that (theoretically) could be driven on the street. It had a spare tire, mufflers (barely), seating for two (if the passenger was a masochist), and a place for a small suitcase (if fireproof; next to the exhaust pipes). The question is: will I someday be able to buy a car like this from my local dealer? And, equally important, will I be able to afford it?

Notes:

This article is continued from "The Automobile, Part I," which was published in the Spring 2001 issue and is available at www.tbp.org. Since this feature was written, Ford has announced that it is considering producing a street sports car based on the GT-40.

This article was written principally from the author's memory, with the information checked and filled in from the references listed below. The author thanks William Pettit, owner of the former Museum of Motoring Memories, Natural Bridge, VA, for proofreading. He also thanks Robert L. LaGrace, who during an interview before election to Tau Beta Pi asked the author "What can you do for Tau Beta Pi?" In survival mode at MIT, the author was stunned and admitted that he had not thought about that, but would do what he could. "Here it is, Bob."

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With added horsepower and torque, having a more aggressive suspension setup is key. Dinan's Racing Coilover suspension allows the driver to adjust to their preferred ride height and utilizes Beehive shaped front springs and low profile camber plates with progressive bump stops that allow the car to be lowered up to 3/4" and still maintain stock suspension travel. Dinan Quiet Design's Camber plates make it the quietest coil-over suspension on the market and suspension packers are included to fine tune handling and comfort by changing the clearance of the progressive bump-stops. "Our 1M R&D vehicle has been an exciting build and we're thrilled to have a big lineup of parts for the car," said Dinan Engineering President, Steve Dinan. Mechanical Engineering. Cars and Automobiles. What's the highest horsepower recorded on a 2.0 4 cylinder engine without turbo on a automobile? Update Cancel. aRdE ZbbKpyByKAotY jFpSXdovrrNjgikem KOJoffw DEFbzAAmlRNrpxwxWZiMrCEAPieuOWSsxtR. BMW's one-liter engine in the S1000RR motorcycle produces around 200 road-legal horsepowers. Of course that doesn't scale up 1:1, but 300 road-legal hp should be possible, 370 to 400 for racing. The characteristic of such an engine would limit usage to lightweight sports cars, however. Running a short-stroke engine with its peak power around 12,500/min in a 1.5-ton saloon is not within the scope of "good idea". 9.3k views · View 10 Upvoters. Thank you for your feedback!