

Evolution

An Introduction

By John Chamberlain

john_chamberlain@glenbard.org

“We will learn about evolution today. By the end of the presentation, you should be able to define the word evolution and tell some of the major ideas it contains.”

Evolution

An Introduction

“We will learn about evolution today. By the end of the presentation, you should be able to define the word evolution and tell some of the major ideas it contains.”



“What is this?”

“When was the automobile invented and by whom?”

(In the 1880’s by several different inventors around the world, independently. Therefore, we do not credit any one individual with its invention. Benz was one of the earliest builders; he named his company after his daughter, Mercedes. The internal combustion engine made its invention possible.)



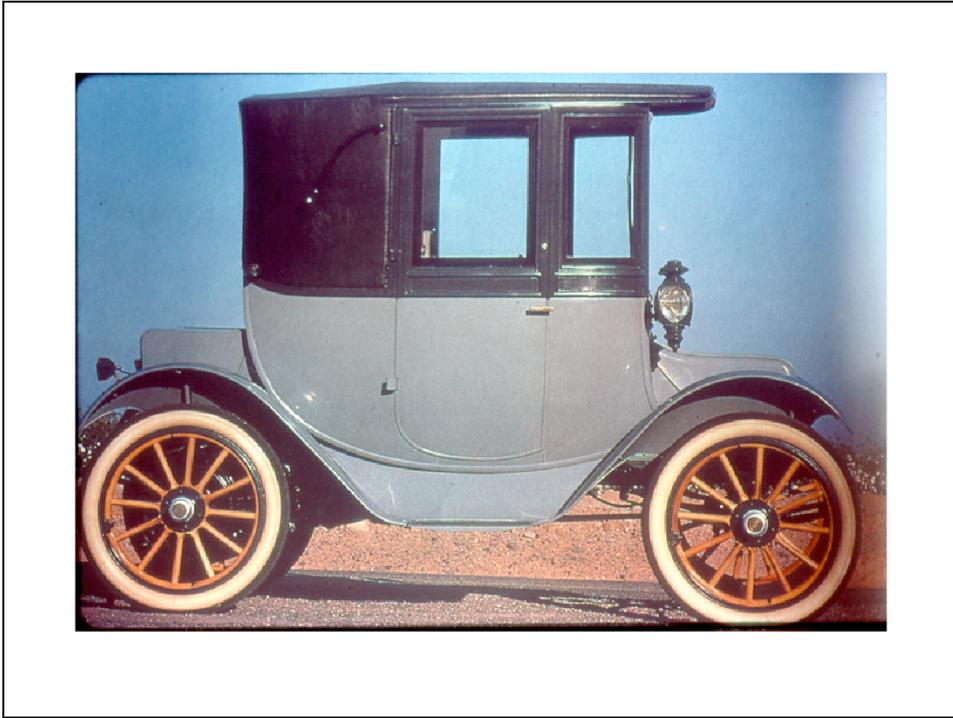
First major idea: Designs are borrowed from pre-existing ones! Cars were not built “from scratch.” This one borrows heavily from the horse and buggy.



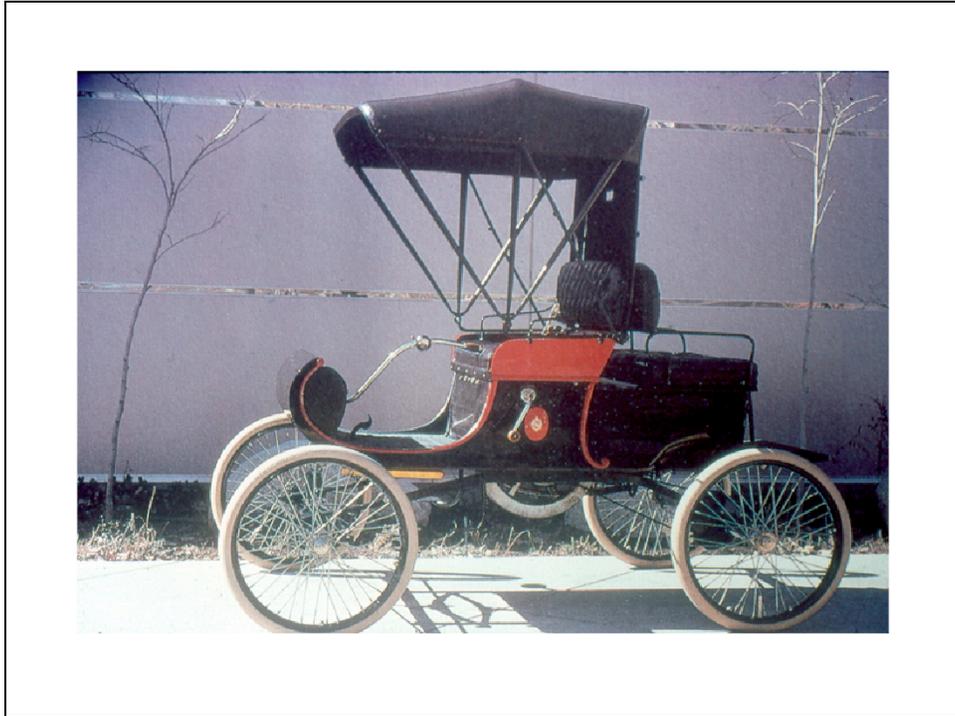
This design seems to borrow from the bicycle. Notice the three wheels and the simplistic engine!



Many early cars were made of wood, by carriage designers. Notice the gas lamp hanging from the side for light.

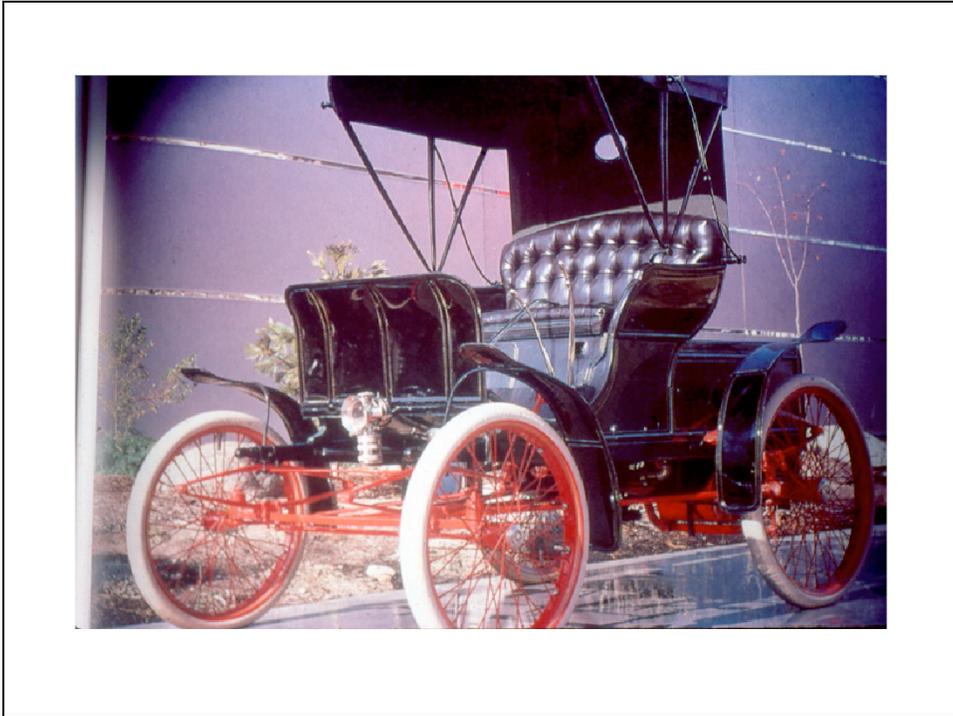


This one is enclosed—making it look more like a modern auto. But designs like this would have been around from the stagecoach days. Again, note the primitive “headlight.” Also, note the wooden-spoked wheels.



Some terms from early autos remain through today. See the hand crank? It was used for starting the engine. We still use the term “cranking” the engine when talking about batteries and their cranking power. “How did you steer this auto?”

(The hand lever moved left and right would steer it. This design was borrowed from horses reins.)



Introduce the concept of form following function here. . . .

“Can you tell something about the speed of the cars from these pictures even though the cars are standing still?” (YES! The presence of mud flaps and a simple suspension system suggest that this car reached greater speeds than those that lacked these items.)



There were diverse designs early on; note the different-sized wheels.



Introduce concept here that “good designs are kept, while bad designs are changed or gotten rid of.” Note the increase in complexity in the steering column—many more levers and a shaft enclosed in a housing. This is more complex than the simple lever from previous models (important for next design breakthrough).

“What is the arrangement of the driver and passenger’s seating in this model?”

(The driver and passenger face each other—OK if driving slow; not so if driving fast.)



“What is the new breakthrough design in this car?” (a steering wheel)

“Is that a better design than the lever? (Yes; it has been retained to this day.)

“The complex steering shaft of the last car made this innovation possible.”



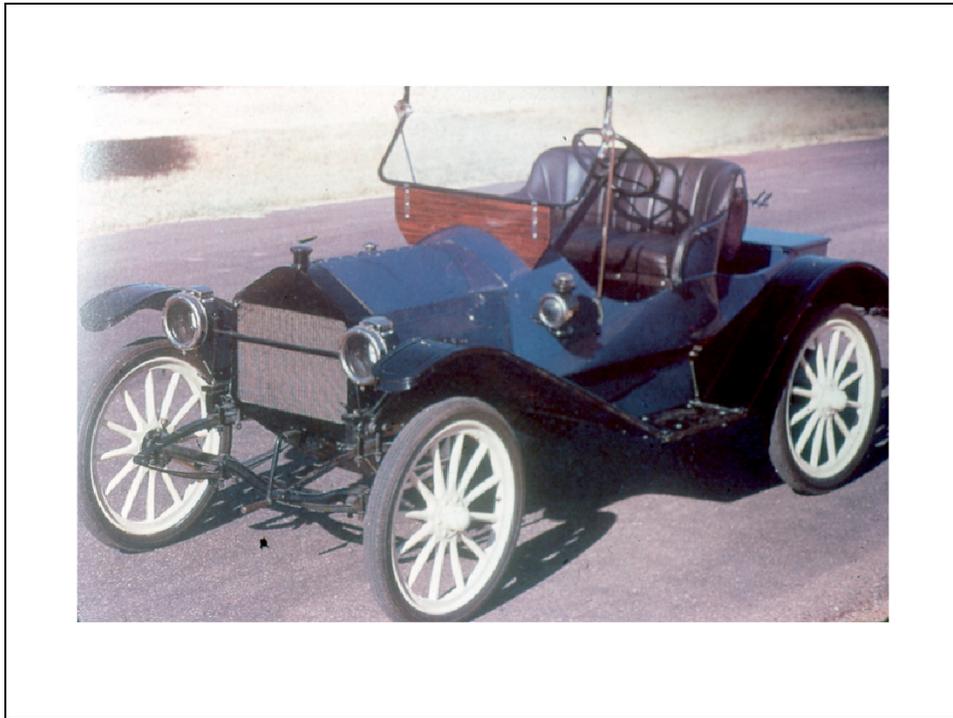
By early 1900's cars started to look more like the cars of today—an enclosed body, forward facing seating, headlights up front, equal-sized wheels and tires. (This model has more lights hung on the sides as well.)



This car is a “benchmark” car if the license plate can be trusted; it says 1905. Cars simpler than this are probably from earlier and cars more complex from later. (Can act like an “index fossil.”) Note the radiator, horn and break levers. “Up to this point, cars were owned only by the ultra-rich! Cars were hand-made by skilled craftsmen, which made them prohibitively expensive.”

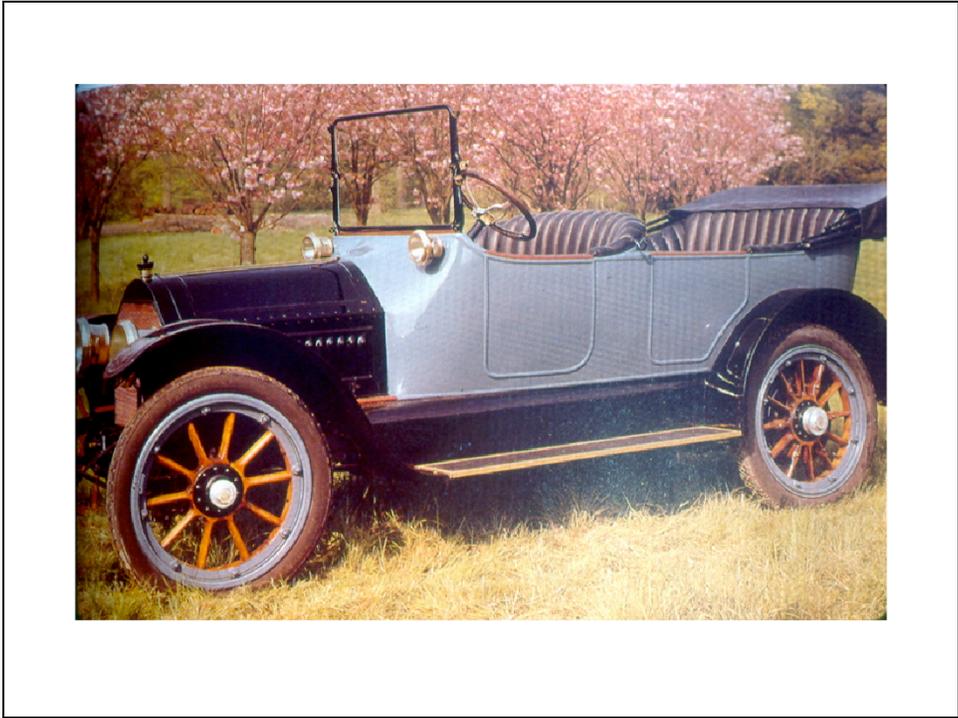


“Who was Henry Ford?” (Many students will have credited him with “inventing the automobile”; WRONG! He invented the assembly line process which brought the cost of the auto down to an affordable level.) He put the automobile into the hands of the masses. He is probably the reason your family owns a car. (You can draw a parallel with Darwin. Did he “invent” the theory of evolution? No, but by proposing natural selection as a means to explain evolution, he made the theory more widely accepted.)

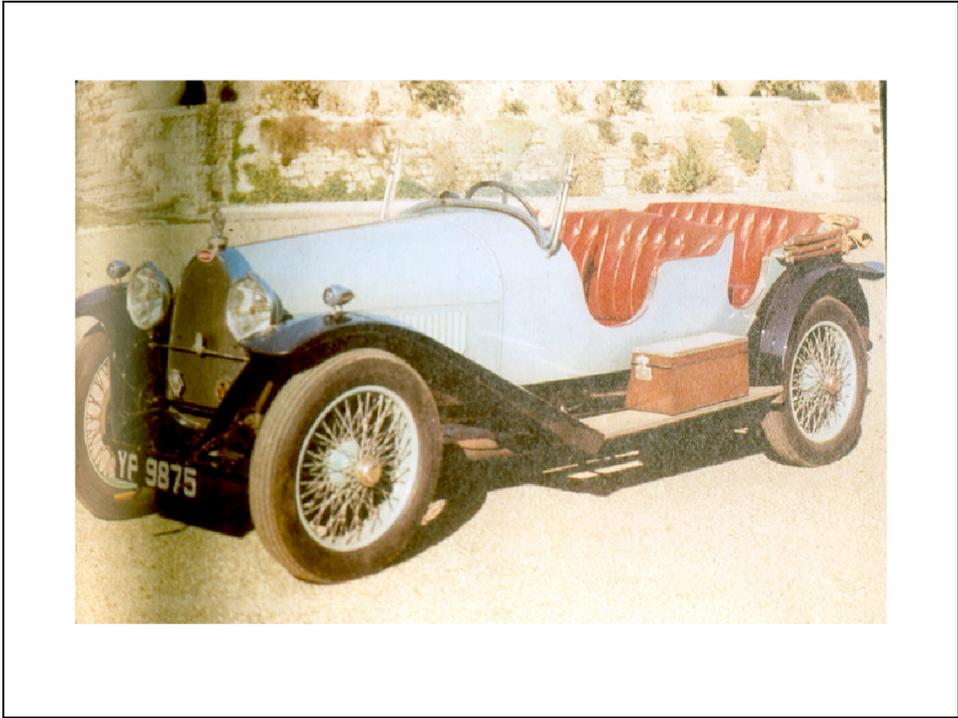


This is Ford's model A. The design was relatively unchanged from 1925 to 1947.

“What are the design elements that you see? Which of these are still on your car today?” (The car is not as “fancy” as the hand-built cars, but it does have a windshield (more evidence of greater speed), steering wheel on the left, headlights, etc. . . .)



There were still other, fancier cars, but they were influenced greatly by Ford's Model T and Model A.

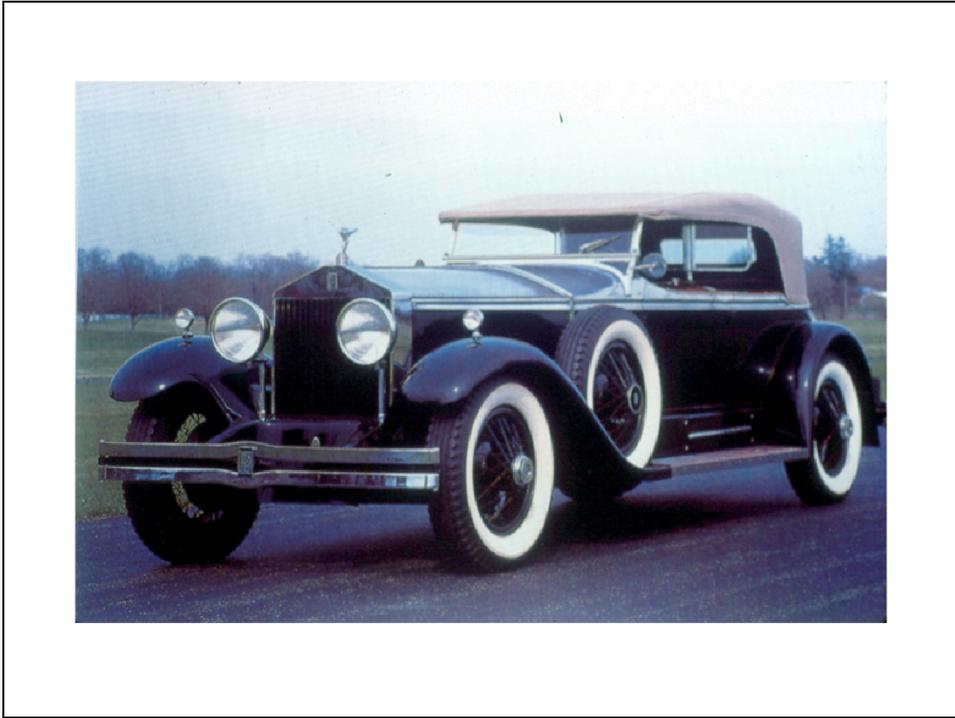


Note the toolbox on the running board. Early cars were not at all reliable!



“Do we have equal representation of cars in this photo array (or at car shows today)?”

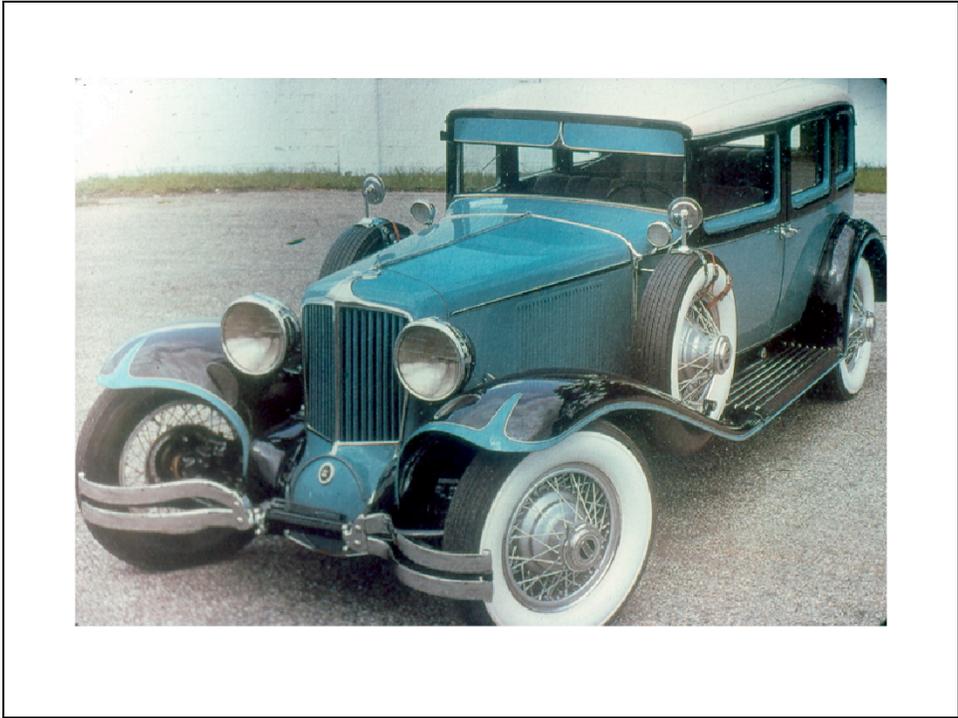
(No) “These are color pictures, so the cars must have survived until modern times. Say your parents owned a Lamborghini and a Ford; which one would they “baby” and take pictures with? So, which cars survive until today?” (The nicer, fancier cars that were cared for (similar to fossils); mostly those with hard parts left a record.)



This is a Bentley; note the hood ornament.



Another large, fancy car of the 1930's. "How is this car like and different from today's cars?"



Note the two spare tires, sun visors, the bumper and the rear-view mirrors (attached to the top of the spares).



Cars of the 1920's and 1930's had a long hood with engine access from the side.



The word “trunk” is used today because it used to be literally a trunk you could take from your home and place on the back deck. Note also the reflectors. Turn signals were not used; they used hand signals.



The doors on this car open from the middle, like French doors in the home. “Is this a good design?” Imagine a child playing in the backseat who opens the door while the car is moving (it happened); the door would fly open! Bad design—gotten rid of. If cars today have this design (like pick-up trucks with a backseat), the front doors close OVER the rear doors.



Another car with “suicide doors.” Good for Al Capone bank getaways; bad for your kids!



Some 1940's cars had actual wood paneling. The Beach Boys sung of their "Woody" cars. 1970's station wagons revised the look with fake wood paneling over metal. "Good design?" (Not in an accident that you want to walk away from; no crumple zones.)



Another benchmark car—1950. Cars of the 50's—romanticized, status symbols, had to look cool and perform well (fast); they would be traded-in every 2-4 years; relatively cheap (no expensive safety features).



Cars had distinctive shapes, like the front grille of this Chevrolet, and lots of chrome.



Tail lights weren't just functional; they had to look cool!



This is a 1950's Thunderbird.



1950's cars would be considered big by today's standards (except maybe for large SUVs).



“Does anyone know what type of car this is?”(Many students will know that this is a 1950’s Jeep.) This is the forerunner of the SUV.



In Europe, cars were getting smaller and sportier—like this Alfa-Romeo . . .



. . . or this Ferrari.



American automakers responded with smaller, sleeker cars like this Thunderbird . . .



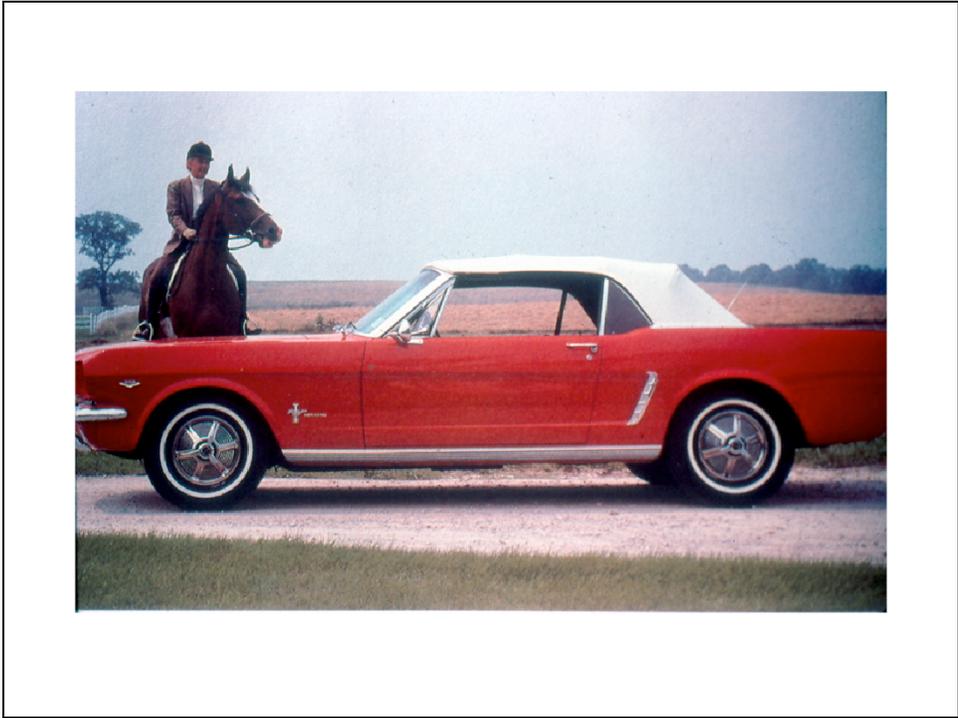
. . . or this Ford Fairlane.



Henry Ford, still the President of Ford Motor Co., wanted to bring back to the designs of the early 1950's—large, lots of chrome, etc. . . . So he designed the Edsel to be the next BIG ford car, like the Model A.



It was a huge flop! It was produced for only two years, 1957 and 1958. So few were purchased that production was stopped. The Edsel went extinct! No one could have predicted it, but consumers did not select it.



Consumers wanted smaller, sportier cars like the Mustang.



By the 1970's the "muscle car" was in vogue— smaller cars with large engines; fast with very poor gas mileage.



Some designs were reminiscent of the 1950's designs.



By 1978 there was a gas crisis! Gas increased in price from 20-25¢ per gallon to over \$1.00 per gallon. Imagine gas increasing 6x what it is now and your car is getting 8 mpg! Foreign imports with better gas mileage—"economy cars" were selling like crazy. Honda and Toyota gained a foothold in the U.S. market that they did not have before.



U.S. automakers had to respond with more fuel efficient vehicles.



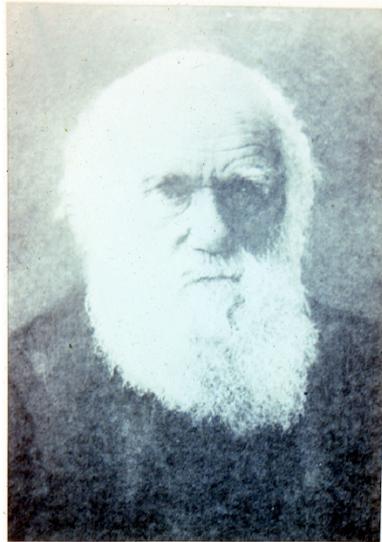
Quality was the selling point that allowed the Japanese automakers to remain in the U.S. market; the U.S. automakers are still trying to catch up.



“We have seen the evolution of the automobile. What do you think the word evolution means?” (Change over time) “What are some of the concepts we can parallel with the evolution of living things?” (Borrow from pre-existing designs, good designs kept, change occurs over time, can’t always predict how selection will take place, can infer a lot from snapshots like speed, safety [like fossils], form follows function).

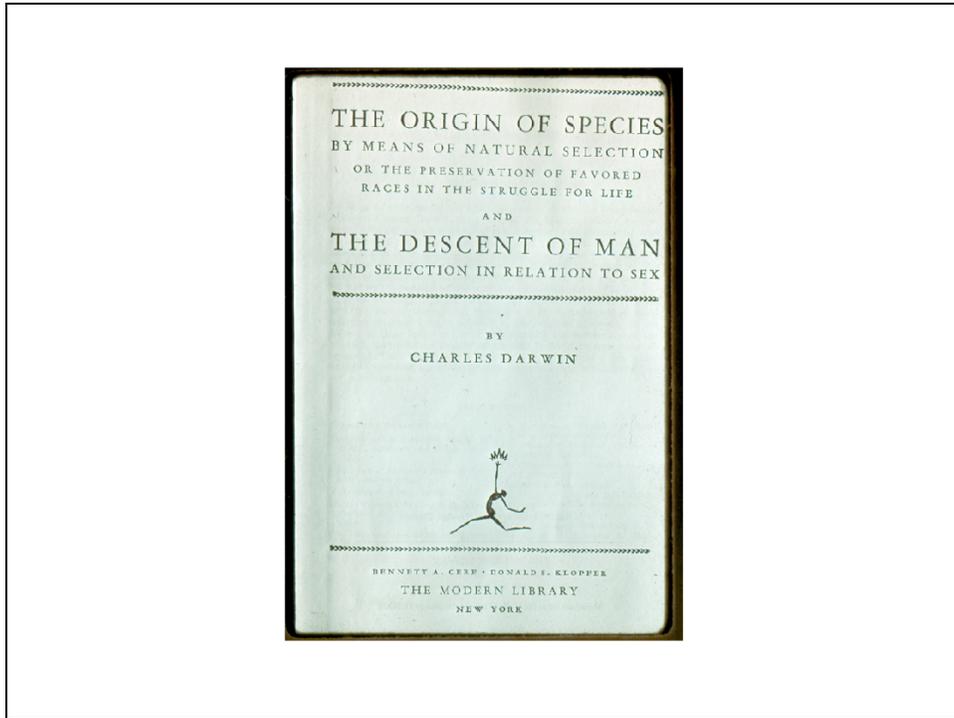


What does the future hold? No one knows for sure, but we like to guess!



▲ Charles Darwin

Darwin—the “inventor” of evolution? No; the theory was widely known in the scientific community since the 1700’s. Darwin proposed how it may have occurred . . .



. . . in his book, *The Origin of Species*. He proposed the idea of evolution by “natural selection.”