

The official newsletter of

**Revs Institute
Volunteers**

Revs Institute
2500 S. Horseshoe Drive
Naples, Florida, 34104
(239) 687-7387

Editor:
Eric Jensen
eric60@gmail.com

Assistant Editor:
Morris Cooper

**Thanks to
this month's
contributors:**

- Tom Dussault
- Brian Lanoway
- Whitney Herod
- Joe Ryan
- Lauren Goodman
- Phil Payne
- Phil Panos
- Anna McDowell

**Inside this
Issue:**

Membership Report	3
New Volunteers	4
Membership Meeting	5
Events Calendar	6
Du Pont Speedster	7
The Other Briggs	12
Lucy O'Reilly Schell PII	14
Tappet Tech	21
Adopt-A-Car	24

TAPPET CLATTER

Volume 27.8

April 2022



Chairman's Notes

Chip Halverson

March was another very busy month at Revs Institute. Most days we were at capacity. We had a number of private tours, committee meetings and other functions as well. The membership and

training committees continue to do outstanding work in recruiting and training new volunteers and docents.

Our March Members Meeting featured two very interesting presentations. Chuck Schmidt, a fellow volunteer and the architect of the building, talked about the design philosophy of making the cars the stars versus some other museums where the building was the star. Having said that, we continue to get many positive comments on the design of the building. Among the interesting topics Chuck discussed was the timing of the building design and the Cunningham acquisition. There were two plan alternatives for the building, with and without the Cunningham cars. Fortunately, the collection acquisition occurred and the plans proceeded for the larger version of the building.

Our second speaker was Nancy Carlson, retired senior executive with Exxon Mobil. Among her many senior management responsibilities was the company's racing sponsorship programs. Her company has been and continues to be a major sponsor across all of motorsports. She shared figures about the impressive fan base for F1, NASCAR, IndyCar, and other racing series giving sponsors reach to very large audiences. Nancy gave other examples of what the company got in return for their motorsports activities. One was their engineering teams working with the racing teams, Mobil 1 was developed to the point that both Porsche and Corvette specify Mobil 1 for use in their passenger cars. It was a very interesting perspective from a major sponsor.

(Continued on page 2)

Chairman's Notes....continued

(Continued from page 1)

Lastly, Scott George introduced the Du Pont to the attendees and pointed out key features and answered questions. Many thanks to all three presenters.

Coming up in April we have

- 4/13 Board of Directors meeting at 10 am. All members are welcome to attend
- 4/20 April Member meeting including lunch. Revs Institute management will be speaking and will be sharing their goals for the future. The board will then develop the membership goals informed by the management goals.
- 4/30 Revs Cars & Coffee.

Thanks to all of you for helping make Revs Institute a special place.

All the best! *Chip Halverson*

Mark Vargas will be retiring from his role as Chief Operating Officer and Director of Library and Archives at Revs Institute on 30 April 2022.

Since joining in July 2016 he has been a valued member of staff, contributing to many important initiatives. Not least among them is the ongoing program of activity to digitize the library and archive materials.

We would like to thank Mark for his work and for his contribution to the success of Revs Institute. We wish him well for the future.



*Mark and Karen Vargas
Photo Courtesy of Revs Institute*

TAPPET RIVIA

By Joe Ryan

This section is devoted to questions about the Miles Collier Collections cars or cars of the same period. Some of the questions might be a bit obscure or tricky. Test your collection knowledge and *have fun!*

1. What was the full name of the founder of the Stutz Motor Car Company?
2. Where was the founder of the Stutz Motor Car Company born?
3. What was the nickname of the Stutz entry to the 1911 Indianapolis 500?

The answers are posted later in the issue.

Membership Report

By Tom Dussault and Phil Panos

The Membership Committee is pleased to have already onboarded eight new members in April, and still have more applicants in the pipeline! Three of our newest members were motivated to become Revs Volunteers after attending an Ambassador Presentation at the Pelican Bay Men's Coffee given by Tom Dussault and John Wharton, where 170 residents were present. Outreach events like this have been instrumental in helping the Membership Committee recruit volunteers, guests and raise overall community awareness about Revs Institute. For this reason, we strive to participate in at least one outreach event each month. If you belong to an organization that would be interested in our Ambassador Presentation or have a great idea of an event we should participate in please contact Tom Dussault.

Greetings from the desk of Phil Panos.

Sometime in February, Hodges University contacted Revs Institute for assisting them in their very first attempt to hold a car show. The show was to benefit their veterans campus organization. Of the 800 students enrolled at Hodges, 19 % are vets. This "club" was formed to help vets transition back into civilian life smoothly. They come together to discuss topics that pertains to them and their past experiences and service.

Being one of the very few veteran volunteers at Revs Institute, Whitney asked me to head up a group to show some of our Volunteer's cars, set up a display table, and hand out flyers to the attendees. Tom Dussault graciously asked if he could help and I said anything he could do would be greatly appreciated.

Being Amelia Island Concourse weekend, the museum could not send a Miles Collier Collections car or a technician to assist us. Tom contacted Bob Rode who said he would be glad to bring his 1956 Porsche and Carmine Ermi said he would love to bring his 2018 Fiat Abarth.

Seven volunteers stepped up to help man the table, hand out flyers and explain to people exactly what the Revs Institute was, where it was and what its purpose is. Chuck Shapiro, Bob Rode, Carmine Ermi, Tom Sarraco, Tom Dussault, Chase Lopez (another one of our vets), Rich Murphy and myself manned the table.

The show was well attended for a first time event and the vets club made \$3000 dollars. Hodges has already started making plans for next year and have asked for our assistance. If anyone would like to joins us next year, please contact me.

Regards to all, Phil Panos



Phil Panos

Photo Courtesy of Revs Institute

Welcoming our Newest Volunteers



Benn Gott

Joined April 2022

A student at FGCU studying history and education. He is from Wellington FL and spends 10 months of the year in Fort Myers. Ben plans to begin volunteering as a Steward in May when his classes end for the summer. He hopes to continue volunteering through the fall. when is hoping his experiences at Revs Institute will be of benefit in his future career in Education.



Bud Terbell

Joined April 2022

Originally from Chicago and is now a full-time resident of Naples. Bud retired after 35 years as an Airline Pilot. Bud was Captain of the Boeing 747-400 Jumbo Jet for Northwest Airlines and was type-rated in many other aircraft. Bud received the coveted FAA "Master Pilot Award" for over fifty years of safe aviation operations. During his spare time, Bud restored the engine in his 1964 Porsche 356.



James Fidanza

Joined April 2022

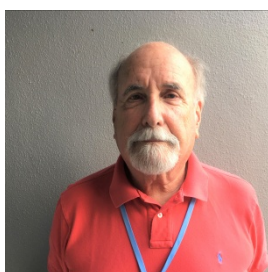
Originally from Chicago. He is semi-retired but still owns a childcare center located near Atlanta. He has a background in Marketing and Sales Management and spends about eight months of the year in Naples. Jim owns a 1999 Cobra SVT.



Rip Hale

Joined April 2022

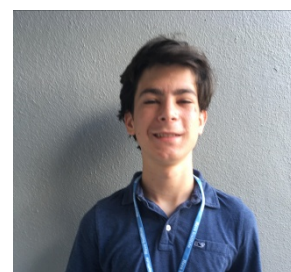
Originally from Pennsylvania but is now retired and a part-time resident of Naples. Rip learned about Revs Institute at the Pelican Bay Men's Coffee Presentation. He had a career with Quaker State Oil and later with Morgan Stanley. Rip is currently the owner of a V12 XKE Jaguar. He has owned many cars over the years and participated in driving and racing schools and lapping days at Mid-Ohio.



Steve Bunin

Joined April 2022

Originally from Connecticut and prior to retiring owned a chain of retail Optician shops. He learned about Revs Institute at our presentation to the Pelican Bay Men's Coffee group. Steve restored a 1956 Porsche 356A convertible. Steve will begin his formal Station Guide training when he returns to Naples in the fall.



Townsend Blabey

Joined April 2022

A high school student in Naples. He is currently participating in the Revs Learning Program on Saturday mornings. Townsend will be volunteering as a Steward on Saturdays as well as weekdays over the summer. His high school requires 100 service hours to graduate so he is eager to serve them with us here at Revs Institute.

Members Meeting March 2022

By Eric Jensen

The Volunteers were treated to the history of the museum as told by the architect involved in the project, Chuck Schmitt. Chuck's firm, Schmitt Design Associates was contracted by the Colliers to create a unique space to house the Miles Collier Collections, as it is now known, in the mid 1980s. At that time, the collection consisted of about 25 rare Porsches but might be joined by another 71 cars from the Briggs Cunningham collection. Therein lay one of the challenges. Two plans needed to be created; one for just the Porsches and one for the combined collections.

Most car museums at that time were simple "big-box" buildings with little character. And then the Mercedes Benz museum opened. Chuck, of course, had travel to Germany to see what Mercedes Benz had created. The assessment was that the museum architectural design was "trying too hard to be the star" overshadowing the cars. The design we see today was created to make the cars the stars. The charcoal colored bricks on the walkway and in the building were to evoke a road.

From that, two designs were created, bid packages were assembled and contractors contacted and meetings scheduled for the smaller of the two concepts.

And then the Briggs Cunningham collection was purchased.

Bid packages were rescinded, contractors were rescheduled, packages recreated with the larger museum option and bids were sought. Ground was broken in 1987 and completed in November of 1988 with lower Vitesse and Porsche wings completed in November 1988. Six hundred guests attended the dedication themed "Saving the Past for the Future".

In 2005 the museum was expanded to create upper Vitesse, the Library and Revs Gallery. The raised portion was not so much a design choice as it was a code requirement for elevation. The back half of the building was constructed to survive a category 4-5 hurricane. Storm shutter segregate the old structure from the new and this is why the back wall is curved. It resists much higher wind loads than a flat wall.

Plastic sheeting was hung to protect the old section from new during construction from dust. Workers just could not resist a peek at the cars and kept cutting the sheet letting in dust. The solution was the promise of "night at the museum" for the workers and their families if they stopped the cuts and finished on time. Both goals were met!

In between speakers, Scott George led a question and answer session around the 1929 Du Pont Speedster. An in-depth article about this wonderful addition is found later in this edition of the *Tappet Clatter*.



*Chuck Schmitt
Photos Courtesy of Phil Payne*

(Continued on page 6)

Members Meeting March 2022

(Continued from page 5)

Our second speaker for the day was Nancy Carlson, a retired Exxon Mobile executive formerly responsible for sponsorship programs for Mobil 1 oil products. Those Mobil 1 banners you see at racetracks, decals on cars and entire events named after the product were her responsibility for a number of years.

Why would Exxon Mobile want to sponsor race cars, race tracks and more? Spectators, television viewers, corporate buyers, engineers, and more. Nearly two billion (with a "B") total viewers watch Formula 1 races each year, 277 million watch Moto GP motorcycle races, 210 million NASCAR, 186 million Formula E races and millions more IndyCar, WEC and IMSA sports car racing. Those people own cars, buy oil and automotive products.



Nancy Carlson
Photo Courtesy of Eric Jensen

Sponsorships have evolved from tobacco, to beer, to telecoms to internet technology companies to energy drinks over the decades from the 1960s to today. While this targets the fans it also fosters a business to business relationship by forming alliances with original equipment manufacturers. It allows showcasing new technology. A business "win" would be Corvette specifying every new car be filled with Mobil 1 at assembly, in the owners manual and on the oil cap.

It also allows entertainment of potential clients, existing customers, employee promotions, cross promotions and more at hospitality suites at races. It allows your sponsored drivers and teams to meet and interact with your guests. If you've ever been to one of these hospitality events at a race, you know what a great experience it is. For those who have not, well, it spoils you for being just a "regular fan" again. The benefits reach every aspect of the company brand. That is why Exxon Mobil is in racing.

Events Calendar

Event	Date	Info or contact
Board of Directors Meeting	April 13 @10:00 am	Sign up on VicNet
Everglades PCOA Tour	April 15 @1:30 pm	Sign up on VicNet
Volunteer Appreciation Luncheon	April 20 @ 11:30 am	Sign up on VicNet
Twin Eagles Tour	April 22, @10:30 am	Sign up on VicNet
Classy Chassis Tour	April 22 @ 1:30 pm	Sign up on VicNet
Miles Collier Book Signing Reception	April 27 @ 5:30 pm	Details Soon!
Revs Institute Cars and Coffee	April 30 @ 8-11 am	Sign up on VicNet

For a full list of daily tour groups and events, go to the 'Calendar of Events' on VicNet.

The 1929 Du Pont Speedster

By Brian Lanoway

A made-in-America sports car in the late 1920s was a rare thing indeed. Amongst limited offerings that included the refined Kissel White Eagle Speedster, the impossibly beautiful - but equally impractical - Auburn Boattail Speedster, or the race-proven Stutz Blackhawk, the Du Pont Speedster suggested the ultimate in exclusivity and performance. Its advertising proclaimed that each Du Pont was “As Aristocratic as its name”.

Du Pont Motors Inc. was founded in 1919 by E. Paul duPont, the great-great grandson of E.I. duPont de Nemours, a Louis XVI noble who fled the French Revolution for Wilmington, Delaware in 1802. Like his forefathers, E. Paul was an inventor and entrepreneur and the first with a formal engineering degree. He left the family gun powder business in 1915 and started the Delaware Marine Motor Company to support the war effort. After WWI, E. Paul used his marine engine to launch a new luxury automobile business.



1929 DuPont G - 924 at Pebble Beach in 2007

Sold as lifestyle machines for the American and International upper class, Du Pont promised a “made-to-order” automobile, despite being assembled from outsourced components. The service, however, was bespoke; E. Paul personally tested each Du Pont automobile before introducing the vehicle to its new owner.

The company had produced 350 automobiles to a very high standard before it introduced the landmark eight-cylinder Model G in September, 1928. Designed by George Briggs Weaver, the Model G was offered in 12 body styles on 16 different chassis, with prices ranging from \$4,950 to \$2,750 for the bare chassis alone. The bodies were built by either Merrimac or Waterhouse, using hand-formed 16-gauge aluminum panels over white ash frames.



Photo Courtesy of Phil Payne

The Model G mechanical underpinnings were impressive. For the first time, Du Pont used an inline 5.2 liter Continental 8-cylinder engine with an output of 125 hp. To give the impression of in-house manufacturing, Du Pont topped the engine with a finned cast-aluminum valve cover, which gave it overhead valve pretensions, even though the cover simply hid the ignition wires and distributor.

(Continued on page 8)

The 1929 Du Pont Speedster... *continued*

(Continued from page 7)

Nonetheless, the combination produced stirring performance when it was equipped with a Warner Hi Flex 4-speed all synchromesh transmission. With the enthusiast driver in mind, the Ross cam and lever steering was unusually fast, with only 3.5 turns to lock, and the braking was reliable and sure, guaranteed by the use of lightweight Lockheed hydraulic brakes.

The company's sales network was as exclusive as its name. A New York City showroom was opened in the Hotel Delmonico by A. J. Miranda Jr., a prior agent for Mercer and Duesenberg. A second major showroom was purpose-built in Los Angeles by E. A. Van Trump. Dealerships in Baltimore, Boston, Chicago and Philadelphia soon followed and the company had an Australian representative: adventurer Major F. Sidney Cotton, who just happened to be a close friend of Ian Fleming and Winston Churchill.

While one third of the Model G automobiles were sold in New York, the other third went to Los Angeles and the Hollywood set with customers including movie stars Mary Pickford and her husband Douglas Fairbanks Sr., jokester Joe. E. Brown, fighter Jack Dempsey and humorist Will Rogers.

With the introduction of the Model G, A. J. Miranda proposed that Du Pont build a sports car version to showcase its powerful new 8-cylinder engine. Priced at \$4,500, the new Du Pont Speedster was aimed at the wealthy sportsman on his way to the country club.



1929 Model G 2 Passenger Merrimac Body Speedster

The Du Pont Speedster was a distinctive machine. Designer Briggs Weaver gave it a signature look with a barrel-shaped Indy race car nose, a trademark body color radiator, French-style raised running boards, a raked, folding windshield and aviation-style Woodlight headlights. The instrument panel could be cast or upgraded to machined aluminum. Upon request, the rear seating compartment was protected by a separate windshield and cowl. With bodies by Merrimac, most Speedsters were painted "Black" or "Bon Soir Grey". Of course, the paint used was the new duPont fast-drying, nitrocellulose Duco lacquer, developed by the family firm in the early 1920s.

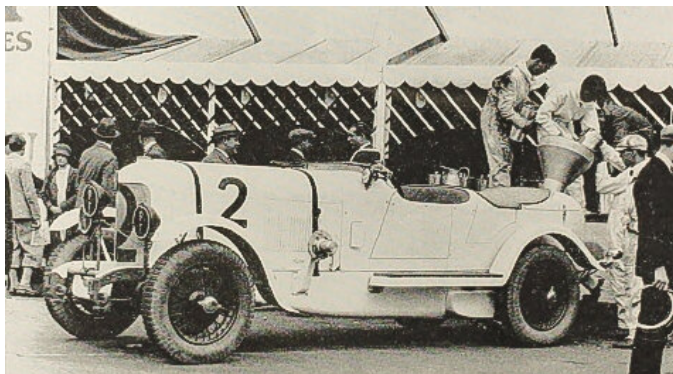
The Speedster was powered by an up-rated version of the Model G Continental engine with a hotter cam, stiffer valve springs, larger ports and RayDay aluminum competition piston. The engine produced a market-leading 140 hp at 3,600 rpm. With its civilized racer looks, the Du Pont Speedster visually guaranteed the factory-promised 100 mph stop speed.

(Continued on page 9)

The 1929 Du Pont Speedster.... *continued*

(Continued from page 8)

To celebrate the completion of the first two-seat Speedster, A.J. Miranda and duPont family friend Charles Moran Jr. proposed an entry at the upcoming Le Mans race in June, followed by another at the inaugural Irish Grand Prix in July. The 23-year-old Moran had just spent the previous summer at his father's home in Paris, where he campaigned a Rally cyclecar at a number of races and hillclimbs. E. Paul readily agreed to the Le Mans proposal, especially after Charles Moran's father offered to fund the venture as his son's university graduation present. The young Moran was immediately hired as Du Pont's chief competition driver and experimental engineer.



1929 Du Pont LeMans Speedster

Du Pont's plans to enter a two-seat Speedster model at Le Mans had to be suddenly modified when it was discovered that the race rules required that entries (with engines larger than 1,100 cc) be standard, four-seat production models. Briggs Weaver quickly designed a new Speedster body with two-plus-two seating in a European-style narrow body, using the same 125 inch frame and running gear.

Du Pont built two four-seat Speedsters for Le Mans, numbers G-876 and G-877, but only G-876 was ready for shipping in mid-May. Painted "American White" with a "Sarasota Blue" chassis, the race car was equipped with a 4-speed transmission, cam and lever steering, 4-wheel hydraulic brakes, Rudge Whitworth racing wheels, one-piece aluminum running boards, a special windshield, leather bonnet straps and three Marshal headlights.

Both Charles Moran and A. J. Miranda were assigned as co-drivers for the Le Mans effort. As a historical footnote, Charles Moran would be the first American to drive an American car at Le Mans. Stutz and Chrysler had entered the race the year before, but these cars were driven by Europeans.

Three days of 24-hour testing at the Linnas-Monthéry Autodrome showed that the new Speedster was race-worthy, with a top speed of just under 100 mph; but, Moran came away from Monthéry concerned about the pace of his co-driver, so he decided to drive the entire Le Mans race alone.

With race numbers and start positions assigned by engine displacement, the white Du Pont Speedster was given #2, just after the #1 of Tim Birkin's Bentley Speed Six. Moran won the starting footrace to the cars and was first to the corner, but he was quickly passed by four of the mighty Bentleys. Falling back, Moran settled into the rhythm of eighth place when disaster suddenly struck three hours into the race; his Speedster had become alarmingly unstable in the turns.

(Continued on page 10)

The 1929 Du Pont Speedster... *continued*

(Continued from page 9)

Unfamiliar with the practise of using secured lead weights for the mandatory passenger ballast (130 lbs. for each unoccupied seat), the Du Pont team had placed 400 lbs. of sandbags in the rear passenger footwell. Some of the sandbags had broken through the rear floor, unbalancing the car, fouling the prop shaft and damaging the transmission. After just 20 laps, the Du Pont team's Le Mans effort was over and the idea of the Irish Grand Prix disappeared.

Undeterred, Du Pont took advantage of new race rules to enter a revised Speedster at Indianapolis the following year. The 1930 Indy rules were designed to bring auto manufacturers back to Indy, with engine displacements increased from 91.5 to 366 cubic inches. This time, the Du Pont race car was a two-seater Speedster built on an earlier frame, but its luxury underpinnings still showed. At 3100 lbs. it was the second heaviest entry after the Stutz roadster.

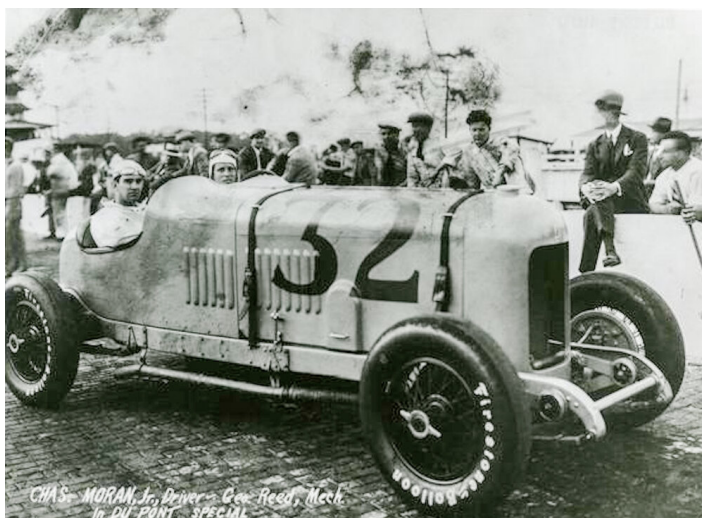
With Charles Moran driving, the Du Pont Indy race car qualified 19th at an average speed of 89.733 mph. A good effort, but one that paled to the 113.268 clocked for the pole position by Bill Arnold in a Miller-powered Summers. In the actual race, Moran slipped to the back of the pack, running in 32nd place after 20 laps.

As a European road racer, Moran was unfamiliar with the driving techniques demanded by the high-banked Indy track. After entering a corner too low, he spun out and crashed on the 22nd lap, damaging his car's frame. The Indy race experience put an end to Du Pont's racing ambitions but it was still an unbridled success: competition put Du Pont Motors in the news.

With a replacement frame, the Du Pont Indy race car was displayed across the US by Du Pont and the American Automobile Association car club. A new "Le Mans" Speedster was added to the company's catalogue – the first American automobile to be given that name. The reputation and renown of Du Pont Motors reached far greater heights than its limited production volume might suggest.

With a replacement frame, the Du Pont Indy race car was displayed across the US by Du Pont and the American Automobile Association car club. A new "Le Mans" Speedster was added to the company's catalogue – the first American automobile to be given that name. The reputation and renown of Du Pont Motors reached far greater heights than its limited production volume might suggest.

The hurrah was short-lived. As the Roaring Twenties peaked, the big three automakers in Detroit began to force the independent automakers out of business. The Great Depression finished the rest. A Du Pont Model H was shown at the 1931 New York auto show, but there were few takers. The company assembled its last vehicle in January 1932 and a liquidation receiver was appointed in February 1933. Du Pont Motors only produced between 533 and 547 automobiles over 12 years of operation.



Du Pont at the Indianapolis Motor Speedway 1930

(Continued on page 11)

The 1929 Du Pont Speedster... *continued*

(Continued from page 10)

But E. Paul duPont had already moved on. Seeking to take control of a failing family investment, E. Paul became President of the Indian Motorcycle Company in 1930 and transferred key members of his staff to Springfield, Massachusetts. After producing six Du Pont automobiles in the motorcycle factory, E. Paul abandoned the luxury car business and pursued the idea of the motorcycle as a leisure object.

With George Briggs Weaver again as Chief Engineer, the Indian Motorcycle Company produced its iconic line of Chief and Scout motorcycles, all available in the full array of brilliant Duco paint colors. By 1938, the company had gone from losing hundreds of thousands of dollars each year to one that generated huge profits. With his health declining, E. Paul sold the company to an investment group in 1945. He died in 1950 at the age of 63. Eleuthere Paul duPont was inducted into the Motorcycle Hall of Fame in 2004.

The arc of success continued for the supporting actors in the duPont automobile story, two of which intersect with the Revs Institute today. Although Charles Moran Jr. retired from racing in 1932 - and would ultimately become a managing partner at the duPont brokerage firm - he returned to racing in 1951 and drove the Cunningham C4RK to 10th place at the 1953 Le Mans. George Briggs Weaver came out of his retirement in 1950 to sign-on as the Chief Engineer for Briggs Cunningham's Le Mans efforts. He viewed the Cunningham C6R as one of his finest designs.

The Collection's Du Pont Speedster G-924 was built on September 5th, 1929 and shipped to the Morton & Loose dealership in Baltimore. The car was originally painted "Bon Soir Grey" and was outfitted with a black leather interior. It is one of fifteen Speedsters built, one of six with a vertical back body and external trunk and one of three still known to exist today.

Last acquired in 2000, the Speedster on display at the Revs Institute underwent a comprehensive restoration and color change in Chatham-Kent, Ontario. Speedster G-924 was generously donated to the Revs Institute in December 2021.

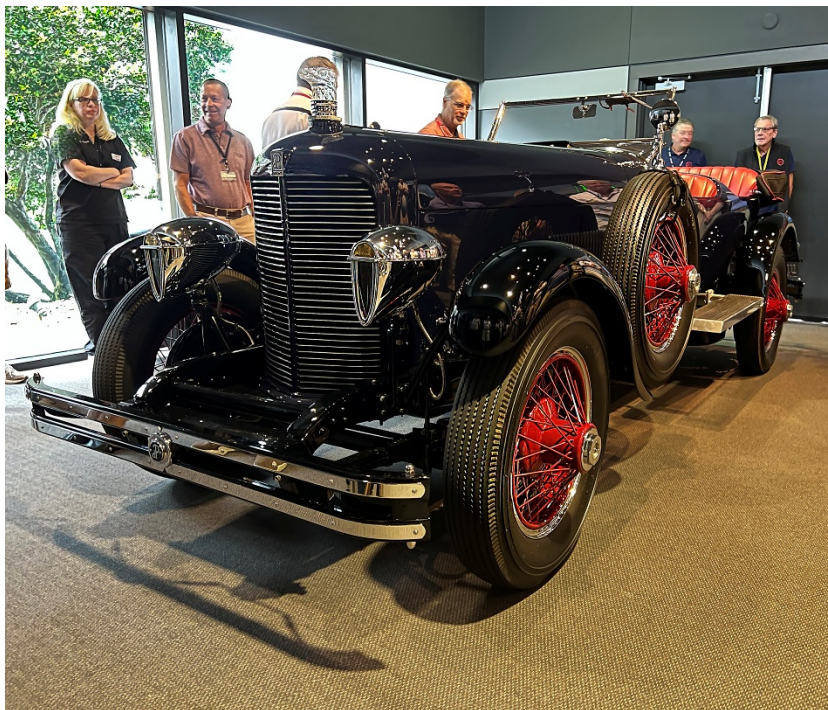
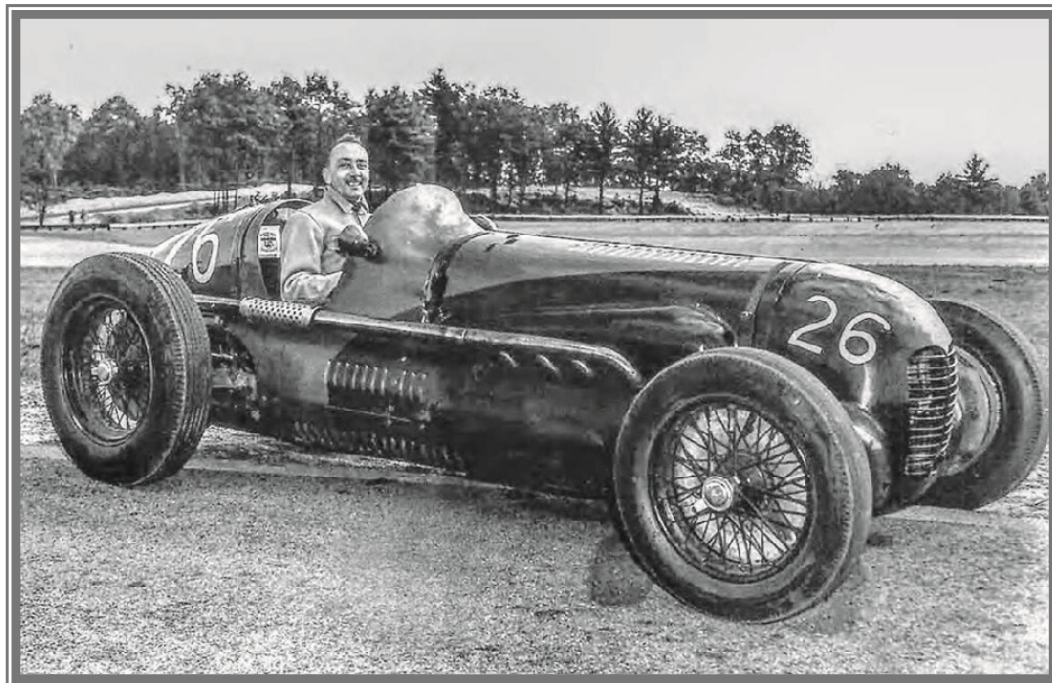


Photo Courtesy of Phil Payne

The Other Briggs

By Morris Cooper



Another “Briggs” is about to enter our Revs Institute narrative with the arrival of the 1929 Du Pont Model G Speedster on April 6th. That person is George Briggs Weaver, usually called “Briggs”, the artist and designer of Du Pont automobiles, Indian motorcycles, and then late in his career, Chief Engineer of Briggs Cunningham’s sports car manufacturing from 1951 through 1955.

As a young artist born in Newport, George Briggs Weaver studied at The Rhode Island School of Design and began his career as a jewelry designer in New York City. In the late Twenties he joined the Waterhouse coachbuilding firm where he designed the body for the Du Pont Model E. That car was so well received that Du Pont hired Weaver as its Chief Design Engineer. Weaver was responsible for all subsequent Du Pont designs including the Speedster now going on display.

E. Paul duPont was the man behind the marque. He was the great-great-grandson of the DuPont chemical company founder. As an inventor and engineer, he started his own marine engine business in 1915 and the Du Pont car company in 1919. Determined to have the best men available, he hired John A. Pierson from the Wright-Martin Aircraft Company as Chief Engineer, William A. Smith from Mercer as his sales manager and elevated Allen P. Carter, who started with Du Pont as an apprentice mechanic, to the position of company service manager and head of the Du Pont’s racing teams.

E. Paul duPont insisted on distinctive styling for his cars. Du Pont’s New York dealer, Alfredo J. Miranda Jr, had his showroom on Park Avenue in the Hotel Delmonico. Miranda had distributed Mercer and Duesenberg cars in the Twenties.

(Continued on page 13)

The Other Briggs.... *continued*

(Continued from page 12)

Miranda suggested to Weaver that the new Speedster be given a bold, signature look. To prove the performance of the new Speedster, Miranda, together with Du Pont's young Experimental Engineer and race driver Charles Moran Jr. proposed a venture to race the car in Europe, including at Le Mans.

Since Le Mans race cars had to be four-seaters, Weaver designed a modified version of the Speedster for the 1929 Le Mans race. The car, driven by Moran failed to finish after 20 laps when the sandbags used as passenger ballast came loose and caused the car to fail in a manner that still generates controversy today.

In May 1930 E. Paul duPont took over as head of the Hendee company which manufactured Indian Motorcycles. He brought Weaver over to Indian to become its Chief Engineer. Du Pont stopped building cars in 1931 to focus on Indian motorcycles. Weaver famously designed the distinctive and futuristic Indian motorcycles of 1940s, the Chief and Scout. Briggs Weaver's styling of these models remains central to Indian's identity; the deeply skirted Deco fenders and Indian-head motifs remain the image of Indian motorcycles today, and the brand identity of every subsequent revival of the Indian marque in modern times.

Weaver's interest in racing came about in the late 1940s. After retiring from Indian, he and his wife came upon the Thompson Speedway in north western Connecticut while out touring the area. Weaver saw the potential of the paved 5/8-mile track within a motorsports fan base of a million people. George Briggs Weaver brought in Briggs Cunningham to help with the financing of a road course at Thompson, purchasing 120 acres south of the existing track and he laid out a 1½ mile road course with two hairpins.

Yes, as strange as it may sound, Briggs Weaver was friendly with Briggs Cunningham. When the renovations at Thompson began, Weaver came out of retirement to become the Supervisor of Engineering for Cunningham. Weaver oversaw the production of the Cunningham race cars which competed at Le Mans. Du Pont's Charles Moran raced again at Le Mans in a Ferrari in 1951, and in 1953 in the Cunningham C4R coupe.

The Offenhauser powered Cunningham C6R was one of Weaver's highly regarded projects and reportedly, the first Cunningham car built from engineering drawings. Later, when Cunningham switched to a Jaguar E-type, Weaver designed an all-new rear suspension for the car.

Weaver owned and built many interesting cars for himself. At the same time, he remained an accomplished artist and sculptor and by all accounts, had a very satisfactory life. In his late seventies and before his death in 1965, Weaver pursued his lifelong hobby of designing sailboats with detailed engineering drawings. In this he also shared Briggs Cunningham's love for sailing. Cunningham never gave up sailing during the many years he was building and racing cars, and was a world-class sailor, skipper of the winning Americas Cup 12 meter "Columbia" in 1958.

Lucy O'Reilly Schell, Racer, Owner, Innovator, Part II

By Lauren Goodman

Lucy was already a mother when she began to race seriously. She would have been around 31 years old when her race results first appeared in the French press in 1927. Auto journalist Maurice Phillipe called her a “conductricepleine de decision” – a decisive driver! At her very first hillclimb in 1928, Lucy came first in her class. Though the reporter was surprised to see a woman enter, he was sure to tell his readers that, with a little practice, this lady would see many top results. Research reveals nearly 60 competition entries; a few of the cars raced are listed below:

Talbot M 67 (sold as a Darraq in Britain)

Bugatti Type 37A

Bugatti Type 40

Bugatti Type 44 Berline (carr. Gangloff)

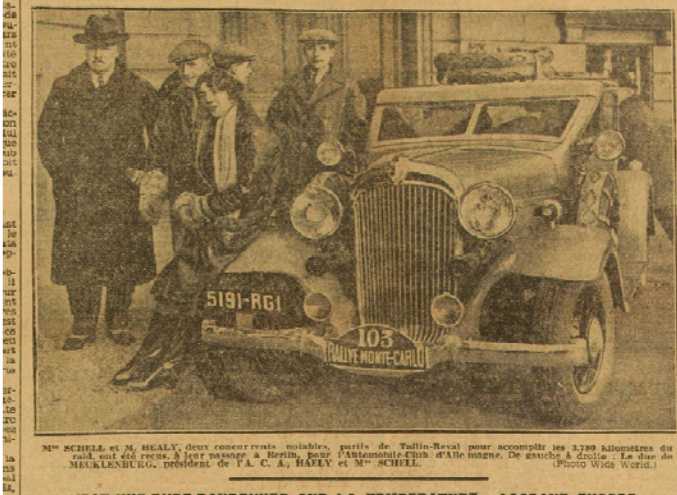
Lucy's specialty was the rally, and “the Monte” was her white whale. During the Interwar years, la

Rallye Automobile de Monte-Carlo was a grueling endurance competition. Think of it as a midpoint between the Paris-Madrid Race of 1903 and the Dakar Rally of today. Entrants could start from their choice of predetermined cities and converge on Monaco, averaging a certain



Lucy O'Reilly Schell Monthry, 7 Oct 1928
Source gallica.bnf.fr / BnF

Le Rallye automobile de Monte-Carlo



La Dépêche : journal quotidien, 22 Jan 1933
Source Bnf

speed along the way (and don't forget, the clock didn't stop for time spent sleeping, refueling, mechanical issues, digging out of a snowbank, missing a ferry, etc.). Lucy entered the 1929 Rally and placed 8th overall in her Talbot M 67. Later, with Laury as co-driver, she would place as high as 2nd place overall, losing the 1936 Rally by mere fractions of a second to a couple of Romanians in a stripped down Ford. It was her search for the right mix of power, performance, and reliability that led her to call on M. Charles Weiffenbach at the Delahaye offices.

(Continued on page 15)

Lucy O'Reilly Schell, Part II...continued

(Continued from page 14)

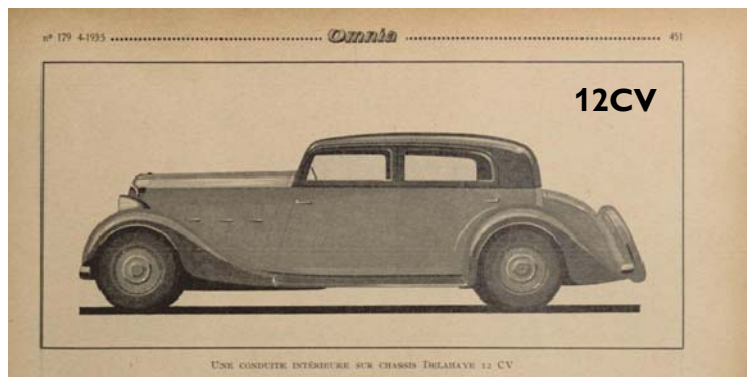
DELAHAYE 1933 - 1939

You may think of Maserati when you think of Lucy, but her real legacy was built with Delahaye. Delahaye was a stuffy firm with a background in sturdy, long-wearing truck engines. [More CPA than CEO, let's say.] Charles Weiffenbach, known to all as Monsieur Charles, had grand plans to lead the ailing firm into a new era. Key to this were engineer Jean François and a scheme to break into the market for high-end, high performance sports cars.

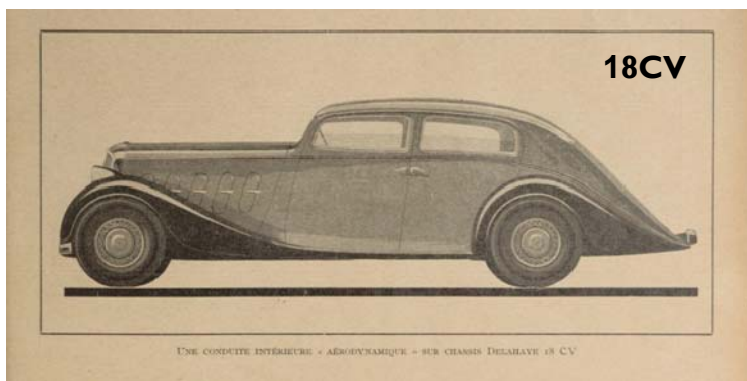
Delahaye unveiled two new Super-Luxe models at the 1933 Paris Salon: the 12CV (formerly 124) and the 18CV (formerly 126). They were really just the old models with new suspension. Lucy, with Laury in tow, appeared at the offices of M. Charles to order a special: the larger engine of the 18CV in the shorter base of the 12CV. M. Charles neglected to mention that Jean Francois was working out how to do just that... so that Delahaye could use such a car for their own works team. Instead, he sold Lucy a special of the 12CV, equipped for the upcoming rally season.

M. Charles decided to test his pair of new Super-Luxe Specials by putting them in the hands of two longtime customers for the 1934 Rallye Feminin de Paris-Saint-Raphaël. However, after Lucy outperformed the two other customers with her smaller engine, M. Charles decided that Lucy was, after all, the best owner for the Super-Luxe Special. Delahaye further aimed to prove its racing merit by showcasing a souped-up Super-Luxe Special in a world record attempt. On the banked track at Montlhéry, they ran the Delahaye continuously to break the 48 hour world record for distance, held previously by Renault. Delahaye not only beat that record, but also set a new timed record for 10,000km.

The success of the Super-Luxe Specials of 1934 led Delahaye to bore an extra 5mm from their 6C engine, increasing capacity to 3.6 liters for a "Sport" version of the 18CV in 1935 – leading to the "M" designation *formodifié*.



Omnia: revue pratique de locomotion
No. 179, p. 451 Source gallica.bnf.fr / BnF



(Continued on page 16)

Lucy O'Reilly Schell, Part II...*continued*

(Continued from page 15)

Before Jean Francois could complete the next iteration of Delahaye's sports car, the 135, Lucy had already placed an order – and made sure a dozen of her wealthy friends called on M. Charles to put down deposits. That ready cash made sure Delahaye could fund their works team. By way of thanks, Delahaye made sure that the first 135 went to Lucy. The 135 would go on to become one of the most important cars to come out of France.

According to Blight, all 135s were standardized to a 116" *surbaissé* ("lowered") chassis (about 3 inches lower than the 18CV chassis). Of the three models offered of the 135, the Competition had the *modifié* engine. So, the 135 Competition is also known as the 135MS, which is the 1937 Delahaye Special in Miles Collier Collections. Delahaye also developed an additional *court* ("short") wheelbase as an option. The 135 used for racing was "Competition Special" created first for Lucy: *modifié*, *surbaissé*, and *court*. This 135CS is what put Delahaye on the map.

But Delahaye's rise was also an indication of how far many other French manufacturers had fallen. This era found Talbot deeply in debt, Bugatti behind on the manufacture of the Type 57, and Delage liquidating its showrooms. Lucy was betting hard on Delahaye, and Delahaye in turn was making a her a stable of serious cars. Lucy was determined, gregarious, and well-connected: she was already becoming a team owner in all but name, so for the 1936 premiere of the 135CS at the Paris-Nice Rally, she dubbed her sports car team "Blue-Buzz".



La 18 CV Delahaye, par Géo Ham

TEAM OWNER 1936 - 1940

Author Neal Bascomb asserts that her dismal performance during the hillclimb portion of the 1936 Paris-Nice rally gave Lucy pause about her driving career, and inspired her to focus almost exclusively on team management. She recruited René Dreyfus as lead driver, one of the great talents to come out of France. Dreyfus had a proven record as a Grand Prix winner, having driven for Bugatti and Maserati and he'd even received an offer from Ferrari – but then Mussolini came to power, and he did not want a French driver in an Italian car.

Adam : revue des modes masculines en France et à l'étranger

15 Mar 1936 Source gallica.bnf.fr / BnF

(Continued on page 17)

Lucy O'Reilly Schell, Part II...continued

(Continued from page 16)

The only other serious teams in Grand Prix racing were the Germans, who did not want a Jewish driver in their car. Lucy came to Dreyfus, who was languishing at Talbot-Lago as a glorified babysitter for a paid driver. She convinced him that her new outfit would be entirely professional. She filled the other spots with very fine talent: René Carriere, and later Gianfranco "Franco" Comotti. Laury, too, was turning out to be a pretty good driver! I saw one source dismiss him as an "enthusiastic amateur" which feels a bit heavy handed. Half the field were privateers and 'enthusiastic amateurs'. Meanwhile Laury drove his 135CS with great aplomb against other very fine drivers, many of whom were professionals.

"[...T]he 135 was a joy to drive. It was a marvelous little car, short on power, but long on everything else. The brakes were good, the acceleration was head-snapping, and it was as easy to handle as a Bugatti." - René Dreyfus

Note well that, at 3.6 liters, the old 103 engine was at maximum capacity. Jean Francois had to rely on creating a lighter car, with more torque to compensate for the lack of horsepower. But the 103 engine was still at its core a truck engine from a time when Delahaye was known for its dependable trucks. This gave the 135 a great deal of reliability, as everyone discovered at the 1937 Le Mans. When a repair caused the team to drop down to 35th, Dreyfus pushed the 135CS like a formula car, driving like he was in a Grand Prix for over ten hours. Dreyfus managed to move up to P4 before handing the car off to his co-driver, who would ultimately cross the finish line in 3rd.



*The Delahaye CS 135 Blue-Buzz
Source: Bonhams*

However, the outlook for French victory in the "Grands Epreuves" of the European calendar was grim indeed. Of the championship Grands Prix run in 1936, no French car finished in the top five. Both Mercedes and Auto-Union, backed by money from Hitler's regime, seemed unbeatable. For a country that had once produced Delage and Mors, it was hugely embarrassing. Both the A.C.F. (the national federation of the country's car clubs) and the French press were in a panic. They even banned formula cars from the French Grand Prix, with the hope of giving sports cars from Bugatti and Talbot a chance to win.

To jump start innovation, the A.C.F. enlisted the government's help to raise money for the cause of French glory on the track. A tax on every new driver's license issued went into the Fonds de Course. A new Grand Prix formula was set to begin in 1937, and the A.C.F. gave French automakers an incentive to create a costly new race car: a prize of one million francs to the constructor who could post the fastest time at the Montlhéry track in a car built under the new formula.

(Continued on page 18)

Lucy O'Reilly Schell, Part II...*continued*

(Continued from page 17)

Delahaye had closed down its works team after a couple of bad wrecks at the Grand Prix de Marne. But after the announcement of the Million Francs Prize, Lucy paid another visit to the office of M. Charles. She had decided to create her own Grand Prix team, and that she would pay Delahaye to build her a car for the Million Francs contest. The announcement went out to the papers in December 1936: a new team named l'EcurieBleue would have the exclusive right to run Delahayes from 1937, and would eventually field a new formula car from Delahaye. This made Lucy the first woman to own and operate a Grand Prix race team. She intended to become the next Enzo Ferrari. Dreyfus again:

"[M Charles] said he would help all he could in providing technical assistance and lending mechanics to the effort, though Lucy insisted on paying for everything. This was to be her team. She made that clear. And this was fine with Monsieur Charles."

Jean Francois faced quite a challenge to meet the August 1937 deadline for the Prize. This new Delahaye, the 145, had to be built from the ground up. Delahaye knew how to build sturdy truck engines – but this new formula would require a new way of thinking. He created a V12 engine cast in a magnesium alloy, and gave it three camshafts (one down the middle for both sets of intake valves, while each arm of the V received a dedicated camshaft for the exhaust valves). Some sources say four, others say five 145 chassis were built for racing. While Jean Francois worked on the new formula car, Lucy busied herself with the duties of team management, running older 135CS in various events for the 1937 season.

Finally, the Delahaye factory was ready to test the new 145. The unveiling was a quiet affair at Montlhéry. Per Peter Stevenson:

The Delahaye was a truly laughable car under any condition – round like a draw pipe with bulbous ends, ugly scoops grafted in place, and a grill that looked like it had been taken from a screen door.



But boy, could it go. It only took Dreyfus a few laps to decide this ugly car was instead truly lovely. And in it, he managed to beat Bugatti for the Million Franc prize. Half of the winnings went to Delahaye, and half went to Lucy. Lucy then gave half of her portion to Dreyfus. With the creation of the 145 and victories in the 135CS, Delahaye was celebrated as the return of French glory to the track.

Delahaye 145 Million Franc Prize Winner

(Continued on page 19)

Lucy O'Reilly Schell, Part II...*continued*

(Continued from page 18)

Meanwhile, adoption of the new formula had been delayed until 1938. The season opener at Pau would be the true test of the 145. Although Auto-Union did not participate, the Mercedes team arrived in cars that showed astonishing straight line speed; it seems Hitler's investment was paying off. However, Pau is truly a 'round the houses' race. Dreyfus knew he couldn't match Mercedes power, but his car was more fuel efficient. He stuck hard to the Mercedes at first, making up time in the corners. When the Mercedes driver finally had to stop for fuel, Dreyfus seized the lead and never let it go. There against that Goliath stood little l'Ecurie Bleue, with its Jewish driver and American money. I can only imagine how Dreyfus felt crossing that line in first place. [Neal Bascomb's account of the whole race is a wonderful read.] The win at Pau, followed by another win for Dreyfus at Cork, would be the pinnacle of l'Ecurie Bleue.

If you're wondering where Lucy was at Pau – she wasn't. At that time, major Concours and the Nice Salon de l'Automobile were happening on the Cote d'Azur. Sources report that at least four of the V12 engines built went into touring cars, carrossé by the likes of Chapron and Fioni. Car manufacturing is a business, after all, and major wins at Juan-les-Pins and Cannes show that Delahaye is the peak of performance and style. But of course her team was first and foremost on her mind, so the night before Pau, she went to a fortune teller at St. Laurent du Var (near Nice) and was told she had "horses that weren't really horses" and that they would win the next day. She called the hotel in Pau and spoke to Dreyfus, reassuring him that he would do well the next day. She then told Laury about the fortune, which made him laugh. Laury hesitated to tell Dreyfus about the prediction, as he didn't want it to mess with his head. Dreyfus only smiled and advised Laury to share the fortune with the German driver.

These Grand Prix victories, as well as other finishes in the 145 equipped as a sports car, would make Dreyfus the Champion of France for 1938. The last half of the 1938 season, however, would prove tumultuous for Lucy, both personally and professionally. Mercedes and Auto Union dominated from mid-season on. The A.C.F. decided to make another distribution from the Fonds de Course, only this time the money would be awarded to the constructor demonstrating the most promising plans for a future car. Having already sunk about two million dollars of her own money into the development of the Delahaye 145, Lucy felt confident that Delahaye would be recognized as the future of French Grand Prix racing. Instead, the committee awarded the funds to Talbot-Lago.

To say that Lucy and Delahaye were enraged would be an understatement. In protest, Lucy withdrew l'Ecurie Bleue from the French Grand Prix at Reims, as it was hosted by the A.C.F. This caused an uproar in the papers: without Delahaye, surely the deck is stacked against French constructors in our home race? The sentiments were roughly: how could this lady do this to us? How fickle is the press: not a few months earlier, they were lauding Lucy and Delahaye as French patriots.

(Continued on page 20)

Lucy O'Reilly Schell, Part II...continued

(Continued from page 19)

Lucy responds in an interview with Paris-Soir:

It's not losing out on five or six hundred thousand francs that disappoints me. Certainly, the money would have aided our developments, but we can get by without it. However, both for Delahaye and for us, it would have been a recompense for our efforts. They preferred to award based on, so they say, preparations for the future. The future is uncertain, and we are the present. The reward should have been ours.

Since those tasked with reviving French motor sport have not understood this, we wash our hands of them, and l'Ecurie Bleue will not take part in the Grand Prix they are organizing. We'll focus on getting 'La Marseillaise' played somewhere other than Reims. Our decision is irrevocable, and Mr. Charles Weiffenbach is of entirely the same opinion.

The ACF tried to strong-arm l'Ecurie Bleue back into the GP at Reims by stipulating that withdrawal from the event would disqualify the team from the constructors championship. Here's a portion of her response:

In this case, the principal and only interested party able to go back on this decision is me. I regret to tell you that the loss of the constructors championship, because of this new clause in the rules, leaves me indifferent. I created Ecurie Bleue more out of enthusiasm for motor sports than out of self-interest [...]

I want you to understand, and I want you to make it understood to your colleagues on the Sporting Commission, that I alone am responsible for this decision, and in no case must it be held against Mr. Charles Weiffenbach, nor Delahaye.

Lucy eventually changed the team's name to l'Ecurie Lucy O'Reilly Schell for the 1939 season: she was clearly irritated with the A.C.F., and she wanted to remind them who exactly had made the 145 victories happen.

The 1939 season, however, did not afford Lucy much pleasure. The Delahaye 155 never fully materialized and her team had to run the previous season's 145s against Mercedes W154, with the new 163 engine (as in the display car at Revs Institute). By the time they arrived at the 1939 Swiss GP, Lucy had switched her team to Maseratis – I think it's very telling she did not choose another French marque.

Next Month, Part III, The Indianapolis 500



TAPPET TECH

Transmissions *Gears to Get You Going* *By Eric Jensen*

Between the engine and the drive wheels resides a mystery box filled with gears we call the transmission. Internal combustion automobiles, even from the earliest days, have had some sort of transmission with two, three or more gears in addition to a reverse to be selected by the driver. Reverse is a selection easily understood. One must occasionally move backwards to turn around or avoid an obstacle but why do we have multiple forward gears? We have all pushed a stalled car at some point. It is very difficult to get it moving but less so to keep it rolling. That is key to understanding why a transmission is required.

To accomplish its task, transmissions are filled with gears. First we need an explanation of what a gear is and actually does.

Gears are simply Archimedes lever in circular form. Gears trade motion for force and, reversibly, force for motion although the motion is reversed. See Figure 1.

The gear on the left is three times the size of the gear on the right. If we drive the gear on the right with an engine, the gear on the left will turn at 1/3rd the speed of the gear on the right *in the opposite direction* BUT will turn with 3 times the torque (or twisting force). We are trading speed for force. If we turn the left gear with an engine, the right gear will turn at 3 times the speed but only 1/3rd the torque. The relationship between the input and output speed of the gears is called the gear ratio. Left to right is a ratio of 1 to 3 (or 1:3). Right to left is a ratio of 3 to 1 (or 3:1).

Remembering back to our discussion of an engine's horsepower and torque, the torque is the twisting power coming out of the engine. If we need to modify that torque, we can place a pair of gears on the engine to increase the torque so the automobile can drive up a very steep hill or accelerate quickly. The smaller gear on the engine and the larger gear to the driveshaft.

The problem we have now is the maximum RPM of the engine will be quickly reached but the car will not be travelling very fast. If the automobile is no longer on the hill nor accelerating quickly, we don't need the torque multiplied but we do need more speed.

For speed, we need to switch the gears so that the larger is on the engine and the smaller is on the driveshaft. That is exactly what happens inside the transmission as selected by the driver.

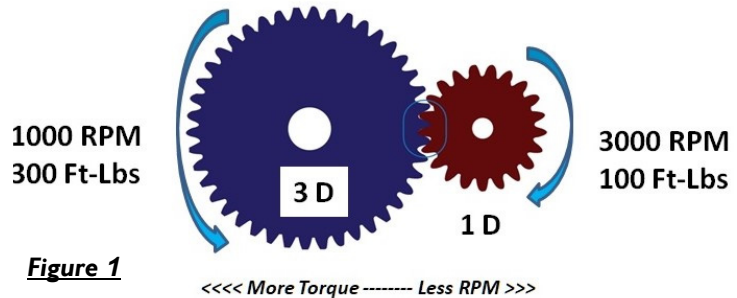


Figure 1

Figures Courtesy of Eric Jensen

(Continued on page 22)

TAPPET TECH

Transmissions

....continued

(Continued from page 21)

Between the transmission and the engine is a device, the clutch, to disconnect the two so that the selection of gears can be made. We won't go into detail about the design of the clutch in this article. Once automatic transmissions were invented, the function of the clutch was also automated so the 3rd pedal to operate the clutch was eliminated.

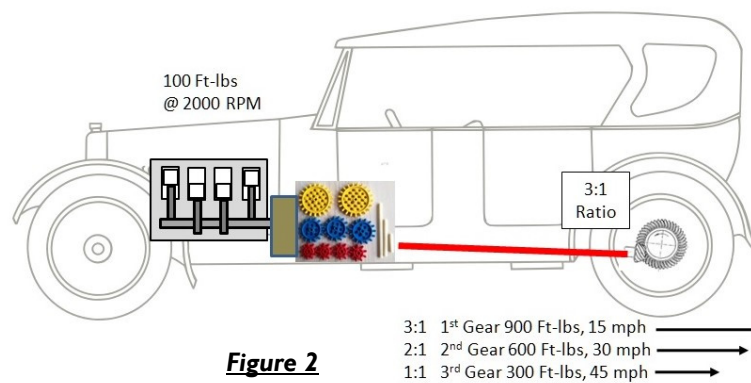


Figure 2

We also need another reducing ratio at the rear axle considering the large diameter of the wheel. Our example uses a ratio of 3:1 so the driveshaft turns at 3 times the speed of the wheel. See the example shown in Figure 2.

Internal combustion engines don't produce much useable torque at very low RPM so they must have a transmission to

multiply the small amount of torque available to get the auto moving. Automobiles generally need one or more gear ratios as the speed increases. The Ford Model T managed with only two gear ratios but its top speed was not much over 40 mph. Gear ratios are chosen so that the engine can be operated mostly between its RPMs of maximum torque and maximum horsepower, especially in the higher gears.

Two or more ratios of gears are built into the transmission with a method to select only one ratio at a time and a set of gears that allow reverse motion. The insides of transmissions are filled with gears, rods and sliding mechanisms to allow the easy selection of the proper ratio. They can rival the complication of an engine (right).

As many as 7 forward gears have been used in passenger car manual transmissions. Some automatically shifted transmissions have 6, 8 or 10 ratios. These multiple gear ratios are used keep the engine in its most efficient range to improve fuel efficiency as much as to improve performance.



TAPPET TRIVIA

And now, the answers...

1. **Q:** What was the full name of the founder of the Stutz Motor Car Company?
Answer: Harry Clayton Stutz, born 1876, Died 1930.
2. **Q:** Where was the founder of the Stutz Motor Car Company born?
Answer: Astoria, Ohio southwest of Dayton and north of Cincinnati in Butler County, Ohio
3. **Q:** What was the nickname of the Stutz entry to the 1911 Indianapolis 500?
Answer: The car was called the Stutz Racer. Nicknamed the Stutz "Bearcat" and the name stuck! The "Bearcat" finished the first-ever Indianapolis 500 in 11th place.

Any Questions or Comments contact Joe Ryan! The Tappet Trivia for September will be more questions about Harry Stutz, his cars, and his multiple companies.



Adopt-A-Car Program

Available Adopt-A-Car Automobiles and Engines

Alfa Romeo Guilietta	Lancia Lambda	Waymo Firefly
Alfa Romeo GTZ	Lotus Elite Series II S.E	Abarth 1000-TC-R
Alfa Romeo 8C 2900	Maserati Tipo 60 Birdcage	Alfa Romeo GTZ engine
Alfa Romeo AutoDelta 1600	Mercedes Benz W-154	C-6R Offenhauser
Ardent Alligator	Mercer Raceabout	Cadillac OHV V-8
Austin Cooper S	Miller	Chrysler Hemi (C-3)
Ballot	Packard Speedster	Duesy Sprint Car engine
Bugatti Type 55 Super Sport	Porsche 718 RSK Spyder	Ford GT-40 Transaxle
Cadillac Series 61	Porsche 904 Carrera GTS Red	Ford Turbocharged Indy
Cisitalia SC	Porsche 904 Carrera GTS	Gurney Eagle GP engine
Cunningham C-1 Prototype	Porsche 907	Jaguar XK120 Series
Cunningham C-3	Porsche 911	Porsche Type 771
Delahaye 135 Comp Special	Porsche RS-60 Spyder	Porsche Type 901/20
Detroit Electric	Porsche RS-61L Spyder	Porsche Type 901/22
Duesenberg Model J	Scarab Sports-Racer	Porsche Type 908
Elva Porsche	Simplex	Porsche Type 916
Fiat Abarth TCR	Stutz Black Hawk	Columbia Three-Track
Jorgensen Eagle	Vauxhall 30-98 Type OE	Humber 58" Ordinary
		Velocipede Bicycle

To adopt a car or engine, contact: **Brian Lanoway, Adopt-A-Car Chair** blanoway@shaw.ca

The **Tappet Clatter** is the official newsletter of **Revs Institute Volunteers** of Naples, Florida. Its intended purpose is to inform, entertain and promote camaraderie for our members.

The editor is **Eric Jensen**, eric60@gmail.com. Although email is preferred, correspondence can be mailed to: The **Tappet Clatter**, 2500 South Horseshoe Drive, Naples, FL 34104.

The **Tappet Clatter** welcomes contributions from all sources. Contributions are subject to editorial review and enhancement. The editor may use third party input to confirm content. Authors can have the right to review and approve the final version of their article before publication. All ideas and opinions are those of the writers. Neither the **Tappet Clatter** editor nor the Board of Revs Institute Volunteers assumes liability for the information contained herein.

The **Tappet Clatter** respects the copyright of all sources. However, the **Tappet Clatter** may choose to use copyright material if that use meets all four factors of the [Fair Use exception](#) identified in [United States copyright law](#). Unless otherwise noted, photo sources can be identified by clicking on the photo.

The **Tappet Clatter** is **not to be reprinted or electronically distributed** beyond the membership of The Revs Institute Volunteers without prior written permission. Rights of reproduction, in printed or electronic media, are retained for any text or photographs submitted. The **Tappet Clatter** reserves the right to refuse publication, edit, or modify any material and hold such material for an indeterminate period.