

The official newsletter of

Revs Institute Volunteers

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Inside this Issue:

Welcome Back	1
Membership Report	3
Volunteers Meeting	4
SIMCA Part Deux	5
Metalworkers Art	7
Dewar Trophy	8
Tappet Tech	14
New Volunteers	16
Events Calendar	19
New AAC Guidelines	20
Adopt-A-Car	21

TAPPET CLATTER

Volume 27.3

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Welcome Back from Our Curator, Scott George

Welcome back to Southwest Florida and to a slightly more normal season than the past one! I hope that you all had a healthy, safe and enjoyable summer. We look forward to having your valuable support again this season. The growth in our area this year has been phenomenal and the interest in cultural activities appears to be strong.

The collection and workshop team have been busy this year. This summer and fall season have been especially strong with numerous car events that have come back online with many extending their normal show dates into the fall season.

To give you some idea of our schedule and participation level this past year, we will have had 40 cars out and about from California to Rhode Island and parts in-between, not including all our normal collection maintenance, exercise activities and restoration projects.

The Ballot has undergone a minor body retransformation to correct details that were discovered in period images found following our 2019 restoration. A short-term exhibit was created to provide our visitors, and all of you, some level of understanding of the paint-by-hand process. The final paint coat will be applied soon, with the lining (pin-striping) and fuel tank artwork planned for completion before the end of the year. All of which is planned to take place on the mezzanine.

The Porsche 906 is undergoing its final stages for painting in the original Elfenbein white (light ivory) color and will begin reassembly in the weeks ahead with the consideration of creating a public exhibit on the mezzanine level of the reassembly process.

(Continued on page 2)

Welcome Back from Scott George...continued

(Continued from page 1)

Our Porsche 904 (red) normally displayed in the upper lobby has gone through a full mechanical restoration in preparation for a track exercise session. We are in the final stages of assembly and expect to have it functional and sorted soon.

In addition, you have all likely seen the images in the newsletter (page 7) of the incredible fabrication effort that has evolved over the last several months for a new special car build project known as *RazzoFab*. The conceptual idea of Mr. Collier, this *sportscar* will be a **fully** reimagined/re-engineered and designed, combination of Fiat 850 Spyder and Subaru WRX (drivetrain) which has been created by the skillful mastery of Dave Klym who engineered the design by CAD, (computer aided design) which is now coming to life. Dave Klym, Tim Bair, Pedro Vela and our newest workshop team member, Rick Kusy (project planning), currently make up that build team, with additional support from others as the project develops. We are creating a new *fabrication center* for this build in the large warehouse space (Tbay) adjacent to the workshop. More will be forthcoming on this project, which is intended in part to help transfer skills to the next generation and provides a platform for our team to continue and develop their own knowledge and skills within the complex and detailed nature of the build. We are also planning to create an online film series for this effort, so stay tuned!

We have also developed, over this past 5-month period, a new *hands-on* lesson plan within the workshop that will be used to teach basic concepts of the 4-cycle engine, its operation, and tuning. We expect to begin offering classes locally this season in our workshop which will be a new and educational opportunity for us and will keep you all apprised. We also plan to create additional lessons and expand the subject range soon.

As we look forward to completing these projects and starting others, we also look to better understand your interests and skillsets as we look to provide a limited number of volunteer opportunities within the workshop. I look forward to seeing you all again soon, to learn more about your interests and to share an overview of our year with you on the 19th of November.

Video Treats... *click on the picture to view*

Prior to becoming part of Miles Collier Collections, the Porsche 906 in its guest spot on the 80s TV show *Miami Vice*



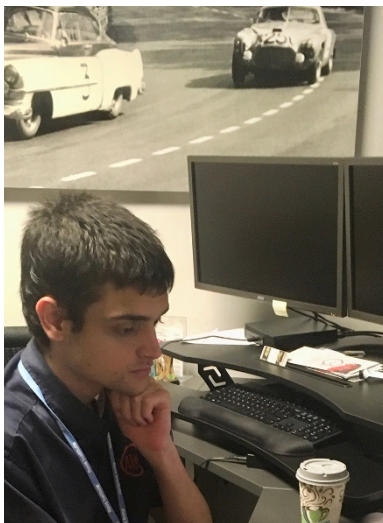
A nostalgic look at automotive service stations in 1957

Your Membership Committee

By Tom Dussault

The Revs Institute Membership Committee have been busy during the past month.

During October, we interviewed twenty-three new applicants. Twenty of these new members completed the Orientation Program. Thirteen are assigned as 'Stewards,' primarily as providing security for the collection, while seven have chosen to take the traditional route working with our Mentors to become Station Guides.



*New volunteer,
Abraham Lowers*

Our new college and high school volunteers are excited to be volunteering here. Just imagine how anyone of us would have felt, back when we were high school or college students being able to work alongside such accomplished individuals as our Revs Institute members. Many of these young people are a bit apprehensive. Please take the time to make them feel welcome and get to know them. They would appreciate that. We believe that they have a great deal to offer to Revs Institute.

These new people are serving in a several roles including providing security for the collection and working in the library and as Tour Assistants, a position that is frequently eliminated when we do not have enough members to cover all of the stations. Several of our new members have already served as Tour Assistants on Docent Tours. These new

members have remarked that they are very impressed with the knowledge and professionalism of the Docents.

We also have a number of new volunteers who are retired or close to retirement. They have varied and impressive backgrounds and we think they will fit right in with the rest of us.

We continue to seek to recruit new members. If you have a friend or neighbor or someone who has returned for the season, and you believe that they may be interested in joining us, please let us know and we will invite them in for an interview.

Thank you all for your help.



*Rick Stomber and new volunteer,
Henry Donath
All Photos Courtesy of Tom Dussault*



John Wharton and a new class of volunteers

Volunteers' Meeting with GM's Sports Car Racing Manager, Laura Klauser.....By Eric Jensen

On October 20th we had our first Volunteers' meeting virtually over Zoom with special guest speaker, Laura Klauser. Introduced by Roc Linkov as a very competent track driver who can not only "talk the talk" but "walk the walk", Ms. Klauser has been GM Sports Car Racing Program Manager since January 2021. She is responsible for all General Motors sports car racing programs. These include programs in IMSA and SRO North America as well as World Endurance Cup (WEC) and SRO in Europe.

GM cars running in those series include the Camaro GT4.R, Corvette C8.R and Cadillac DPi-V.R entries. Laura has been involved with the very successful Cadillac programs since 2016 so this is not a new assignment but a expanded one.

GM has involvement is a wide range of racing activities that include NASCAR, IndyCar, NHRA drag racing and a new EV Hummer off-road class. The involvement is expanding so much that a new technical center is being built in North Carolina near the center of the NASCAR industry.

The program was a very informative look at GM's role in motorsport and specifically sports car racing. We thank Ms. Klauser for her time speaking to Revs Institute Volunteers.



Photos Courtesy of General Motors

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. Louis Chevrolet raced bicycles for 3 years! How many Bicycle races did Louis Chevrolet win?
2. What car did General Motors build with construction methods similar to the Trabant?
3. The East German Trabant was unchanged until 1990 when the 2 cylinder 2 cycle engine was replaced in 1990 by what brand and type of engine?
4. We as Station Guides and Docents are often asked what number is shown on the side of the 1950 Cadillac "Le Monstre?"

The answers are posted later in the issue.

From FIAT to SIMCA to Chrysler to Peugeot to Lee Iaccoca and Chrysler Again *Part Deux*

By Morris Cooper

It is impossible to avoid the pun of describing the Rootes of the Chrysler Europe story. The dream of legendary Chrysler President Lynn Townsend was to have a world-wide brand, and to take advantage of the expanding European economy and appetite to buy cars. When Townsend became President in 1961 at the age of 42, Chrysler had a very minor share of the U.S. and world market.

It would make a good case study for business school to unravel the compounding errors made by Chrysler management that threatened to kill the company. Chrysler gradually purchased France's second largest car builder, SIMCA, which had been consistently profitable since inception in the 1920s and was later lucky to be able to sell it for \$1.00 and debt to Peugeot.

While there are always multiple causes for a train wreck, the one that stands out here was a monumental failure to understand the French and British car markets and their trade unions. Then there was the ill-fated decision to expand Chrysler Europe in 1967 by buying Rootes Motors in the U.K.; the manufacturer of Hillman, Humber, Sunbeam and Singer cars. Recall that the Sunbeam Tiger was powered by a Ford V8.



Chrysler paired SIMCA with models like the stylish Rootes built Humber Super Snipe in 1967

But the great irony of this story is the fact that SIMCA (then Chrysler Europe) wound up saving its parent company and narrowly averting its bankruptcy. How? The answer is the front-wheel-drive SIMCA Horizon, which then morphed into the similar looking but very different Plymouth Horizon and Dodge Omni in the U.S.

The compact hatchback Horizon was the first and only world car developed by Chrysler. Started after Lynn Townsend retired in 1975, it was produced under SIMCA, Chrysler Europe, and finally Talbot nameplates.



Since very few still exist due to massive rust problems, it is compelling to discover that the Horizon was voted Motor Trend Car of the Year in 1978 and European Car of the Year in 1979.

The U.S. versions shared almost no similar body stampings with different motors and completely different front suspensions.

1979 SIMCA Horizon

(Continued on page 6)

From FIAT to SIMCA *Part Deux... continued*

(Continued from page 5)

Chrysler adapted a 1.7L 4 cylinder from Volkswagen because it had no capability to supply 4-cylinder engines in the U.S. The horsepower of the SIMCA-designed engines were considered insufficient for the U.S. market.

The 1978 sale of Chrysler Europe allowed Chrysler to retain the design rights of its Horizon project. Its transverse-engine front-wheel-drive layout led to the great success of the K-car which sold over two million units. The Omni/Horizon became Chrysler's best selling model line between 1978 and 1980 and is regarded as the key to Chrysler's ability in 1979 to obtain government funding to stay alive by proving that it could develop fuel-efficient, competitive cars. That \$1.5 Billion loan allowed Chrysler to develop its K-Cars and its minivans which became their most profitable lines during the 1980s.



Chrysler's K-Car, The car born from the SIMCA/Talbot Horizon



Chrysler's Minivan, complete with faux wood trim, based on the K-Car Platform

After the fire sale to Peugeot and the end of Chrysler's world-wide ambitions, Peugeot rebadged the SIMCA Horizon/Chrysler Europe Horizon as the Talbot in all European markets. The car was also built in Spain by PSA's Spanish subsidiary and in Finland by Saab-Valmet, including a model there that ran on both kerosene or turpentine.

The best summary of Lee Iacocca's vision of building more cars with fewer parts was in a 1984 article in the New York Times: *The K platform not only single-handedly*

saved Chrysler from certain death, it also provided the company with a platform that could be stretched, smoothed, chopped and trimmed.

As for Peugeot, it purchased 30% of Citroën in 1974 and became PSA Peugeot Citroën. In February 2019, PSA had announced that they intended to re-enter the U.S. market in 2021. However in January 2021, PSA merged on a 50/50 basis with Fiat/Chrysler to form Stellantis, which includes Maserati, Alfa Romeo, Lancia, Opel, Vauxhall, Citroën and many others. It is now one of the world's top 10 automakers and number four by volume with 300,000 employees manufacturing in 30 countries. Earlier this year Stellantis and Foxconn announced a new joint venture to develop breakthrough digital cockpits and personalised connected services.

And so we have come full circle in just under 100 years. Fiat creates SIMCA, SIMCA sells to Chrysler, Chrysler sells to Peugeot, Fiat merges with Chrysler and finally Fiat/Chrysler merges with Peugeot. To quote the Grateful Dead's Jerry Garcia, "What a long strange trip it's been."

The Metalworkers Art

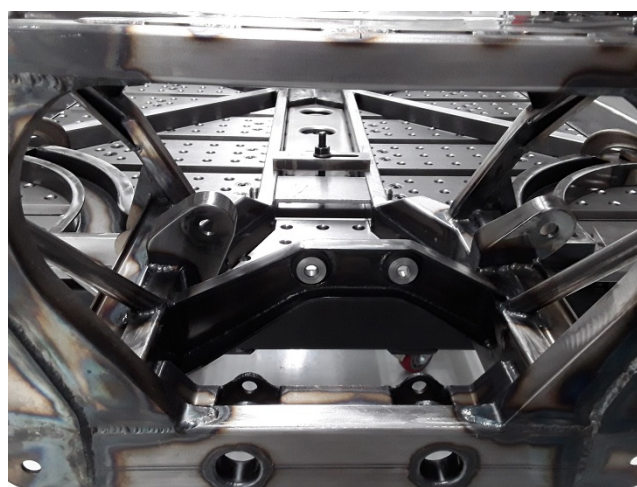
By Eric Jensen



A special project is progressing in the CH Motorcars workshop in Revs Institute. Expert builder and fabricator, Dave Klym, is bringing to life his computer designs in the form of metal. These skills are being taught to the next generation of restoration specialists. Please enjoy the metalworkers art and science, in its full glory.



Eric Jensen Photos



What is the Dewar Trophy?

By Joe Hauser

During my interactions with Revs Institute visitors, I often ask if they have heard of the Dewar Trophy, and overwhelmingly, they tell me that they know what Dewar's Scotch is, but they have never heard of the Dewar Trophy. In the early days of the automobile, it was the most prestigious award that could be bestowed on a car manufacturer. These trophies went to the best automotive innovation each year as determined by the Royal Automobile Club (the RAC). The RAC, which was founded in 1897 by English motoring pioneers became the most highly regarded governing body for motorsports in Great Britain (and maybe the world), in the early 1900's. So how did the Dewar Trophy become the leading award for rewarding the development of the automobile?



The Dewar Trophy

It all started with Sir Thomas Dewar, one of the heirs to the Dewar's Scotch fortune, a member of the Great Britain Parliament and an avid automotive enthusiast. Sir Thomas came up with the idea of using the Royal Automobile Club to evaluate new technologies developed by English car companies and awarding a Trophy to the best of those companies to encourage innovation. Thomas decided that by offering a trophy that recognized technical advancements, he could motivate the motor industry of Great Britain to become the world leader in automotive manufacturing. To initiate the Trophy, Lord Dewar donated the endowment fund, and ordered the first trophy in 1906. Being selected by the RAC for the yearly award was recognition of one's accomplishments, and a huge marketing bonanza for the recipient. Although the trophy's luster decreased over the years, as did the RAC's reputation, the trophy is still being awarded to this day.

This author and the *Tappet Clatter* editor both agreed that there were several early automotive pioneers that have not been given the appreciation they deserved. Several of these "silent" innovators had won the Dewar Trophy in the early days of the automobile, so I got out my 'Dewar Trophy' notes and picked 3 awardees who fit in this category. The three gentlemen whom I thought fit this mold were Dewar Trophy winners Claude Johnson (Rolls-Royce, 1907), Henry Leland (Cadillac, 1908), and Charles F. Kettering (Delco, 1913).

1) 1907 Dewar Trophy Awarded to Rolls-Royce for "Reliability"

When Charles Rolls and Henry Royce joined forces to produce luxury cars in 1904, they agreed that reliability and roadworthiness should be their number one priority. Charles Rolls was in charge of sales, while Henry Royce oversaw engineering. Henry Royce was a perfectionist and was the proper person to produce the "Best Car in the World" - a title bestowed on Rolls-Royce (by Rolls-Royce).

(Continued on page 9)

What is the Dewar Trophy?....continued

(Continued from page 8)

Background: The Rolls-Royce 40/50, later known as the Silver Ghost, became available in 1907 and brought with it quality and engineering excellence at a level that had never been seen before on a motor vehicle. This was the result of Henry Royce's incredible attention to detail. Other engine designs of the time had long, flexible crankshafts that produced a large amount of vibration. To reduce vibration and increase longevity, the Rolls-Royce engines were designed with large rod bearings and pressurized oiling systems, served by seven main bearings. This was then enclosed in a strong aluminum alloy crankcase eliminating noise and vibration. The crankshaft had an accuracy of plus or minus 0.00025 inch on its bearing surface, unheard of at the time. To achieve this level of precision, they were hand polished by technicians to remove any microscopic imperfections left by the grinder. Instead of using noisy chains to drive the ignition, Royce used gears. Phosphor bronze and nickel steel were used in the construction of the timing gears which were then ground and polished by hand. The engine was further shortened (and thereby stiffened) by manufacturing the engine blocks in two three-cylinder castings. Cooling problems and leaks were reduced by using removable cylinder blocks and fixed heads.

Additional procedures used to ensure ultimate reliability of each car included the following notable steps. Each chassis was designed with the gearbox, engine, and radiator mounted on sub-frames to cushion their rides on the rough roads of the day to insure a smooth velvety ride. To ensure the quality of every automobile, each car was test driven hundreds of miles until every minor fault was found and corrected. All these precautions resulted in an extremely reliable, and smooth automobile.



Car AX201, the original Silver Ghost

Once Royce had designed and built this extraordinary automobile, Claude Johnson, managing director of Rolls-Royce and marketing guru, decided that Rolls-Royce needed to demonstrate the extraordinary properties of the car through a series of reliability demonstrations. Claude was often referred to as the hyphen in Rolls-Royce because of his importance to the success of the brand. His plan started by taking the twelfth Rolls-Royce 40/50 produced, Chassis number 60551 (aka AX201), and having all its fittings silver-plated and the coachwork

painted in aluminum paint. This car became known as the "Silver Ghost" because of its exterior treatment and quiet ride and was probably the most famous car in the world at the time. The car still exists residing in a collection in the U.K. Years later, when the next Rolls-Royce series, the Phantom I was introduced, the name Silver Ghost, was expanded to include all the 40/50 cars, not just AX201.

(Continued on page 10)

What is the Dewar Trophy?....*continued*

(Continued from page 9)

Reliability Demonstration: In May 1907, Claude Johnson entered the 'Silver Ghost' into the 'Scottish Reliability Trial,' which was a well-known test of reliability for automotive manufacturers. The 'Silver Ghost' won the trial which was run on difficult roads and terrain in Scotland, and was awarded a gold medal by the RAC, who oversaw the trial. After winning the trial, Claude Johnson announced his intention to break the world record for a 'non-stop' run, which stood at 7,089 miles. "Non-stop" in this context meant "without an involuntary stop on the road, apart from punctures" (this was before Binney & Smith introduced carbon black to tires!). RAC officials rode on the Silver Ghost as observers to ensure this criterion was met. Mr. Johnson chose a route from Glasgow to London that was 512 miles long, and the Rolls Royce team of drivers covered this route 29 times to equal 15,000 miles. However, an unfortunate mishap where the petrol tap shook loose stopping the car 629 miles into the reliability run, meant the actual 'non-stop' record was only 14,371 miles! Since in 1907, a car trip for more than a couple hundred miles was an adventure, this was quite a demonstration of reliability. The Silver Ghost was, quite simply, in a class of its own.

Postscript: After completing the 15,000 miles, the RAC and Rolls-Royce agreed to inspect the moving parts of the car to determine the amount of wear caused by the long trek. After their engineers had examined the parts, the RAC submitted the following analysis of the condition of the Silver Ghost, post 15,000 miles: "After a thorough technical examination and dismantling, no wear measurable by micrometer was found in the engine, gearbox, rear axle, or brakes." The Dewar Trophy was then awarded to Rolls-Royce for this amazing demonstration.

Chassis number 60551, better known by its registration number AX201, is the only car truly entitled to be called Silver Ghost. Now well over 100 years old, this superb piece of British engineering has covered over 500,000 miles and still travels extensively to appear at events worldwide. It redefined motoring in the early days of the 20th century and did so much to ensure that Rolls-Royce were recognized as the manufacturers of "*The Best Car in The World*".

2) 1908 Dewar Trophy to Cadillac for "Interchangeable Parts"



The 1906 Cadillac Model K

The Dewar trophy awarded in 1908, went to Cadillac, led by Henry Leland. At the turn of the century, Henry Leland was introducing high precision machining equipment to the fledging American auto industry. This allowed companies like Olds and Cadillac (and of course Ford) to introduce 'parts interchangeability' into their production line, and greatly decrease the time to assemble one of their cars. This manufacturing technique was just becoming known around the world when the Dewar Trophy was first introduced in 1907.

(Continued on page 11)

What is the Dewar Trophy?....continued

(Continued from page 10)

Background: Henry Leland had a long career in manufacturing precision parts, starting in the gun industry in the Civil War. This eventually led to starting a company, Leland-Faulconer, that built precision machining equipment. High precision lathes, mills, and grinding machines were necessary to manufacture parts for guns with exacting tolerances. He transferred this technology to car production when he went to work for R.E. Olds. This technology made the 'curved dash' Olds the first car with 'interchangeable parts,' a key technology essential to never before seen production volumes of automobiles.

Prior to 1908, most automobiles were made one at a time, to allow technicians to hand-fit each part for assembly. Pistons, threads, cylinder walls and bearings were ground, shaped and fitted individually to meet the high tolerances needed. The idea of interchangeable parts was considered expensive and unrealistic. Frederick Stanley Bennett, a British importer of Cadillac cars and a believer in interchangeability as necessary to advancing the automobile manufacturing process, urged the Royal Automobile Club to hold an interchangeability contest. The RAC was reluctant because they were convinced that standardization of parts was impractical. Even though it seemed unlikely to them that anyone would be able to meet the test criteria, the RAC agreed to hold a competition for demonstrating interchangeability and would award the Dewar Trophy to any company that could meet their criteria.

The new Cadillac company started building the Model K in 1906 and used precision machine tools to allow it to build 'standard' parts that were interchangeable. To publicize his revolutionary process, Henry Leland decided to compete for the Dewar Trophy, which would legitimize this new method of manufacturing.

The Interchangeability Test: In February 1908, three Model K's were delivered to the new Brooklands racetrack in Weymouth, England, and were driven around the track for thirty miles. Then, under close RAC scrutiny, the three cars were disassembled into a heap of more than 700 parts each, for a total of 2100 pieces from the 3 cars. In addition, another 90 parts from the local dealership's parts supplies were added to the pile of Model K parts and the parts were then 'jumbled' up.

Technicians were then required to assemble three complete cars under careful observation by the RAC committee of experts. Once the three cars were put together, they were driven around the Brooklands racetrack for 500 miles to prove the cars were returned to their original operational state.



The jumble of parts ready to be reassembled

(Continued on page 12)

What is the Dewar Trophy?....continued

(Continued from page 11)

This demonstration was proof to the RAC that Cadillac had verified that they were using standardized parts, and were therefore deserving of the 1908 Dewar Trophy! Henry Leland and Cadillac used this recognition of their successful use of interchangeable (i.e., standard) parts to declare that the Cadillac automobile was “The Standard of the World”!

Author's Observation: To understand how significant standardization (or lack thereof) was, one needs to realize that at this time, even basic hardware such as nuts and bolts, differed from supplier to supplier. This meant that every assembly required parts to be individually hand-fitted. This was a huge, unproductive waste of time and money. Automobiles of the era were handmade, their parts individually crafted to fit and even simple assemblies required skilled technicians to put them together. Among the earliest efforts of the Society of Automotive Engineers (the S.A.E.), that was organized in 1905, was standardization of parts. Henry M. Leland was one of the original members, and served as its president in 1913. Henry's introduction of interchangeable parts to the Detroit automotive manufacturers, allowed the U.S. to greatly outpace European manufacturers in mass producing cars. In fact, the use of assembly lines, made practical because of interchangeability, allowed American manufacturers to dominate the number of automobiles built world-wide. Consequently, standardization and interchangeability became known as the ‘American system of manufacture.’

3) 1913 Dewar Trophy: Electric Starter and Electrical System

Background: In 1908, a friend of Henry Leland, president of Cadillac, was killed while trying to start a car (a Cadillac) using a crank starter. The story has it, that Henry Leland was quite upset and vowed that no one should have to die starting a Cadillac. He immediately directed his top engineers to come up with an automatic starting system that would eliminate the necessity of having a crank. The team of engineers decided upon using an electric motor, then designed a starter/generator and the additional parts needed to make it a reality. Frank Johnson, one of Cadillac's top engineers oversaw designing the motor/generator but was unable to produce a reasonably sized motor that would do the trick.

Cadillac turned to an outside source to come up with a smaller, workable version. The man chosen for this task, Charles F. Kettering, was a man that Henry Leland referred to as “a young and generally unknown electrical genius.” Kettering, an electrical engineering graduate of Ohio State University, had worked for National Cash Register (he led NCR's Research Department), and had developed a compact electric motor to automatically open the cash register's drawer. While working for NCR, Kettering and some of his top engineers became intrigued with technology development for the automobile and spent nights and weekends working on solutions to some of the automobile's problems. They used a barn owned by Edward Deeds as their workshop, and they became known as the “Barn Gang.”

Their first breakthrough development was a coil ignition system, an improvement over the then prevailing magneto system. In 1909, when Cadillac ordered 8,000 ignition sets, Kettering and Deeds quit NCR, and formed Dayton Engineering Laboratories Company, Delco.

(Continued on page 13)

What is the Dewar Trophy?....continued

(Continued from page 12)

After being selected by Cadillac to develop the starter, Kettering used the same thought process that he had used with the NCR motor, and was able to significantly reduce the volume of the starter to a practical size. One of the assumptions made by Kettering was realizing that the motor could be overloaded for short periods of time while it was used and could then recover afterwards. Although designing the first useable electric starter, was a significant achievement (many people consider it one of the top ten 'best ever' automotive innovations), Charles Kettering and Delco, contributed several more pieces to the Cadillac's outstanding electrical system that was installed on the 1912 Cadillac Model 30.



Charles F. Kettering with his starter

Delco/Cadillac's Total electric System: The 1912 Cadillac introduced more than just an electric motor in the Model 30. Their contribution to advancing automotive technology included several additional parts, all of which contributed to allowing Cadillac to claim, once again, that they produced cars that were "The Standard of the World." The complete electrical system developed by Delco and implemented by Cadillac consisted of four parts.

1. Small, efficient electric starter/generator
2. An improved ignition system consisting of a single ignition coil, breaker points, a capacitor, and a distributor.
3. A mercury voltage regulator to maintain the battery's level of charge.
4. Electrical lighting, including headlights, side lights and taillights.

Author's Observation: How revolutionary was this electrical design? The piecing together of a completely successful, self-contained electrical system performing these four necessary functions: starting, ignition, charging, and lighting was a game changer. From this point on other starting devices (non-electrical) became obsolete, the magneto ignition declined and acetylene lights dimmed (pun intended). This electric system was a major *tour de force* by Charles F. Kettering and Henry Leland because it was such a technological leap forward. It convinced the RAC to recognize the exceptional contribution of this innovation and they therefore awarded the 1913 Dewar Trophy to Cadillac.

Winning its second Dewar Trophy in five year reaffirmed Cadillac's claim that they were "The Standard of the World"!

TAPPET TECH

Horsepower and Torque

By Eric Jensen

Horsepower and Torque, What do they really mean?

Any racing enthusiast can quote horsepower figures for their favorite race car from memory but what does horsepower really measure? Any off-road enthusiast will boast of how much torque they have to push their four wheel drive up that next hill. This article explains how torque and horsepower are related and how they came to be the measure of internal combustion engine, or (electric) motor, performance.

Jokingly, horsepower has been described as "how fast you are going when you hit the wall" and torque is "how far you move the wall when you hit it." Horsepower, as a measure, was developed about 1720, in the days of the steam engine, as a way to compare the work the new steam engine could do to a horse. This way, the salesman could offer a 10 horsepower steam engine to replace a team of 10 horses to turn a mill or raise water. Eventually after much argument, the measurement was standardized as; 1 hp is the power needed to lift 550 pounds, 1 foot high, in one second, or 550 foot-pounds per second.

Torque is a measure of twisting force. It is expressed as a force times a distance, or foot-pounds. If you have a wrench one foot long and you apply a 550 pound weight to the far end, you are generating 550 foot-lbs of twisting force, or torque, at the near end. If you have a 10 foot wrench and you apply 55 pounds of force, you still generate 550 foot-lbs of torque. If you spin that wrench around once every second with that 550 ft-lbs you will generate 550 foot-lbs per second or one horsepower.

A dynamometer usually measures torque. If you know torque and RPM, you can calculate horsepower at that point (math alert!) with the following equation;

$$\text{Horsepower} = \frac{\text{Torque} \times \text{RPM}}{5,252}$$

The typical internal combustion engine produces a different torque and horsepower number at each RPM. The numbers we compare are the maximums of each. Maximum torque occurs at lower RPM and maximum horsepower at a higher RPM.

Torque is the measurement of force that pushes the car, horsepower is how fast that work gets done. Torque tells you how steep a hill you can climb. Horsepower tells you how fast you can climb that hill. Both are important to performance.

We can use two very different sports cars that produce very similar horsepower to illustrate torque and horsepower and their affect on performance.

(Continued on page 15)

TAPPET TECH

Horsepower and Torquecontinued

(Continued from page 14)

Below you see horsepower and torque curves plotted out for our two example cars: A 2000 Honda S2000 (Figure 1) and a 1986 Corvette V8 (Figure 2). The S2000 sports car with its 2.0 liter twin cam, 4 valve, 4 cylinder produced 240 HP (in blue) at 8400 RPM but only 153 ft-lbs of torque (in red) at a lofty 7500 RPM (Figure 1). The Corvette with its 5.7 liter V8 with pushrods acting on 16 valves produced its 230 HP (blue) at only 4200 RPM but 330 ft-lbs of torque (red) at 3200 PRM (Figure 2).

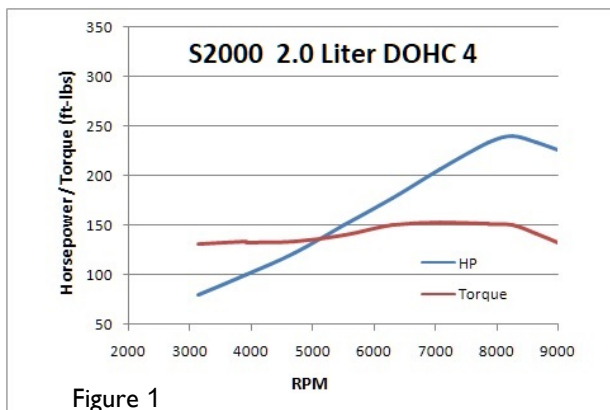


Figure 1

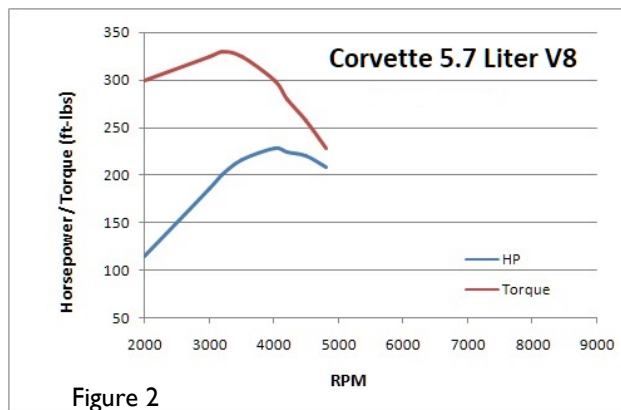


Figure 2

Each car's top speed was essentially the same at 149 mph. 0 to 60 MPH times were very similar with the Corvette just under 6 seconds and the S2000 just over. Even though the Honda was a bit smaller and 320 pounds lighter than the Corvette, the end result was two cars with remarkably similar performance. The Corvette's greater torque made up for the additional weight.

An electric motor performs much differently. It develops maximum torque at nearly zero RPM and drops off in a straight line to the maximum RPM. Horsepower shows a rise to mid RPM and then a fall (Figure 3). The high torque at zero RPM is why electric cars do not need a multi-speed transmission and why they feel so strong from a standing start.

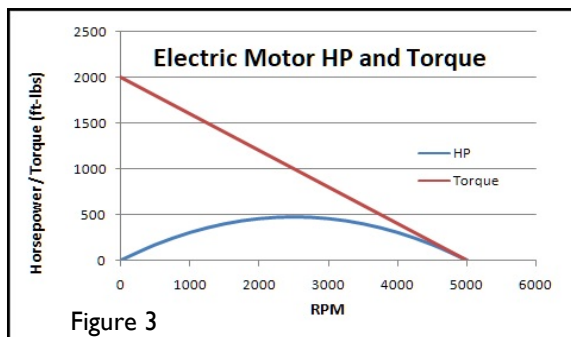


Figure 3

Small engines turning high RPM can produce a lot of horsepower. Larger engines will produce more torque. Either can be used to make a quick and fast car.

Welcoming our Newest Volunteers



Jillian Feeney

Joined Sept 2021

Full Time Resident
Steward - FGCU
Resort & Hospitality
Major,
Naples resident



Jayne Gresch

Joined Sept 2021

Full Time Resident
She's a Health Care
Professional with a
background in
Nursing and
Rehabilitative
Counseling. Jayne
will be trained as a
Station Guide, but
will primarily support
the Membership
Outreach initiative,
lending her talents to
recruiting and
retention efforts.



Gina Ferber

Joined Sept 2021

Full Time Resident
Steward - FGCU
Forensic Studies
Major and Naples
resident



Henry Donath

Joined Sept 2021

Full Time Resident
Steward – Passionate
about both cars and
their history, Pursued
volunteer position
after being impressed
with his museum visit.
He looks forward to
supporting our
Knowledgeable
Station Guides and
Docents as a Steward.



Joe Giraldi

Joined Sept 2021

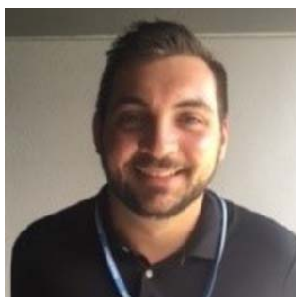
Full Time Resident
Steward and Station
Guide - I love cars!
I'm sure I'll have a
lot of fun learning
about cars from pre-
vious time periods. I
also really enjoy his-
tory and museums,
so Revs would've
been on my radar to
visit even if there
weren't volunteer
positions.



Mitch Hakoun

Joined Sept 2021

Full Time Resident
Mitch resides in
Bonita Springs and
will serve as a Station
guide. Mitch was a
C.P.A. originally from
New Jersey and is
waiting for his new
Corvette to arrive.



John Ania

Joined Sept 2021

Full Time Resident
Steward - FGCU
Resort & Hospitality
Major, Resident of
Bonita Springs



Diane Johnson

Joined Sept 2021

Full Time Resident
Steward - Diane
hopes to put her
retail background to
use as a Guest
Services Volunteer.
She was recruited by
her husband Doug
Johnson.

Welcoming our Newest Volunteers



Bob LaPorta

Joined Sept 2021

Seasonal Resident

Bob was looking for an opportunity to advance his skills in the area of automotive education and research. Volunteering as Station Guide and additionally supporting the *Tappet Clatter* seemed like a perfect fit! (editor: Yes!)



Scott Miller

Joined Sept 2021

Full Time Resident

Scott is a Naples resident and IHeart Radio executive. He will serve as a Station Guide.



Caroline Lee

Joined Sept 2021

Full Time Resident

Steward – High School Junior who learned about service opportunities at Revs Institute through the Service Learning Fair at FGCU where she takes classes.



Jim Scott

Joined Sept 2021

Full Time Resident

Jim is a Bonita Springs resident who was recruited by Mark Vargas while conducting Library research will serve as a Station Guide.



Gary Lefkowitz

Joined Sept 2021

Full Time Resident

A retired Medical Technology professional and full-time Bonita Springs resident who was recruited by John Wharton to be a Station Guide. Also awaiting a new Corvette.



David Moreno

Joined Sept 2021

Full Time Resident

Senior at FGCU studying Business Management and fellow car enthusiast. He will serve as a Station Guide.



Abraham Lowers

Joined Sept 2021

Full Time Resident

Steward – A Software Engineering major at FGCU and who discovered enjoyed a visit to Revs Institute and later found us on the FGCU service learning site. He will serve as Steward and also offer Library and Administrative



Mathew Smith

Joined Sept 2021

Full Time Resident

A realtor and full-time Naples resident who will serve as a Station Guide.

Welcoming our Newest Volunteers



Jim Wood

Joined Sept 2021

Full Time Resident

A Naples resident looking forward to serving as a Station Guide. Retired M.D. from St. Paul MN. Likes his 1970 Boss 302 Mustang and Porsche 911.



Peggy Wood

Joined Sept 2021

Full Time Resident

Peggy was recruited by husband Jim Wood. She is starting as General Library Volunteer and will eventually be trained as a Library Station Guide.



Kevin Wassel

Joined Sept 2021

Full Time Resident

Kevin is a FGCU Management and Computer Information Systems major who will serve as a Station Guide.



Joan Trute

Joined Sept 2021

Full Time Resident

Joan loves cars, racing and tennis. She was recruited by fellow volunteer Carol Hoffman and will serve as a Station Guide. services.



TAPPET RIVIA

And now, the answers...

1. **Question:** Louis Chevrolet raced bicycles for 3 years! How many Bicycle races did Louis Chevrolet win? **Answer:** Louis Chevrolet won 28 Bicycle races before he turned to auto racing and drove a Fiat and later Buick.
2. **Question:** What car did General Motors build with construction methods similar to the Trabant? **Answer:** The 1984 to 1988 Pontiac Fiero! Both cars had composite body panels fastened to a steel skeleton.
3. **Question:** The East German Trabant was unchanged until 1990 when the 2 cylinder 2 cycle engine was replaced in 1990 by what brand and type of engine? **Answer:** The Volkswagen 1.1 liter 39 HP, 4 cylinder, 4 cycle engine from the Polo model replaced the 2 cylinder due to a trade agreement before East and West Germany reunited. The Trabant ceased production in 1991.
4. **Question:** We as Station Guides and Docents are often asked what number is shown on the side of the 1950 Cadillac "Le Monstre?" **Answer:** The Le Monstre is a number 2. It is a French styled 2, as the numbers were originally placed on it at Le Mans by a French race representative. The numbers are not original to 1950, as the car was repainted once after Le Mans, but Briggs had his team match the originals.

Events Calendar

Event	Date	Info or contact
Buick Club of America Tour	Nov 12, @ 10:30 am	Sign up on VicNet
Volunteers BOD Meeting	Nov 12, @ 10:30 am	Sign up on VicNet
Members Meeting and Luncheon	Nov 19, @ 11:30 pm	Sign up on VicNet
Twin Eagles Group Tour	Nov 26, @ 10:30 am	Sign up on VicNet
Rotary-District 6960 Tour	Dec 1, @ 10:30 am	Sign up on VicNet
Shark Tooth Sport Car Club Tour	Dec 3, @ 10:30 pm	Sign up on VicNet
VT Industries Tour	Dec 8, @ 10:30 pm	Sign up on VicNet
Quail West Car Club Tour	Dec 10, @ 10:30 am	Sign up on VicNet

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

1958	Alfa Romeo Guilietta Sprint Veloce
1964	Alfa Romeo GTZ
1934	Alfa Romeo 8C 2300
1934	Alfa Romeo 8C 2900B Berlinetta Touring
1967	Alfa Romeo AutoDelta 1600 GTA
1967	Anglo American Racers Gurney Eagle
1949	Ardent Alligator
1988	Arrows A10B Formula 1 Car
1919	Ballot
1926	Bentley Super Sport
1901	Benz Dos-a-Dos
1930	Bugatti Type 35
1933	Bugatti Type 55 Super Sport
1950	Cadillac Series 61 LeMans LeMonstre
1950	Cisitalia SC
1961	Citroen 2CV Sahara
1950	Cunningham C-1 Prototype
1952	Cunningham C-3
1952	Cunningham C-4R
1953	Cunningham C-5R
1955	Cunningham C-6R
1937	Delahaye 135 Comp. Special Roadster
1917	Detroit Electric
1963	Elva Porsche
1970	Fiat Abarth TCR
1955	Jaguar D-Type
1974	Jorgensen Eagle
1927	Lancia Lambda
1962	Lotus Elite Series II SE
1938	Maserati 8CTF
1961	Maserati Tipo 60 Birdcage
1995	McLaren F1
1929	Mercedes Benz SSK
1939	Mercedes Benz W-154
1912	Mercer Raceabout
1935	MG PA PB Leonidis
1922	Miller
1927	Packard Speedster
1896	Panhard & Levassor
1951	Porsche 356SL Gmund Coupe
1956	Porsche 550A Spyder
1959	Porsche 718 RSK Spyder
1964	Porsche 904 Carrera GTS Red
1964	Porsche 904 Carrera GTS Silver
1966	Porsche 906 Carrera 6
1968	Porsche 907
1969	Porsche 908-02 Spyder
1967	Porsche 910-6
1964	Porsche 911
1967	Porsche 911R
1969	Porsche 917 PA
1958	Porsche Carrera Speedster
1963	Porsche Elva
1961	Porsche RS-61L Spyder
1958	Scarab Sports-Racer
1914	Simplex
1928	Stutz Black Hawk
1920	Vauxhall 30-98 Type E
1927	Vauxhall 30-98 Type OE
1869	Velocipede Bicycle
1884	Columbia Three-Track Tricycle
1885	Humber 58" Ordinary Bicycle
	Abarth 1000-TC-R engine
	Alfa Romeo GTZ engine
	C-6R Offenhauser Racing engine
	Cadillac OHV V-8 engine
	Chrysler Hemi engine (C-3R)
	Duesenberg Sprint Car engine
	Ford GT-40 transaxle and engine
	Ford Turbocharged Indy engine
	Jaguar XK Series engine
	Porsche Type 771 engine
	Porsche Type 901/20 engine
	Porsche Type 901/22 engine
	Porsche Type 908 engine

New Adopt-A-Car Format

Now that the seasonal volunteers are starting to get work their way down to Florida, perhaps it's time to consider adopting a Collection car. None of the cars listed here have ever been researched by a volunteer.

Although a full Adopt-A-Car report is still our ultimate goal, we have made the research possibilities easier by offering shorter sub-topics that you can investigate, such as:

- the car's pedigree
- the history of the car's manufacturer
- its racing history
- how to drive the car
- the innovations in the car's design
- the processes and materials used to produce the car
- the styling features and colors used
- the car's restoration or re-restoration
- anecdotes about the car's history
- identifying additions to the car's research bibliography

The sub-topic research efforts don't have to be long. A one to three-page effort would do.

Any time spent on your research can be applied to your annual volunteer hours, even if your work is remote.

Even better, for those of you who are willing to take on a full Adopt-A-Car research report, we will do our best to get you a ride in your selected car when it's being exercised.

For further information, click on the link [here](#) to look at our Adopt-A-Car guidelines.

If you are interested please contact:

Brian Lanoway at blanoway@shaw.ca.

Adopt-A-Car Program

Available Adopt-A-Car Automobiles and Engines

Alfa Romeo Guilietta	Jorgensen Eagle	Porsche Elva
Alfa Romeo GTZ	Lancia Lambda	Porsche RS-60 Spyder
Alfa Romeo 8C 2300	Lotus Elite Series II S.E	Porsche RS-60 Spyder
Alfa Romeo 8C 2900B	Maserati 8CT	Scarab Sports-Racer
Alfa Romeo AutoDelta	Maserati Tipo 60	Simplex
Gurney Eagle F-I	McLaren FI	Stutz Black Hawk
Ardent Alligator	Mercedes Benz SSK	Vauxhall 30-98 Type E
Arrows A10B Formula I	Mercedes Benz W-154	Vauxhall 30-98 Type OE
Ballot	Mercer Raceabout	Columbia Three-Track
Bentley Super Sport	MG PA PB Leonidis	Humber 58" Ordinary
Benz Dos-a-Dos	Miller	Velocipede Bicycle
Bugatti Type 35	Packard Speedster	Abarth 1000-TC-R
Bugatti Type 55 Super	Panhard & Levassor	Alfa Romeo GTZ engine
Cadillac Series 61	Porsche 356SL Gmund	C-6R Offenhauser engine
Cisitalia SC	Porsche 550A Spyder	Cadillac OHV V-8 engine
Citroen 2CV Sahara	Porsche 718 RSK Spyder	Chrysler Hemi engine
Cunningham C-1	Porsche 904 Carrera	Duesenberg Sprint Car
Cunningham C-3	Porsche 904 Carrera	Ford GT-40 transaxle
Cunningham C-4R	Porsche 906 Carrera 6	Ford Turbocharged Indy
Cunningham C-5R	Porsche 907	Gurney Eagle GP engine
Cunningham C-6R	Porsche 908-02 Spyder	Jaguar XK Series 6 cyl
Delahaye 135 Roadster	Porsche 910-6	Meyer-Drake Turbo
Detroit Electric	Porsche 911	Porsche Type 771 engine
Elva Porsche	Porsche 911 R	Porsche Type 901/20
Fiat Abarth TCR	Porsche 917 PA	Porsche Type 908 engine
Jaguar D-Type	Porsche Carrera	

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.

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