#### The official newsletter of

# The Revs Institute Volunteers

The 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:

- Chip Halverson
- Joe Ryan
- Mark Kregg
- Susann Miller
- Mark Koestner
- Susan Kuehne

## Inside this November Issue:

| Volunteer Cruise-In | 2  |
|---------------------|----|
| Tappet Trivia       | 3  |
| New Road Trip       | 4  |
| Automotive Forum    | 5  |
| Cosworth DFX        | 6  |
| Motorsports 2020    | 10 |
| Tappet Tech         | 16 |
| Events Calendar     | 17 |
| Video Treats        | 17 |
| Adopt-A-Car Changes | 18 |
| Adopt-A-Car         | 19 |
|                     |    |



Volume 26.3

November 2020



# Chairman's Notes

**As** I sit here and write this on 11/4, even though we do not have a winner in the Presidential election from yesterday, I am happy to get one more thing from 2020 off my plate. Only 2 months left to go in 2020, thank goodness. It has been quite a year.

As always, in anticipation of reopening, Revs Institute has all safety protocols and guidelines in place, but at present no opening date has been released. Many of our volunteers have attended our "Returning with Confidence" training session either in person or online.

I have received official word from Carl Grant that the museum intends to remain closed to the public until the early January, however management will continue to monitor and reevaluate the situation as things progress.

Your Board, with the assistance of Revs Institute staff, are putting together some exciting opportunities for volunteers to remain engaged while the museum is closed to the public, so be sure to monitor your email for the most up-to-date news. I would like to thank Susan for her efforts to get us interesting and informative links on a regular basis.

I, for one, am happy to have some distraction from the boredom of Covid-19. To that end, another Road Trip to lunch is planned for November 16th. The notice is on page 4 of this issue of the *Tappet Clatter* and was sent in an email blast. Hope to see you there!

Stay Healthy,

Mark Koestner

Volume 26.3

November 2020

Page 2

## Volunteer Cruise-In October 20, 2020

**A** nice follow-up to last month's cruise to the Rod and Gun Club, Revs Institute sponsored a cruisein and lunch for the volunteers and staff. Forty-three volunteers joined twenty-five staff members for lunch.





Cars on Display

Eric Jensen Photo Above

**Revs Institute Photo Left** 

A nice selection of eighteen volunteers' cars were dusted off and driven to the museum to share. A pair of electric cars were even on display. Carmen Ermi's BMW i3 joined Jack Sprague's Tesla Model 3 near Miles Collier Collections' Detroit Electric.

A few gasoline powered Miles Collier Collection cars were rolled out to join the group. The hot rod Volkswagen made an appearance as did the Cunningham C3, a Ford Model



Jay's Ferrari Testarossa Eric Jensen Photo A and the white Mini.

Few cars are as iconic as a Testarossa. Wall posters of the Ferrari would be at home right next to the Lamborghini Countach on any 1980s teenage boy's bedroom wall. We were lucky enough to have Jay McGurrin's1991 Testarossa at the show; in red, of course. The show included an eclectic mix of cars from Jim Wood's '48 Chevy woodie wagon and Larry Kobel's 32 Ford Tudor Sedan hot rod to Gary Dworkin's Jaguar F Type. Don Parmalee and Roc Linkov brought their Corvette C7 and C6, respectively.

(Continued on page 3)

Volume 26.3

## Page 3

## Volunteer Cruise-In October 20, 2020



John Aibel drove his 1950 Cadillac Cunningham Le Mans tribute car. The lone Audi was a bright red A5T convertible driven by Mark Kregg.

A group of Porsches, Bruce Laswell's '85 911 Targa, Fred Bally's 1976 914, Bob Rode's silver 1963 356B and Glenn Hanke's green 356C graced the lot. John Fritz rolled in his 2017 Alfa Romeo Giulia along with Nick Ward's 2018 Porsche GT2 RS. Not surprising that Porsche seems to be the favored mark. The canopy in the parking lot protected the food and the guests when a little of Florida's "liquid sunshine" made its appearances Ultimately, the weather was not a deterrent as we ate lunch out of the rain, enjoyed the view and each other's company.



## 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!* 

- I. For which famous movie star wife did Ali Khan buy a Delahaye?
- 2. Why did Bugatti design his iconic grill in the semi-horseshoe shape?
- 3. What precious material partially lines the engine compartment of the McLaren FI?
- 4. Which is the first car in the Collier Collection to have unibody construction and what gave the designer the idea?

The answers are posted later in the issue.

Volume 26.3

Page 4



## It's time to join your fellow volunteers on another road trip south!

Where: The Island Gypsy Café at 292 Capri Blvd on the Isles of Capri waterfront dining with ample outdoor seating

When: Monday, November 16th

**What Time:** Meet at the Walgreens at the SE corner of East Tamiami Trail and Collier Blvd at 10:45. We have a 11:30 lunch reservation

Ĕ

Who: Revs Volunteers (guests are welcome!)

**RSVP:** Mark Koestner



Locally World Famous.



### Page 5

# The Automobile Forum Looking for New Members By Jane Hamel

**E**arlier this year, the Revs Institute Volunteers were invited to join a new initiative entitled the **Automobile Forum**. This Forum is geared towards anyone who is enthusiastic about the automobile and wants to join like-minded individuals in exploring and discussing topical events related to car culture, engineering, the automotive industry, and self-image. As we near completion of our first edition, we are looking to add new members and choose our next topic!

In this first edition, we chose to focus on a book. Each week, several volunteers take one hour out of their day to sit down and discuss two chapters of the entertaining and educational, *Engines of Change* by Paul Ingrassia. Chapter leaders are encouraged to fuel the discussion by posing discussion questions at the beginning of each meeting.

These questions are centered around the major themes of a chapter. The cars below were each the subject of discussion.

As we near our final chapters in this first edition of the Forum, we have been evaluating feedback from our participants, and plan to make a few changes to our next edition of



the Forum. While we still live in a virtual world, we will attempt to host at least two physical meetings at Revs Institute. We will also begin inviting guest speakers where we can, based on the topics we discuss. While we intend to choose another book title for our next edition, we will be discussing different topics each week. Published articles, movies, YouTube videos, and podcast episodes will be suggested at the end of each meeting for inclusion in the following week's discussion.

Open enrollment period begins the week of November 23rd. For this next edition of the Automobile Forum we want YOU to decide our topic! If you have works in mind that do not appear on this poll, please send an email to facilitator,

We hope to see YOU at our next Forum!

## The Story of the Cosworth DFX Desperation as the Mother of Invention By Chip Halverson

In 1974 Parnelli Jones and his partner Vel Miletich were running VPJ racing out of a shop in Torrance California. At the time they were running an Indy Car team, a Formula 1 team, and an F5000 team. Parnelli's Indy car team was having some success with Eagle chassis driven by Mario Andretti, Al Unser and Joe Leonard among others. However, they were having frequent engine failures.

The venerable Offy, whose basic design, in large part, dated back to the 1913 Peugeot, had won 24 Indy 500's by this time. In order to remain competitive, it was turbocharged in 1969, and by the use of over 120 inches of boost (or 58.9 psi) was producing somewhere



Miles Collier Collections Cosworth DFX V8 Indycar Racing Engine Powered Johnny Rutherford's car to a win at the 1980 Indianapolis 500 Jack Sprague Photograph

around 1,000 horsepower. Many thought the number closer to 1,200 when a little nitro was added for qualifying, but no one would talk about the exact number.

At those power levels the original design was stretched well beyond its limits and many catastrophic failures resulted. As one old crewmember said, "the connecting rod made an escape .... through the side of the block"! The Offy had also passed through multiple ownership cycles and the current group was having manufacturing issues. Vel ordered 30 new blocks and upon testing, 27 of those failed as a result of castings not passing pressure and Zyglo checks. Al Unser said at the time "We were having a terrible time with those Offies, we used to puke 'em while we were warming 'em up. The water jackets were the worst part - they used to crack and shift all the time."

Across the shop the F1 team was using the Cosworth DFV. This engine was introduced in 1967 when F1 went to a 3 liter formula. Climax, who had dominated since 1958, with the Coventry Climax, elected not to build a new engine to fit the rules. The Cosworth was a purpose-built race engine, light, compact, dual overhead cams, and very efficient. The DFV (Dual Four Valve) went on to win an astounding 155 Formula 1 races.

Page 6

(Continued on page 7)

# The Story of the Cosworth DFX, continued

(Continued from page 6)



Parnelli Jones (left) and his partner Vel Miletich (center) receive the the Championship Car Owners Award presented by Dick King in 1972 at the USAC banquet in Indianapolis

Courtesy of Revs Institute C.V. Haschel Photo

Parnelli and Vel were spending large sums on the Offy and getting very inconsistent results. Since Vel, a Ford dealer, was running the business side of the team and paying the bills, he pressed for an alternative to the Offy. Finally, Vel and Parnelli were so fed up that they looked across the shop at a Cosworth DFV and told the engine shop guys, machinist Chickie Hiroshima and engine builder Larry Slutter, something like "see if you can make that into an Indy Car engine."

Very early on they contacted the Cosworth factory in England to assess their interest. Cosworth co-founder and leader, Keith Duckworth, was not in favor of turbocharging the DFV. However, they offered some help in the way of crankshafts which would reduce the displacement from 3.0 liters to 2.65 liters, the Indy car limit at

the time. It turns out they had made the crankshafts the previous year for Roger Penske's organization. Penske had elected not to proceed, perhaps due to having a full plate with projects going on for the Porsche 917-30 Can-Am car, a two car Indy team, and trying to make an AMC Matador competitive in NASCAR.

With the displacement issue resolved, Larry and Chickie then went to work on the other two major hurdles to the conversion, adding turbocharging, and getting the engine to run on methanol versus gasoline. After about six months of development, they did their first dyno test in the fall of '74. By then, USAC had reduced turbo boost to a maximum of 48 inches (23.6 psi). The results were very encouraging. According to Slutter, "The first time we ran it, it was up more than 50 hp over the Offies we had, so we knew right away we had a going piece."

The team had an engine installed in a converted VPJ Formula 1 chassis for practice at Indy in May of 1975. Al Unser practiced the car but found the handling poor and elected to run his Eagle Offy... the result, a thrown rod and DNF. By the fall, the chassis (now known as the VPJ6B) had been improved and qualified on pole at Phoenix. Unser went on to finish fifth and the engine had everyone's attention.

As is usually the case in racing, success is quickly copied. McLaren began building the engines for their own use and for the Penske team. Others followed and soon there was large demand for used DFV blocks and the Cosworth factory was seeing demand grow for parts.

# The Story of the Cosworth DFX, continued

(Continued from page 7)

At this point, with potential of the Indy Car version of the engine obvious, Keith Duckworth had a major decision to make. Competition was coming to Formula 1. The revenue from a project that was an adaptation of the DFV not requiring the effort of developing a new engine was attractive. But before he could commit to a full factory supported effort, two issues needed resolution.

Cosworth hesitated to get fully involved in the project early on because of the politics of Indy racing. At the time Indy car racing was sanctioned and controlled by the United States Auto Club (USAC). USAC was very pro-American, some said xenophobic, and was still stinging from the European invasion of the sixties which led to Jim Clark winning in 1965 in a British built Lotus chassis. By the seventies many of the chassis were built in Europe or had close ties to European designs. Penske had even set up an operation in the UK to build chassis. To USAC's relief, at least the engines at the time were American.

Second, the issue of what to call the engine arose. The DFV was badged as a Ford and had Ford emblazoned on the head covers. This was quite natural given Fords financial backing of Cosworth. The legendary Ford of UK executive, Walter Hayes, was very aware of the strong Ford versus General Motors rivalry in the US at the time. A number of the Indy teams, most notably Penske, had strong ties to GM. He felt it was possible that those teams would not be willing to run an engine badged as a Ford. Since Cosworth was an important source of engineering for Ford, and they had a major investment in the company, it was in his interest for them to be successful. Hayes blessed the concept of badging the engine as a Cosworth to enhance its chances of success in the US.

By 1976 Duckworth, seeing the growing demand, and sensing that the politics had diminished,

decided to proceed with a factory version of the engine, which was by now called the DFX. They also opened a facility near the VPJ shop in Torrance and hired Hiroshima and Slutter away from Parnelli. The facility supplied entire new engines, rebuilds, and parts.

As they say, the rest is history. In 1978 the DFX, fittingly driven by its development driver, AI Unser, won the Triple Crown of USAC (The 500 mile races at Indy, Pocono, and Ontario), a feat that was never repeated.



The Cosworth DFX's first Indianapolis win came in 1978 with Al Unser driving for Jim Hall's Chaparral race team. Further wins came that year at Ontario and Pocono.

(Continued on page 9)

# The Story of the Cosworth DFX, continued

## (Continued from page 8)

The engine went on to win ten straight Indy 500s and 151 Indy Car races. The DFX dominated the field at Indy for many years. In 1983 32 of the 33 starters at Indy used the engine.

In a final twist of irony, the DFX lost its dominant position to a Chevrolet badged engine in the late 1980's. That engine was designed by Illmor, a company formed when Roger Penske hired two top engineers, Paul Morgan and Mario Illien, away from Cosworth.





Above: The chart illustrates the number of Indianapolis 500 entries powered by the DFX and the best finish for the engine in that year's race. The dominance of the Cosworth DFX is apparent with 10 straight wins.

Left: Johnny Rutherford's 1980 Indy winning "Yellow Submarine" fielded by Jim Hall Racing.

## **Fast Facts:**

We all know racing is expensive. Just how expensive is it? A few comments on cost from one well versed in the costs of living with the engine. The comments are from Ian Biscoe, General manager of Cosworth USA at the time.

"The rebuild interval was 500-600 miles under normal use, rebuild cost was anything from \$20k to \$55k depending on how many major items needed replacing, blocks were around \$15k, heads I think were \$3.5k each. Labor with the dyno I think was around \$6k It took 100 hours to complete a rebuild. Rebuilds always had new pistons, bearings and valve springs while everything else was carefully crack tested.

Top revs were around 10,500 to 11,000...... horsepower was around 650."

#### Page 10

# Motorsports in 2020

A Season of Adaptation

by Eric Jensen

The last time the world was embroiled in a global health crisis, the First World War that decimated Europe for 4 years, was winding down. The Spanish flu global health crisis started around February 1918 and lasted until about April 1920. Evidence suggests it affected the world much earlier. The response varied from country to country and state to state. Much as we see today, schools, churches, and theaters were closed. Social distancing and masks were often required. Public transportation was restricted as were large public gatherings are very much the definition of auto racing crowds. So how were motorsports affected by the 1918 global health crisis?

European auto racing was virtually non-existent from 1914 until 1918. This was not a consequence of the health crisis but of the war that embroiled much of Europe. The Targa Florio was cancelled after 1914 and did not return until 1919. The sheer size of the course used in 1919, the 108 kilometer Media Circuit, may have made the race possible. Social distancing is quite easy over a long course. The Monte Carlo Rally, after its 1911 debut, was run in 1912 not to return until 1924 due to the war and the economic conditions that followed. Neither the 24 Hours of Le Mans nor the Mille Miglia yet existed.

In the United States, racing continued until the US entered the war. The American Automobile Association Championship auto races sanctioned 21 events in 1917 which included the Indianapolis 500. The United States' entry into the war caused the cancellation of the 1918 race and a reduction of AAA races to 17 for 1918. The Indianapolis 500 was resumed in 1919 as part of a schedule of 21 races. Referring to the pictures in



The 1919 Indianapolis 500 start with the stands full of spectators Revs Institute Photo

the September 2020 *Tappet Clatter* article about the Ballot racing at Indianapolis, we can see there was a large crowd in the background attending the race in 1919.

So what are we doing differently in 2020 and how is that affecting motorsports?

(Continued on page 11)

# Motorsports in 2020, continued

(Continued from page 10)

"Beware the Ides of March", as the Romans once warned, nor should we forget its unlucky predecessor, Friday the 13th. Ironically, both would factor into racing around the globe.

As a European based series, the global health crisis should have affected Formula 1 first. It did not. Teams and equipment were in Australia for the March 15th opening race. The decision to cancel the event was made the morning of Friday the 13th, the first day of practice before the race. The first eight races of the 22 race season were soon cancelled.

A revised schedule had the opening two races in Hungary's Hungaroring on back to back weekends starting July 5th. No fans in the stands but the practice and qualifying formats remained. Health and safety protocols including testing were required for all teams members and media. Races were centralized in Europe to minimize travel. One consequence was no swing to the Americas for the Canadian, Mexican, Brazilian nor US races. Monaco would not host a race for the first time since 1954. Rules changes for the cars themselves planned for 2021 were shifted to a future date.

Sports car racing's sanctioning body, International Motor Sports Association (IMSA) was similarly affected on the very same weekend. Racing started off the season early with the Rolex 24 Hour at Daytona International Speedway's road course in January before the health crisis got into full swing in the US. The Sebring 12 Hour race, first run in 1952, was scheduled to have a separate support race for the European World Endurance Cup (WEC) prior to the International Motor Sports Association (IMSA) Sebring 12 Hour race on March 14th. The event first was downsized as the WEC race was cancelled due to European travel restrictions. The 12 Hour was later cancelled and then rescheduled to November. IMSA would not race again until July 4th at Daytona.



Rolex 24 at Daytona 2020 starting grid

The NASCAR story was similar and happened on the same weekend. Race transporters to support each NASCAR series were parked at Atlanta Motor Speedway Friday, March 13, 2020 ready to unload. At 11:36 a.m. EST, the teams were told to head home. No racing would happen that weekend nor the next.

The 24 Hours of Le Mans, however, would run, but on a later date in September without fans and the fanfare normally associated with the

great race. It was a strange sight to watch the race with most of the fan areas totally dark.

## Motorsports in 2020, continued

(Continued from page 11)

INDYCAR was certainly not spared changes. Forty-eight hours before the season opener in St. Petersburg, Florida, the race was cancelled. Another casualty of Friday the 13th. The traditional running of the Indianapolis 500 over Memorial Day weekend plus the two weeks of events that precede the great race were cancelled as well. It took three months to resume racing at Texas Motor Speedway in June. That race was a one-day affair with teams arriving early in the morning, practice, qualifying and the race in the evening returning home the same day. As with most races at that time, no fans were allowed. The Indianapolis 500 was later rescheduled to a single weekend in August.

What did we do with ourselves with no racing to watch?

To fill in the open television air time, the choice was iRacing. Racing within computer games. Racing video games have been around for decades, improving with each gain in computer performance to the point where they are very close to the real thing. Race teams use simulators to train their drivers so why not compete? Drivers can log in from home and race against people from around the globe. Enthusiasts tune and race their



Indycar iRacing virtual race car

virtual cars against others from around the world. The online gaming worldwide is a 2.2 Trillion (with a *T* !) industry.

Drivers would sit in specialized computer racing "rigs" equipped with force-feedback steering wheels, pedals and even actuators that can bump and tilt the seat to provide feedback to the drivers. The races were organized with professional drivers within their respective series and broadcast to the public with surprisingly good results. The racing was actually quite good, in this author's opinion. Television viewership ratings for iRacing were generally about forty percent of 2019 live action races.

As the health crisis progressed, each race series adapted as needed to re-open their series. Schedules were revised, tracks were dropped and others added to ease travel restrictions. Some teams revised their schedules or stopped racing altogether. As the year progressed, each of the racing series expanded their weekend programs to allow practice, qualifying and some adopted double-header races over a weekend.

# Motorsports in 2020, continued

## (Continued from page 12)

Limited fan attendance was introduced as restrictions eased. Far from "back to normal," but at least with television coverage, the car sponsors got some visibility and teams earned money to keep their doors open and team members employed.

How did the global health crisis affect the racing fans?

This author attended the prehealth crisis IMSA Rolex 24 and the later Petit Le Mans events. The usual trappings were in full swing at the Rolex 24; crowds, grid walks, paddock access, exhibits for the fans, and a wide range of concessions serving all manner of food and drink. No restrictions beyond the usual safety spots like the hot pits and the track itself, of course. Car counts were strong at 38 entries in four classes. Support races were also well subscribed.

The Petit Le Mans was very different. Fan counts were greatly restricted. Camping was



Podium Club at Petit Le Mans 2020. Normally this room would be full of spectators. Attendance was restricted to about 25% Eric Jensen Photo



limited although we were hard pressed to see those limits when walking through the infield. There was no access to the paddock areas. That "bubble" to separate fans from teams restricted paddock access to team members only. The fan displays were very limited.

Petit Le Mans fans at turn 10. Estimated at 25% of a normal. Eric Jensen Photo

(Continued on page 14)

# Motorsports in 2020, continued

(Continued from page 13)

As an example, Chevrolet always brings a large display of cars, hands out tee-shirts and has representatives on hand to answer questions. The display was there, the people and tee-shirts were not. The same could be observed with food concessions as the selection was a fraction of years past. Estimates of the crowd size were about one fourth the size of previous years. The car count was a bit lower than the Rolex 24 at 31 entries but the racing was as exciting as always.

Reports from Volunteer, Mark Kregg, attending the INDYCAR season final in St. Petersburg Florida, noticed that the rules for spectators mostly matched experiences from the Petit Le Mans. Masks were required for entry, reduced fan count to about one fourth, and restricted areas for fans and teams. Social distancing and mask usage were more than a bit lax once inside the track, especially amongst younger fans. Very similar to IMSA's rules and crowd compliance at the Petit Le Mans.

During a year of great turmoil we've seen the world's three great races affected. The Indy 500 and 24 Hours of Le Mans were rescheduled and the Monaco Grand Prix cancelled outright. We were introduced to televised virtual racing. Historic venues like Sebring, Road America, Watkins Glen, Laguna Seca and others will suffer economic losses as will many race teams.

Racing traditions run strong. Those traditions were adjusted as necessary in the name of safety. This is not the first time racing has changed for greater safety. Racing will survive, as it always has. As it always will.

Special thanks to Susann Miller for the inspiration to write this article. - Eric Jensen

## And now, the answers

- I. For which famous movie star wife did Ali Khan buy a Delahaye? **Answer:** *Rita Hayworth*
- 2. Why did Bugatti design his iconic grill in the semihorseshoe shape? Answer: His father was a furniture maker and the grill mimics the back of a chair he developed.



- 3. What precious material partially lines the engine compartment of the McLaren FI? **Answer: Gold**
- 4. Which is the first car in the Collier Collection to have unibody construction and what gave the designer the idea? Answer: 1927 Lancia Lambda Torpedo. Vincenzo Lancia was influenced by the hull of a steamship.

Volume 26.3

# **APPET** ECH

# **Ride and Handling** You Want to do *What*?

By Eric Jensen

We want our cars to ride smoothly. The bumps and potholes in the road should be smoothed away by the complicated bits and pieces underneath called the suspension. To accomplish this, cars should be soft and compliant. We also want our cars to handle well. Cars should round corners sharply under the driver's control even if the road is very rough. That, in contrast to the ride, demands a stiff, controlled and well damped suspension. Two jobs with contrasting needs and solutions.

When man decided to build a box with wheels to carry him pulled by a beast of burden, he quickly realized his machine was going to punish him by hitting the ruts and bumps in the road. His horse had no such problem as nature provided the horse with legs and muscles to cushion the ride. Man determined that he, too, could devise something to cushion the ride so he invented springs. Leaf springs. Clever devices explained in an earlier article would be used to cushion the ride. The slow moving wagons would bounce a bit after hitting bumps but, rarely exceeded 10 miles per hour, so that was of little concern.

As the first automobiles were developed, the technology applied to the horse-drawn carriages was used for the very same reasons. This is the basic concept of "ride." Parts are created that will

smooth the vibrations created by the road that will upset the passengers. If the wheel hits a bump, the spring will flex and absorb that bump so the passengers feel less of it. The earliest cars were equipped with springs for that reason. It worked on horse-drawn carriages, so it will work with this new invention; for a while.

Now let us proceed to "handling." Handling covers all aspects of controlling the car. Traction, steering and stopping are all required to some degree on any vehicle. The earliest cars were equipped with solid wheels as were the earliest bicycles. The earliest bicycles were called "bone shakers" for an obvious reason; they had no suspension except for the rider's posterior and maybe a sprung seat.



Click on the above photo to watch a Jam Handy video explaining ride. The front suspension under the Miles Collier Collections Buick - Mercedes is very similar to the example in the video.

Revs Institute, Peter Harholdt Photo

Volume 26.3

Page 16



# Ride and Handling,

## continued

## (Continued from page 15)

Steel shod wooden wheels just would not corner properly and traction was a vague wish, at the best of times. To that end, a clever Scotsman named Robert William Thompson invented the pneumatic tire in 1845. No one seemed to care, so it was subsequently re-invented by another clever Scotsman, John Boyd Dunlop in 1888. This rubber covered fabric tube, filed with high pressure air, revolutionized both bicycles and cars as it allowed a better ride, better traction and better handling. Pneumatic tires were a great enhancement to early cars but they also produced a problem in search of a solution.

A pneumatic tire acts much like a rubber ball. It bounces. On cars, the wheel is attached to the axle, which is attached to the spring, which is then attached to the frame. There is little to control the bouncing of the tire and the bouncing of the springs. At 15 miles an hour, that is of little concern. At 70 miles an hour, it is a very large concern. A video showing that tire bounce is <u>linked here</u>. Now we need a damper of some kind. The 1902 Mors recognized that 70 miles per hour over rough dirt roads creates a tremendous amount of bouncing. This makes the car very hard to control so pneumatic dampers were fitted to the car. Racing *does* improve the breed.

The bouncing of the car's body on the springs is fairly slow; it is less than 2 cycles per second. For a nice ride, slower is better. For better handling, faster is better. The tire bounces at its own rate that is much faster than the body. The nature of the tire, lower weight and higher stiffness, make it bounce much faster; 20 cycles per second or more. With early high pressure tires or performance tires, the frequency is much faster. On modern low pressure tires, the bounce would be slower. The damper is attached between the frame and the wheel and is trying to control both of these motions. The damper has a tough job as it must control the tire to keep it on the ground but not over-damp the body so the passengers feel the rough road.

Performance cars are tuned less for the comfort of the driver. The tires must stay in contact with the road at all times and the body must not flop around as the driver steers back and forth. The springs are stiff, the damping is high and the suspension is firmly attached to the frame. The car, however, will go exactly where it is steered, can apply the engine's power, and brake effectively to put the driver in control on any road. Performance cars skew to the "handling" portion of ride and handling. An example of one such car, the 1968 Jaguar XKE, is linked here.

The smoothest riding road cars are the opposite. They are softly sprung, softly damped and focus on comfort. An example would be any 60s or 70s Lincoln Continental or Oldsmobile 88. Large amounts of rubber are used throughout to attach the suspension to the frame. The car, of course, doesn't change direction very quickly nor will it round a corner without a roll to the side and a cacophony of squeals from the tires. It will, however, move smoothly down the road. Luxury cars skew to the "ride" portion of ride and handling as linked here.

All cars must handle. All cars must ride reasonably well. Reality is a compromise.

Volume 26.3

November 2020

Page 17

| Events                                      | s Calen         | dar                               |
|---|-----------------|-----------------------------------|
| Event                                       | Date            | Info or contact                   |
| <b>Revs Institute Re-Opens</b>              | TBD             | Susan Kuehne                      |
| For a full list of daily tour groups and ev | vents, go to th | e 'Calendar of Events' on VicNet. |

# **Video Treats**

Click on the photo at the right to watch Cosworth DFX's first win at Indianapolis in 1978. The video is about 101 minutes, so set aside a little time!





Click on the photo to the left to watch a 1960 promotional video about GM's most unique car and Ralph Nader's favorite target, the Chevrolet Corvair

# AN INVITATION to the new Adopt-A-Car Program

**A**re you missing your involvement with Revs, especially if you are still remote? Do you crave doing research on the historic vehicles in the Collection, but need a focus and purpose? Do you want to explore individual topics without writing a thesis?

We think we have the solution for you: a revised, more manageable Adopt-A-Car program, where you can explore sub-topics one at a time.

To encourage this, we have broken down the Adopt-A-Car reporting requirements into ten possible sub-topics. We think you will like this new list.

## Adopt-A-Car sub-topics:

- **Pedigree** of the automobile (initial owner, subsequent owners, timeline, sibling automobiles, period reviews and articles, subsequent modifications, collection acquisition).
- **History of the automobile manufacturer** (this may be applied to other OEM cars in the collection).
- **Racing** and/or public **display history** of the automobile.
- A basic **mechanical and operational description** of the automobile (including how to drive and/or race the car). Discuss any subsequent modifications or improvements made to the Collection car or a related model.
- Unique engineering and innovations used in the design of the car.

Materials or processes used in manufacturing the car.

**Styling** features, colors and materials used (related to the fashion of the time).

**Restoration** and re-restoration history of the Collection automobile.

- **Anecdotes** involving the personalities or period history related to the car (this can apply to the other cars in the collection).
- Building the car's **bibliography**: A list of books, periodicals and web sites that can be used for further research by others on the car, its manufacturer or related historical era. This can be updated by other volunteers.

Unless otherwise noted, our intention is that each sub-topic relate to a specific Miles Collier Collections automobile.

Page 19

| Available .   | Adopt-A-Car Automo  | obiles and Engines  |
|---|---|---|
|   |   | Peer Harhold  |
|   |   | Perr Harhold  |
| A A A A   |   |   |
| S. S  | 04  |   |
|   |   |   |
|   |   |   |
| ALFA 1300 Giuliett Sprint Veloce  | LOTUS Type 14 Elite   | ENGINE: Cadillac OHV V-8  |
| Alfa 8C 2900B   | MASERATI Birdcage   | ENGINE: 1965 Ford Indy Car  |
| ALFA GTZ  | MERCEDES SSK  | ENGINE: Abarth 1000-TC-R  |
| APPOW/S Formula 1   | OSCA MT4  |   |
| ANNOWSTOTTICIAL   |   | ENGINE: AITA ROMEO GIZ  |
| BENTLEY 6 1/2 LITRE SPEED SIX   | PANHARD LEVASSOR Wagonette  | ENGINE: Alta Romeo GTZ<br>ENGINE: Chrysler Hemi (Cunningham C-3)  |
| BENTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre  | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder   | ENGINE: Alfa Komeo GTZ<br>ENGINE: Chrysler Hemi (Cunningham C-3)  |
| BENTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP   | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder   | ENGINE: AIRA ROMEO G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car   |
| BENTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55  | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)  | ENGINE: AIRA ROMEO G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car   |
| BENTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55<br>CISITALIA 202  | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)  | ENGINE: AITA Romeo G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford GT-40 Transaxle   |
| BENTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55<br>CISITALIA 202<br>COLUMBIA Three-Track Tricycle  | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 907   | ENGINE: AIRA ROMEO G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford GT-40 Transaxle<br>ENGINE: Ford Turbocharged Indy Car   |
| BENTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55<br>CISITALIA 202<br>COLUMBIA Three-Track Tricycle<br>CUNNINGHAM C-1  | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 907<br>PORSCHE 907<br>PORSCHE 907   | ENGINE: AIRA ROMEO G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford GT-40 Transaxle<br>ENGINE: Ford Turbocharged Indy Car<br>ENGINE: Jaguar XK Series   |
| BENTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55<br>CISITALIA 202<br>COLUMBIA Three-Track Tricycle<br>CUNNINGHAM C-1<br>CUNNINGHAM C-1<br>CUNNINGHAM C-2  | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 908/3<br>PORSCHE 910/6<br>PORSCHE 910/6   | ENGINE: AIRA ROMEO G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford GT-40 Transaxle<br>ENGINE: Ford Turbocharged Indy Car<br>ENGINE: Jaguar XK Series<br>ENGINE: Jaguar XK100 Prototype   |
| EINTLEY 5 1/2 LITRE SPEED SIX<br>EENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55<br>CISITALIA 202<br>COLUMBIA Three-Track Tricycle<br>CUNNINGHAM C-1<br>CUNNINGHAM C-2R<br>CUNNINGHAM C-2R  | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 907<br>PORSCHE 907<br>PORSCHE 910/6<br>PORSCHE 911<br>PORSCHE 911   | ENGINE: Alfa Romeo G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford GT-40 Transaxle<br>ENGINE: Ford Turbocharged Indy Car<br>ENGINE: Jaguar XK Series<br>ENGINE: Jaguar XK 100 Prototype<br>ENGINE: Porsche Type 771  |
| BENTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55<br>CISITALA 202<br>COLUMBIA Three-Track Tricycle<br>CUNNINGHAM C-1<br>CUNNINGHAM C-4R<br>CUNNINGHAM C-5R<br>CUNNINGHAM C-5R<br>CUNNINGHAM C-5R   | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 907<br>PORSCHE 907<br>PORSCHE 910/6<br>PORSCHE 9110<br>PORSCHE 9111<br>PORSCHE 911R   | ENGINE: Alfa Romeo G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford GT-40 Transaxle<br>ENGINE: Ford Turbocharged Indy Car<br>ENGINE: Jaguar XK Series<br>ENGINE: Jaguar XK 100 Prototype<br>ENGINE: Porsche Type 771<br>ENGINE: Porsche Type 901/20   |
| BENTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55<br>CISITALIA 202<br>COLUMBIA Three-Track Tricycle<br>CUNNINGHAM C-1<br>CUNNINGHAM C-4R<br>CUNNINGHAM C-5R<br>FLAT ABARTH 1000<br>EORD MODEL 4  | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 907<br>PORSCHE 908/3<br>PORSCHE 910/6<br>PORSCHE 911<br>PORSCHE 911R<br>PORSCHE 917K<br>PORSCHE 917K  | ENGINE: AIRA ROMEO G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford GT-40 Transaxle<br>ENGINE: Ford Turbocharged Indy Car<br>ENGINE: Jaguar XK Series<br>ENGINE: Jaguar XK100 Prototype<br>ENGINE: Porsche Type 771<br>ENGINE: Porsche Type 901/20<br>ENGINE: Porsche Type 901/22   |
| BRITLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55<br>CISITALIA 202<br>COLUMBIA Three-Track Tricycle<br>CUNNINGHAM C-1<br>CUNNINGHAM C-4R<br>CUNNINGHAM C-5R<br>CUNNINGHAM C-5R<br>CUNNINGHAM C-6R<br>FIAT ABARTH 1000<br>FORD MODEL A<br>GURDEY EAGLE G P  | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 907<br>PORSCHE 908/3<br>PORSCHE 910/6<br>PORSCHE 911<br>PORSCHE 911R<br>PORSCHE 917K<br>PORSCHE 917K<br>PORSCHE 917K  | ENGINE: Alfa Romeo G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford GT-40 Transaxle<br>ENGINE: Ford Turbocharged Indy Car<br>ENGINE: Jaguar XK Series<br>ENGINE: Jaguar XK Series<br>ENGINE: Jaguar XK100 Prototype<br>ENGINE: Porsche Type 901/20<br>ENGINE: Porsche Type 901/20<br>ENGINE: Porsche Type 901/22<br>ENGINE: Porsche Type 908  |
| BRITLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55<br>CISITALIA 202<br>COLUMBIA Three-Track Tricycle<br>CUNNINGHAM C-1<br>CUNNINGHAM C-4R<br>CUNNINGHAM C-5R<br>CUNNINGHAM C-5R<br>FIAT ABARTH 1000<br>FORD MODEL A<br>GURNEY EAGLE G.P.  | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 907<br>PORSCHE 907<br>PORSCHE 910/6<br>PORSCHE 9110<br>PORSCHE 911R<br>PORSCHE 911R<br>PORSCHE 911R<br>PORSCHE 917K<br>PORSCHE 917K<br>PORSCHE 917K   | ENGINE: AIRA Romeo G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford GT-40 Transaxle<br>ENGINE: Ford Turbocharged Indy Car<br>ENGINE: Jaguar XK Series<br>ENGINE: Jaguar XK Series<br>ENGINE: Porsche Type 901/20<br>ENGINE: Porsche Type 901/20<br>ENGINE: Porsche Type 901/22<br>ENGINE: Porsche Type 908<br>ENGINE: Porsche Type 908<br>ENGINE: Porsche Type 906                                    |
| BINTLEY 5 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55<br>CISITALA 202<br>COLUMBIA Three-Track Tricycle<br>CUNNINGHAM C-4R<br>CUNNINGHAM C-5R<br>CUNNINGHAM C-5R<br>FIAT ABARTH 1000<br>FORD MODEL A<br>GURNEY EAGLE G.P.<br>HISPANO SUIZA H6C CHASSIS  | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 907<br>PORSCHE 910/6<br>PORSCHE 9110<br>PORSCHE 9111<br>PORSCHE 9111<br>PORSCHE 9117K<br>PORSCHE 917K<br>PORSCHE 917K<br>PORSCHE 917K<br>PORSCHE BEHRA F2<br>PORSCHE BEHRA F2<br>PORSCHE F5 611   | ENGINE: Alfa Romeo G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford GT-40 Transaxle<br>ENGINE: Ford Turbocharged Indy Car<br>ENGINE: Jaguar XK Series<br>ENGINE: Jaguar XK 100 Prototype<br>ENGINE: Porsche Type 771<br>ENGINE: Porsche Type 901/20<br>ENGINE: Porsche Type 901/22<br>ENGINE: Porsche Type 908<br>ENGINE: Porsche Type 916  |
| BINTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55<br>CISITALIA 202<br>COLUMBIA Three-Track Tricycle<br>CUNNINGHAM C-1<br>CUNNINGHAM C-1<br>CUNNINGHAM C-6R<br>FIAT ABARTH 1000<br>FORD MODEL A<br>GURNEY EAGLE G.P.<br>HISPANO SUIZA H6C CHASSIS<br>HUMBER 58" Ordinary Bicycle<br>IAGIAR D-TYPE   | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 908/3<br>PORSCHE 908/3<br>PORSCHE 9110/6<br>PORSCHE 911R<br>PORSCHE 911R<br>PORSCHE 917K<br>PORSCHE 917K<br>PORSCHE 814R F2<br>PORSCHE BEHRA F2<br>PORSCHE BEHRA F2<br>PORSCHE BEHRA F2<br>PORSCHE GT CARRERA SPEEDSTER<br>PORSCHE GT LWER GHOST  | ENGINE: AIRA ROMEO G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford Turbocharged Indy Car<br>ENGINE: Jaguar XK Series<br>ENGINE: Jaguar XK 100 Prototype<br>ENGINE: Porsche Type 771<br>ENGINE: Porsche Type 901/20<br>ENGINE: Porsche Type 901/22<br>ENGINE: Porsche Type 908<br>ENGINE: Porsche Type 916  |
| BRITLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM P578 GP<br>BUGATTI Type 55<br>CISITALIA 202<br>COLUMBIA Three-Track Tricycle<br>CUNNINGHAM C-1<br>CUNNINGHAM C-4R<br>CUNNINGHAM C-5R<br>FIAT ABARTH 1000<br>FORD MODEL A<br>GURNEY EAGLE G.P.<br>HISPANO SUIZA H6C CHASSIS<br>HUMBER 58" Ordinary Bicycle<br>JAGUAR D-TYPE<br>IORGENER FAGL   | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 718 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 907<br>PORSCHE 908/3<br>PORSCHE 910/6<br>PORSCHE 911<br>PORSCHE 911R<br>PORSCHE 911R<br>PORSCHE 917K<br>PORSCHE 917K<br>PORSCHE 817K<br>PORSCHE BEHRA F2<br>PORSCHE BEHRA F2<br>PORSCHE BEHRA F2<br>PORSCHE GT CARRERA SPEEDSTER<br>PORSCHE SG 61L<br>ROLLS ROYCE SILVER GHOST<br>STUTZ BIACKHAWK | ENGINE: Alfa Romeo G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford GT-40 Transaxle<br>ENGINE: Ford Turbocharged Indy Car<br>ENGINE: Jaguar XK Series<br>ENGINE: Jaguar XK 100 Prototype<br>ENGINE: Porsche Type 771<br>ENGINE: Porsche Type 901/20<br>ENGINE: Porsche Type 901/22<br>ENGINE: Porsche Type 908<br>ENGINE: Porsche Type 916  |
| ENTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY 6 1/2 LITRE SPEED SIX<br>BENTLEY Corsica 8 litre<br>BRM 578 GP<br>BUGATTI Type 55<br>CISITALIA 202<br>COLUMBIA Three-Track Tricycle<br>CUNNINGHAM C-1<br>CUNNINGHAM C-1<br>CUNNINGHAM C-4R<br>CUNNINGHAM C-5R<br>CUNNINGHAM C-5R<br>CUNNINGHAM C-5R<br>CUNNINGHAM C-6R<br>FIAT ABARTH 1000<br>FORD MODEL A<br>GURNEY EAGLE 6.P.<br>HISPANO SUIZA H6C CHASSIS<br>HUMBER S8" Ordinary Bicycle<br>JAGUAR D-TYPE<br>JORGENSEN EAGLE<br>LAMEDRGHINI 350 GT | PANHARD LEVASSOR Wagonette<br>PORSCHE 550A Spyder<br>PORSCHE 518 RSK Spyder<br>PORSCHE 904 Carrera GTS (red)<br>PORSCHE 904 Carrera GTS (silver)<br>PORSCHE 907<br>PORSCHE 910/6<br>PORSCHE 910/6<br>PORSCHE 911R<br>PORSCHE 911R<br>PORSCHE 911R<br>PORSCHE 917K<br>PORSCHE 917K<br>PORSCHE 917K<br>PORSCHE 817K<br>PORSCHE 817K<br>PORSCHE 817K<br>PORSCHE 817K<br>PORSCHE 817K<br>PORSCHE 85 G1L<br>ROLLS ROYCE SILVER GHOST<br>STUTZ BLACKHAWK            | ENGINE: Alfa Romeo G12<br>ENGINE: Chrysler Hemi (Cunningham C-3)<br>ENGINE: Duesenberg Sprint Car<br>ENGINE: Ford 1965 Indy Car<br>ENGINE: Ford GT-40 Transaxle<br>ENGINE: Ford Turbocharged Indy Car<br>ENGINE: Jaguar XK Series<br>ENGINE: Jaguar XK Series<br>ENGINE: Jaguar XK 100 Prototype<br>ENGINE: Porsche Type 901/20<br>ENGINE: Porsche Type 901/20<br>ENGINE: Porsche Type 901/22<br>ENGINE: Porsche Type 908<br>ENGINE: Porsche Type 916<br>To adopt a car or engine |

The **Tappet Clatter** is the official newsletter of **The 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 The 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 <u>Fair Use exception</u> identified in <u>United States copyright law</u>. 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.