

The official newsletter of

The Revs Institute Volunteers

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- Chip Halverson
- Whitney Heron
- Brian Lanoway
- Tom Dussault
- Frank Brown
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- Joe Ryan
- Max Trullenque

Inside this Issue:

Editor's Corner	2
Volunteers Lunch	3
Membership Report	5
Digitizing Sales Lit	7
Jaguar XK100 Engine	12
Tappet Tech	19
Events Calendar	21
Adopt-A-Car	22

TAPPET CLATTER

Volume 26.9

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Chairman's Notes

Chip Halverson

As I write my first letter in this position I am humbled to be Chair of such an outstanding organization and to follow a long line of great leaders. Thanks to Mark Koestner for his leadership as Chair, and for helping me in this transition.

When I first came to Revs Institute six years ago I was awed by the incredible collection and its presentation. It wasn't long thereafter that I realized the strong culture that existed in the volunteer organization. Everyone held themselves, and each other, to very high standards.

The results of that culture show up in all of the positive comments from our guests. One of the measures of that guest experience can be seen on the website Tripadvisor. When I checked today Revs Institute is rated the **number one** attraction in Naples against some very stiff competition. Obviously, the Miles Collier Collection resonates very strongly with the guests. A review of the comments often refers to the volunteers in very positive ways such as "bringing the collection to life" and similar postings. Those comments are a direct result of your skills at collection interpretation and guest interaction.

(Continued on page 2)

Chairman's Notes...continued

(Continued from page 1)

As we move towards, hopefully, a more normal post-health-crisis environment, our most pressing challenge is recruiting more volunteers. Our membership committee, led by Tom Dussault and Tom Saracco, has committed to a very aggressive plan which you will read more about in this issue. To meet that plan they need all of us recruiting friends, neighbors, museum guests and others. Once they have succeeded, the rest of the organization, training, mentors, and all of our other committees will have to help get the new volunteers up to our high standards as quickly as possible.

I have to say a special thanks to Whitney. We have come into these new roles at about the same time and she has been terrific to work with.

Finally, with all of the effort put forth by all of you to get where we are, and to take this organization to the next level, we do this as volunteers. We should never lose sight of the fact that this should be fun!

All the best!

Chip Halverson

Editor's Corner

Following tradition set by my predecessors, the May edition of the *Tappet Clatter* will be the ninth and last issue for the 2020-2021 season. The *TC* goes on hiatus until the September 2021 issue.

My first year as editor has been very rewarding. Special thanks to Brian Lanoway, our former editor, for helping me through the first few issues navigating the sometimes maddening eccentricities of Microsoft Publisher and a thousand other details to tend to each month. Brian raised the bar quite high during his four year tenure at the helm and I hope I have done the *Tappet Clatter* justice, at least by the end of my first year.

Thanks to Morris Cooper, Susan Kuehne, and Whitney Herod for their help each and every issue with every month's details. Thanks to each and every author who contributed work to this season's issues. Thanks to Mark Vargas for sending me nice historic pictures and sales literature from the library archives to illustrate the articles. Thanks to Max Trullenque for far better pictures than I could hope to take on my own.

If any volunteer has an article they'd like to research and write, or if you are looking for a topic for an article to contribute, please feel free to contact me. There is always great history that needs uncovering!

Keep Learning, Keep Writing

Eric Jensen eric60@gmail.com

Volunteers' Appreciation Lunch

By Eric Jensen



Revs Institute Photos

What better time for our Revs Institute Volunteers to gather together than April; National Volunteer Month. Originally planned as an outdoor picnic, lunch was moved inside to accommodate Florida's random rainy season.

As the Volunteers returned to entering through the shop break room, they were greeted by an odd sight; A 2018 Subaru WRX sitting just inside the garage bay. This car seems out of place, doesn't it? Read on to find out why it was there.

Whitney Herod shared a few thoughts on this spring's re-opening and our outstanding performance. We have all had to adapt to new protocols to keep our Volunteers, the staff and our guests safe while responding to a very strong demand for visits to the museum. A new paradigm for tours was created to address social distancing with a 135 guest group from the Paradise Porsche Club to great success. This success was duplicated a couple of weeks later with 119 Mustang Club members. A strong, safe, showing for all.

The Volunteers are always happy to hear from our Curator, Scott George, as the information he presents never disappoints. First up was an explanation of the presence of the WRX; It is a donor car for a special promotional project. Its turbo-charged flat-4 cylinder engine and all-wheel-drive driveline will be removed from the WRX and installed into the Fiat 850 roadster some of you have seen floating around the shop. Talk about stuffing 10 pounds into a 5 pound bag! Dave Klym has been working this swap out in CAD (computer aided design, not cardboard aided design) for a year. The entire driveline will be installed backwards to create a rear-engine, AWD, layout.

Miles Collier Collections cars will again be out and about and attending the many concours as they reawake after their year's slumber. Seven cars will attend Amelia Island in May. Two cars, the BRM and the Cooper T43 have been requested for Goodwood in July and both Porsche 917s and the Miller for Pebble Beach in August. There is also an invite to the Audrain in Rhode Island.

Cars out for restoration include the Porsche 906 with target completion around October. The Bentleys; the SS and the Speed Six, are in the United Kingdom for corrections to earlier restorations. The Ballot after its extensive restoration and world tour, was found to not quite be as correct as once thought after some period photographs were discovered. These are being corrected and should be done by August.

(Continued on page 4)

Volunteers' Appreciation Lunch

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(Continued from page 3)

Paul Kierstein is progressing with the research on the Ardent Alligator. The desire is to restore the car with actual period parts rather than reproduction. To that end, Scott obtained an authentic late period 8000 RPM Sun tachometer in an online auction for the project. Quite a find, considering few cars of the era, including the Alligator, would even reach 8000 RPM.

Mark Vargas then approached the podium wearing what looked like gorilla hands. They were actually bear fur driving gloves. Just one of the artifacts available to show guests what early drivers wore before closed cars with heaters. Mark shared an ongoing library project to scan the sales brochures for early cars. See the article on page 7 of this issue.

Mark reminded us Revs Institute is a member of North American Reciprocal Museum Association. Any individual with a NARM membership can visit any other NARM museum for free. Details are linked [here](#). A NARM membership can be purchased at the front desk.

Our new Volunteer Chairman, Chip Halverson shared his delight at being chair of such a dynamic and committed group of volunteers. Details of those thoughts are highlighted in this month's Chairman's Notes.

Last but not least on the slate of speakers were Tom Saracco and Tom Dussault, the co-chairs of the membership committee. These two took over from the splendid job done by Joe Ryan over the past 7 years. That there need be two to fill Joe's shoes show the depth of his involvement as well as the importance of this important task. A more comprehensive explanation of the committee's activities appear on page 5.

While we all know the Revs Institute appreciates the Volunteers, we do appreciate hearing it on occasion. What better way than a good lunch, camaraderie, history and car stories?

TAPPET TRIVIA

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. In the model designation for the 1929 Mercedes-Benz SSK, What does the "K" mean?
2. In the model designation for the 1966 Ford GT-40 Mark II B What did the "B" designate?
3. And a 3 part question; Who designed the body of the 1958 Scarab? How old was he? How much was he paid?

Your Membership Committee

By Tom Dussault

Picture Courtesy of
Revs Institute



Your Membership Committee has been busy bringing in new volunteers to Revs Institute as well as working on new ideas to identify and recruit more new members. We supported two car shows during the first quarter of 2021; The Rookery Bay Car Show and Cars on 5th. Car shows have proven to be a great way of recruiting new volunteers and we intend to do more.

During the past year, we recruited fifteen new volunteers. All of whom have completed the New Member Orientation Program as well as the Intro Class. Nine of the new volunteers have completed initial station guide training with their mentors while six are currently in training. Four new volunteers have begun working in Guest Services.

We have also recruited new mentors to join and complement those experienced mentors. Our thirteen mentors have completed the Mentor Training Program. They give of their time to our new volunteers through learning the galleries to learning the skills to engage our guests to ensure a Best-in-Class experience.

Since our reopening, it has been a challenge to fill the station guide positions throughout the galleries. This is particularly true for the afternoon shifts. And, as we all know, ensuring the safety of our cars is our primary responsibility. Having adequate number of station guides is also critical to providing the best experience for our guests. Moreover, many of our members have not yet returned to volunteering due to the health crisis, so we need to recruit new volunteers to meet our current and future needs.

Not only do we need new volunteers, both men and women, young or experienced, to fill station guide, and ultimately docent positions, we have new opportunities in Guest Services, and in our Research Library.

Guest Services/Gift Shop Assistant Volunteer is a brand-new volunteer opportunity. This volunteer is responsible for engaging with visitors upon check in and during their visit to Revs Institute - ensuring the best quality visitor experience. Training will be provided on all aspects of the position. General responsibilities include:

- Greeting and engaging visitors in a welcoming, energetic, friendly, and professional manner.
- Checking in guests using Point of Sale (POS) software program.
- Processing Gift Shop sales through POS software program.

(Continued on page 6)

Your Membership Committee...continued

(Continued from page 5)

- Gift Shop merchandising and display maintenance.
- Restocking of items in Gift Shop as needed during each shift.
- Answering incoming phone calls and learning system for proper transfer of calls.
- General customer service - answering questions and/or referring to the appropriate staff member.
- Assisting with general crowd control – provide directions/advice to guests.
- Provide information to visitors regarding tours, classes, workshops, and/or other upcoming programs.

This new position will not only help our employees, but also will allow staffing by Guest Services of two current Station Guide positions thereby freeing up station guides to work in our galleries.

Library & Archives Station Guide is new opportunity for our Station Guides. The Library will soon be added as a new station in our museum rotation. If you are interested in the role of introducing the Library to our guests, please sign up for the special training that is a prerequisite to being assigned there.

How do we find new, qualified volunteers who will continue our tradition of excellence and provide a top-notch guest experience? Here are some of our plans:

- Expanding our participation in Car shows.
- Producing monthly articles, in both the internal as well as the public version of *Tappet Clatter*, covering the variety of opportunities for potential new volunteers.
- Reaching out to car clubs as well as other clubs and organizations with presentations about Revs Institute.
- We also plan to recruit college students for our Guest Services and Research Library opportunities. This effort is geared towards those students seeking an opportunity to develop their interpersonal skills and work experience while enhancing their resume.

Here is where you, our fellow volunteers, can really help. No one knows what kind of people we need to fill these roles better than you; our fellow members. We are asking each of you to reach out to your friends, your family, someone in your club or organization, anyone whom you believe could be a good fit at Revs Institute.

We hope to recruit twenty or more new volunteers to help all of us to do our jobs. If each of our members could recruit one new man or woman, we would far exceed our goal. Please send us their contact information or, better still, have them complete the application on the Revs Institute website. We will take it from there. Thank you for your support!

Digitizing Automotive Sales Literature

By Frank Brown and Mark Vargas

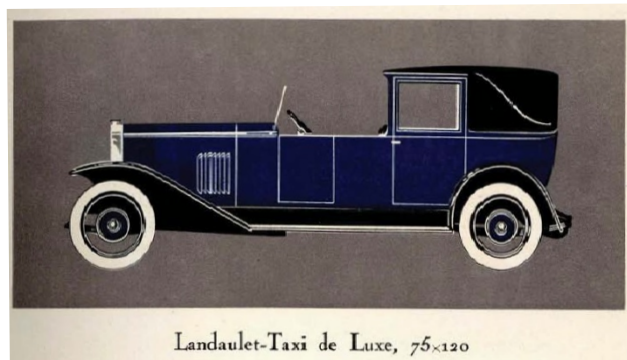
Sales literature is a form of advertising automobiles. Manufacturers wanted more customers; brochures, pamphlets, and booklets were common ways to promote their vehicles. Standard themes included price, luxury, sportiness, safety, or special engineering features.

Revs Institute has 639 boxes holding automotive sales literature. In 2021, the Library team began cataloging and scanning all examples of pre -1930 materials, and as of this writing, about 1,000 pieces are available. The Library staff catalogs each piece following professional best practices, one piece of a time, and adds them to WorldCat (public interface at www.worldcat.org), the world's largest network of library content and services. WorldCat is a union catalog of over 15,000 libraries from more than 100 countries, with 500 million bibliographic records in 483 languages, representing over 3 billion physical and digital library assets. The sales literature on WorldCat will include the Revs Institute logo as a watermark.

After the Library staff catalogs the items, a dedicated group of volunteers scans the materials as PDF files in preparation for upload to WorldCat. The Library then watermarks the PDF, links the catalog record and the PDF, and adds the scanned documents to secure web servers, where they will permanently exist. Any researcher, anywhere in the world, can download the documents at no cost. Being in WorldCat means the bibliographic records are permanent and will be forever available. The sales literature is available in the [Library's catalog](#) or on [WorldCat](#).

Many websites sell or offer some sales literature. However, those websites last for relatively short periods of time, usually at the whim of its owner or aficionado, and are crowded with advertising to keep the site workable. Therefore, they often prove limited and problematic for researchers. Revs Institute, with its mission to preserve the future of the past, is taking a more professional and archival approach.

Peter Blair Richley, an avid collector of automobilia in all formats, compiled his sales literature over several decades and donated his extensive library to Revs Institute. Richley was English, so the materials have a strong emphasis on European marques and models. The collection holds examples of extremely rare and unique items from AC to Zédel (right) cars and everything in between.



The various materials vary in their current physical condition. Many are fragile and it is good that scanning helps preserve them because users will be able to view them without further damaging them while examining them. The digitization assures their preservation and availability virtually instantly around the world, once uploaded into WorldCat.

(Continued on page 8)

Digitizing Sales Literature.....continued

(Continued from page 7)

The act of scanning these items provides volunteers with a direct view into historical advertising and promotion approaches of the last century. As the industry was evolving, it was developing messages that would help sell their products. Some sales promotion and marketing literature focused chiefly on the auto maker's firms' capabilities, its management heritage, its manufacturing facilities, and apparently all of the engineering and technical details of their machines.

The brochures are written in sometimes lengthy prose that likely was aimed to first educate the potential auto buyer. Many early brochures did not feature photographs so illustrators filled the gap by producing beautiful drawings. Notable too, is the limited use of colors used in the illustrations. Colors used in the illustrations were limited to as few as four. Photographers seemingly lacked the imagination to present automobiles in any other way than viewed from the side. Not too many three-quarter photo perspectives are found. Missing also is the later twentieth century practice of using scantily clad models.

Other sales brochure features include lists of famous customers (numerous members of royalty, and, in one case, even the Pope is mentioned), the names and locations of their concessionaires and dealers around the world, and letters and testimonials from customers attesting to the quality and useability of the vehicles. In some British brochures, pictures of the cars were featured in the various English colonial territories (Africa, India, New Zealand, and Australia).

Not unlike today, brochures reflect pictorially the society of the times. Last century, high-end automobiles were frequently shown on courses, in picnic fields, and even airfields, as backdrops to suggest the automobile was the latest convenience or novelty to augment the life style of the rich and famous. The people pictured are seemingly always dressed to the nines, holding cigarette in hand, and engaged in the most fascinating of conversations.

Potential buyers' appeal was sought in other ways too: in 1905, [Rolls-Royce](#) promoted its "all-British" motor cars of "accurate and scientific construction," employing "simplicity, silence, lightness & strength, absolute reliability, ease of management & economy of upkeep." In 1928, [Franklin](#) capitalized on the heroics of aviator Charles Lindbergh with the "Airman" models and even included signed photographs of Lucky Lindy with their car (left). In 1930, [Pierce-Arrow](#) said the most important feature of its cars was that they were Pierce-Arrows.



(Continued on page 9)

Digitizing Sales Literature.....continued

(Continued from page 8)

However, it claimed one item for singular mention: the silent gearshift, which eliminated grinding of gears, making the cars “the greatest of all traffic performers in the world today.”

At the other end of the spectrum, “nuts and bolts” auto and truck brands (e.g., [Chevrolet](#) and [Citroën](#)) emphasized utility, good business, value added, and possible profitability improvements to business with the addition of vehicles to enterprises. Many brochures for [lorries](#) (even steam-powered lorries) emphasize customer service improvement through speedier and more reliable delivery services. Pictures of trucks for Harrod’s of London and the Galleries La Fayette of Paris are part of the promotional messaging that demonstrated the versatility of the vehicles and the many places where they could be used.

for Economical Transportation



Features You Would Expect to Find Only in High Priced Cars

IN Chevrolet you will find quality features such as you would expect to find only in much costlier cars.

First and foremost of the quality features that have been responsible for Chevrolet's sensational march to world leadership is the famous Chevrolet valve-in-head motor. A motor so smooth and so powerful that it is a revelation in low-priced car performance.

A rugged frame of heavy pressed steel, channel section, with four rigid cross members to prevent weaving—assures basic strength and sturdiness. A modern, three-speed transmission—easy acting clutch and positive brakes—foot acceleration and foot rest, semi-reversible worm and gear type steering mechanism—all assure driving safety and driving ease.

And so it goes—feature after feature emphasizing the truly high quality construction of this car. Dry disc clutch, large quick-acting brakes, Remv system of lighting, starting and ignition, Harrison radiator, semi-elliptic springs, Duco finish, and in addition, on all closed models, Fisher Bodies, VV one-piece windshield with automatic wiper, rear vision mirror, Ternstedt rotary type window regulators—all these features serve to establish in an owner's mind a firm conviction that he has made the greatest dollar-for-dollar investment in the world.



Chevrolet's modern VV type one-piece windshield gives full vision and is lowered by one quick working regulator.

An automatic windshield wiper makes the weather driving safe.

Extra long semi-elliptic springs make every mile a pleasure and a delight.

As complete set of instruments is located in convenient position completely grouped on a dash in full view of the driver. Rear vision mirror also attached on all closed models.

Paul Kierstein, a staff researcher at Revs Institute, is delighted the sales literature is now individually cataloged. Paul notes that these documents are a window to the past, in essence a time capsule.

(Continued on page 10)

Digitizing Sales Literature.....continued

(Continued from page 9)

Of course, they were intended to persuade customers to part with hard-earned money, so the best and most sterling features were emphasized, highlighting how modern and inventive these machines were. In many cases they illustrate how the designer attempted to solve problems that we do not consider today because of advancements in technology and manufacturing.

Early cars were mechanically unreliable, so a striking feature of early sales literature is the focus on attention to engineering detail. For example, it was not unusual for the manufacturer to supply facts about the chassis and engine design, cooling systems, braking, lubrication, transmission, and more. The Britannia Company, manufacturer of the [1896 Facile](#) petroleum engine, noted it took only six minutes to start. A booklet for the 1906 [Argyl](#) is an

THE 11'9 BEAN "SEDAN"

A CHASSIS which has proved itself in all the classic events of the year as well as in the hands of thousands of private owners, and coachwork which yields pride of place to none for distinction, comfort and finish, combine in making the Bean "Sedan" a car of which the most fastidious might well approve.

The following extracts from letters received from Doctors are typical of many and speak of the BEAN in use under your conditions.

"I have just done 15,000 miles on my BEAN, and you will no doubt be interested to know how it has behaved.

1. There has never been one hour when it was not able to take me out except on one occasion when I collided with a lamp-post.
2. It is very comfortable to sit in and is really cosy, as you can get so well down in it.
3. Gear changing is seldom required except on starting. I did a run to Perth two months ago and changed down once going and once coming home.
4. It is a car of which one need never feel ashamed."

Another (after 9,000 miles) writes —

"Engine-power excellent, petrol consumption 28 m.p.g., the easiest engine to start I have ever met.

Gear box . . . has just been taken down after 16 months (9,000 miles) and looks like new.

Brakes . . . too good to be true, but actually A.I.

Tyres . . . The BEAN car is extremely light on tyres. After 9,000 miles of really hard work, covering a period of 16 months, I have all five original tyres in use.

Reliability . . . excellent.

To sum up . . . an excellent and reliable car, with plenty of power, an excellent appearance, and the best value for money on the market."



The BEAN "Sedan"
An Ideal Car for the
Medical Man.

engineering tour-de-force, with details even on the wiring. New features such as automatic windshield wipers, roll-down glass windows, and interior levers might be noted. The 1923 [Bean](#) (above) highlighted a customer who noted "there has never been one hour when it was not able to take me out except on one occasion when I collided with a lamp post."

(Continued on page 11)

Digitizing Sales Literature.....continued

(Continued from page 10)

Success in racing, rallies, or endurance tests were popular ways to sell cars, important in an era when reliability was difficult to achieve. The sales pamphlet for the 1923, 11.5 horsepower

**Some of the Performances of
The ALFA-ROMEO**

The King of Cars

THE Italian victories won in Italy in the FLORIO SHIELD; in the Circuits of SAVIO and MUGELLO, at CREMONA; in the GRAN PREMIO TURISMO of MONZA; in the ALPINE CUP and, in other Countries, in the GRAN PREMIO DI JUGOSLAVIA, in the KLAUSEN RACE, in the CRAU CIRCUIT, in the EVIAN-LES-BAINS WEEK, in the MEASURED KILOMETRE at OPORTO, and in the SEMMERING RACE, are evidence that the ALFA-ROMEO holds the leadership in all important tests for speed, endurance and fuel consumption, and occupies a foremost position among machines of similar cylinder capacity.

"Averaging 71 m.p.h. Campari scored a notable success for Italy in the European Grand Prix last Sunday. His eight-cylinder supercharged ALFA-ROMEO finished in magnificent fettle. From the outset the team of ALFA-ROMEO cars accomplished wonderful lap-speeds and they were seldom at the replenishment pits."—*The Autocar*, August 8th.

Sole Concessionaires:
Alfa-Romeo British Sales Ltd.
54, BAKER STREET, LONDON, W.1.
Telephone: Mayfair 4081.
Telegrams: "Mullimota, Baker, London."

All segments of artwork and advertisements in this article
courtesy of Revs Institute

unexpected brochures for chauffer uniforms from Harrod's of London.

The Library staff estimates there are another 1,000 pieces to catalog and scan. Making the sales literature freely available in WorldCat ensures the watermarked items are available to researchers for generations to come.

There is no better way to preserve the future of the past.

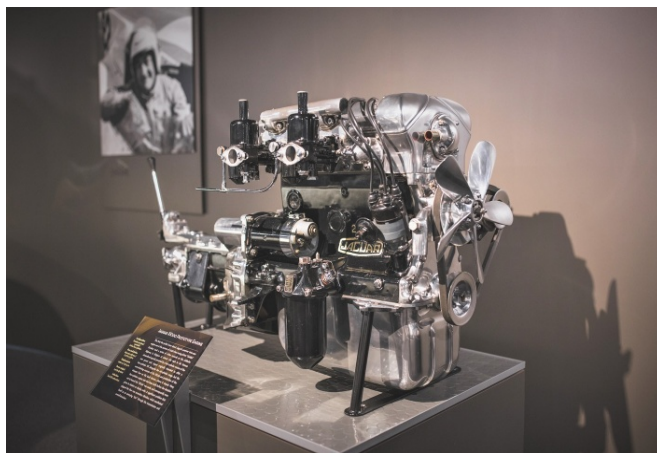
[Bugatti](#) listed its triumphs in racing and was guaranteed to provide over forty miles per gallon while also going 60 miles per hour in the three-seated body. In 1925, rival [Alfa-Romeo](#) called itself the "King of Cars," and a "supreme achievement in automobile design and construction." In 1928 [Bentley](#) advertised its 4 ¼ liter as the "world's finest sports car" and noted its maximum speed was not frequently attainable on English roads, but "the engine might almost be described as idling at 60 m.p.h." Not to be outdone, the 1929 [Mercedes](#) SS and SSK was the "car par excellence for the sports driver, and the tourist who appreciates performance far above the average—the car whose superior power and maximum speeds, whole hill-climbing and bed-rock reliability have won for it the reputation of the fastest sports car in the world."

The Library scanning project has provided volunteers another way to remain connected with the Institute during the health crisis. They make an important contribution to the mission and purpose of the Revs Institute without being exposed to potential risks in public areas. Moreover, volunteers help uncover materials that are historic, artistic, and interesting to most aficionados of automobilia. The volunteers also get to help share the many other treasures such as engineering papers, parts lists books and other catalogs, price books and other related matter such as

Jaguar XK100 Four Cylinder Engine

By Brian Lanoway

Often bypassed and in the shadow of the fabulously original Cunningham 1955 D-Type race car, if not further diminished by the push-button internal motion of its more famous six-cylinder XK brother just to the right, the four-cylinder XK 100 Jaguar engine on display at the Revs Institute looks to be more of an afterthought than an important piece of Jaguar history. At first glance, there doesn't seem much more to say; The words on the XK 100 display plaque appear to say it all.



But to this author, such anonymity begs the thrill of a deeper dive.

Photos Courtesy of Revs Institute unless otherwise credited

There is an oft-told tale that the breakthrough Jaguar XK engine, with its hemispherical combustion chambers and double-overhead cams, was conceived by Bill Heynes, Wally Hassan and Claude Baily while on Sunday evening roof-top fire duty at the SS factory in Coventry during the Blitz. That is a romantic anecdote, but the full story of the magnificent, Le Mans-winning XK engine is far more interesting.

Like most British manufacturers, William Lyons' SS Cars Ltd. was sidelined by World War II production needs. Before the war, Lyons' company sourced four-cylinder and six-cylinder 1.5, 2.5 and 3.5 litre engines from the Standard Motor Company (later known as Triumph). It was during these years, alongside a company name change to Jaguar, that Lyons' chief engineer, Bill Heynes, concluded that the previously used Standard engines would no longer meet Jaguar's post-war ambitions. Furthermore, in October 1942, John Black of Standard informed Lyons that they would not be able to support Jaguar with six-cylinder engine production, as they wished to divert all their capacity to their new four-cylinder Vanguard car. (This new Standard four-cylinder engine, which was also used in Ferguson tractors, later became the mainstay of Standard Triumph's early TR sports cars.)

Undeterred, and lacking any engine production capacity of his own, William Lyons immediately bought Standard's six-cylinder engine manufacturing equipment and had trucks at their gates before the ink on the cheque was dry.

Looking for higher profits, Lyons' target after the war was the fast saloon car market with a new design that would be capable of an astonishing 100 mph. Bill Heynes calculated that the engine required would need to produce 160 brake horsepower (bhp) at 5,000 rpm – neither of which were possible with the Standard engine.

(Continued on page 13)

Jaguar XK100 Engine....*continued*

(Continued from page 12)

Lyons' thinking further divided this market into the four-cylinder and six-cylinder segments his company had successfully exploited before the war.

To achieve this, Lyons presented Bill Heynes with the unheard-of-opportunity to design an engine using a "clean sheet of paper," unencumbered by the influence of existing tooling and equipment. In a IME paper presented later in 1953, Heynes further elaborated on the requirements for the new engine: Its design must be sufficiently advanced to not require any major changes in tooling before it was amortized; and, to keep tooling costs to a minimum, the parts for the different engine models must be interchangeable and produced in the same plant with the same tooling.

Heynes' first step was to round out his engineering team with Harry Weslake who had previously optimized the intake flow on the Standard engines. After evaluating four-cylinder, V8, inline six-cylinder and V12 engine concepts, they decided that the inline four and six-cylinder engines were still the best proposition. Both would be needed to sell in the quantities required to make manufacturing an economical proposition.

Bill Heynes and Wally Hassan were huge fans of motorsports, but it was Heynes who was most bullish about overhead cam engines. Indeed, Lyons had previously discussed the twin-overhead cam designs used in earlier Peugeot and Sunbeam racing cars. Furthermore, Heynes was attracted to the DOHC (double-overhead camshaft) layout because it eliminated the complexity of pushrods while allowing higher engine speeds.



Unusually, Lyons also wanted the engine to look aesthetically attractive, which, in Heynes' words, "must convey the look of high-speed efficiency so that the layman had some idea of the quality within."

Although Lyons knew the twin-overhead cam engine would likely cost more, he encouraged the idea as his engineering team took the concept forward.

Starting in 1944, Bill Heynes and his team stepped through the design and test of a series of proof-of-concept engines.

Heynes serialized all his experimental engines with an 'X', followed by a letter, going down the alphabet (XA, XB, XC, etc.) to identify each engine. His first running prototype was the XF 1732 cc four-cylinder engine, with a low-speed crankshaft, and a DOHC cylinder head and valve gear.

(Continued on page 14)

Jaguar XK100 Engine....continued

(Continued from page 13)

First tested in October 1945, the XF engine was used to refine the DOHC head and port design that was eventually used in the final XK engine. One of the highly-modified XF engines, with its displacement increased to 2.0 litres, sporting a five bearing crankshaft and pistons modified to bring the compression ratio up to 14:1, was loaned to Lt. Col. Goldie Gardner for his September 1948 speed run in his MG streamliner on the Jabbeke motorway. With his Jaguar XF engine developing 146 bhp at 6,000 rpm on methanol fuel, Gardner achieved a new 2-litre land speed record of 173.678 mph.

To ensure that the DOHC was the right choice, the Jaguar team also tested an XG prototype, using the old Standard push-rod four-cylinder engine as the foundation but with an alternative Jaguar-designed cylinder head similar to that used on the very successful BMW 328. This concept was found to have insufficient inlet port flow to produce the power required while its push-rod valve train was judged too noisy to meet Jaguar's saloon car standards.

The next XJ prototype was a DOHC six-cylinder design meant to replace the earlier 2.5 and 3.5 litre push-rod engines obtained from Standard. Not satisfied with the low-end torque, a longer stroke was incorporated into the next 'XK' experimental six-cylinder engine. Producing 159 bhp at close to 5,000 rpm, the XK version satisfied Heynes' design requirements, thus giving birth to the famous Jaguar XK designation.

Although the six-cylinder XK engine later went on to decades of fame, at this stage, the four-cylinder engine was no less important. In fact, most of the XK engine DOHC cylinder head development was conducted on the four.

The design features of the XK engine, common to both the four and six-cylinder versions, are worth recounting:

The hemispherical combustion chamber: Heynes viewed the advantages of this design to be "so abundant" that he found it difficult to see why this design was not more widely used. Before confirming that this was the right conclusion, the Jaguar team evaluated other combustion chamber shapes, including the "lozenge" or 'T' head, the overhead inlet, the side-exhaust 'F' head and the side valve engine before settling on the DOHC hemi design.

(Continued on page 15)

Jaguar XK100 Engine....*continued*

(Continued from page 14)

Double-Overhead Cam: Once they made the decision to use the hemispherical combustion chamber, the engineering team investigated at least a dozen different valve designs. In the end, they decided that the simplest was best: twin overhead camshafts operating directly on the tappets, particularly since the engine would have to operate at a higher continuous engine speed than had ever been used before in a production automobile.

Camshaft drive: After looking at a variety of combinations of chains and bevel gear drives, Heynes selected a chain-only design, not only because it was cheaper, but because it would be readily understood by the average service mechanic. Concerned about chain noise and durability, Jaguar spent considerable effort trying to develop a simple, single-chain drive that used just one adjustable sprocket, one fixed sprocket and a sprocket driver for the oil pump and distributor. This design had to be abandoned for a more complex and sophisticated double-chain drive because the former produced a persistent and peculiar high-pitched whine. The final iteration was uniquely designed for ease-of-service; It allowed the cylinder head to be removed without removing or re-timing the cam chain drive. This double-chain design was used, with only minor modifications, until the end of XK engine production.

Aluminum Cylinder Head: Heynes' team selected aluminum not only for its heat conductivity, but for its 70 pound weight savings over a conventional cast-iron head. Experimenting initially with a high-silicone alloy, they settled on a more conventional DTD 424 aluminum that could be readily machined. There was an initial fear that an aluminum cylinder head might allow the cast iron valve seats to fall out in service, but this proved not to be the case.

Induction port swirl: This feature, developed under contract by Harry Weslake and Company, used a patented curved port with a venturi orifice in the intake portion of the cylinder head. The resulting swirl of the intake charge, which was developed on a flow bench rather than on the engine test bed, was a significant contributor to the XK engine's high output.

Seven bearing crankshaft: To meet Jaguar's standards for smoothness and grace in a saloon, Heynes specified a well-supported, seven bearing crankshaft that used unusually large 2 ¾ inch main bearings. The smoothness was further enhanced by a proprietary crankshaft-mounted harmonic damper consisting of a steel plate and a floating iron weight all bound together by thick rubber. The four-cylinder XK engine however, likely for economic reasons, was confined to a three-bearing crankshaft.

A cast iron block: Heynes did not feel that an aluminum cylinder block would offer the required stiffness, so his engineering team designed a cast iron block for light weight

(Continued on page 16)

Jaguar XK100 Engine....*continued*

(Continued from page 15)

and minimal post-casting machining. The early XK engines did not use cylinder liners. The cylinder wall thickness was designed to last the life of the owner, further aided by the use of a chromium-plated top piston ring.

The cooling system: Unlike a conventional engine, where coolant is forced through the entire block by the water pump, the pump on the XK engine forced the coolant through the exhaust side of the engine only, where it rose by convection through large orifices in the cylinder head before being directed through the cabin heater and thermostat on its way back to the radiator.

William Lyons was determined to make a big splash at the October 1948 Earl's Court British Motor Show. Because Jaguar's plans for a post-war performance saloon were not advanced enough, he had to settle for a reworked 3.5 litre pre-war Mk V bare chassis. But Lyons wanted more buzz for the show, so he asked his engineers to come up with something new on short notice. Bill Heynes and his team gladly obliged and came up with a sports car concept based on a cut-down Jaguar chassis using a new torsion bar front suspension and a svelte one-off aluminum body designed by Lyons himself.

The bronze-colored Jaguar XK sports car shown at the 1948 motor show was not a runner. Its engine bonnet remained shut. To flesh out the display, Jaguar included the four-cylinder, 105 bhp XK engine and a six-cylinder, 160 bhp XK engine on individual stands. Promotional brochures at the show promised that the new XK 100 and XK 120 sports cars would be capable of 100 and 120 mph. Although the four-cylinder was offered for sale at the 1948 show, there were no takers and none were sold. Nevertheless, the XK 100 remained in the Jaguar price list until August 1949.

The rest is well-known and well-loved. The demand for the new XK 120 sports car was so great at the 1948 show that Lyons decided to put the one-off, prototype sports car, with its hand-built aluminum body, into production. As for the XK six-cylinder engine itself, it went on to power Jaguar race cars and all manner of sports, saloon and limousine cars for the next 44 years.



Instantly overshadowed by the 120 mph promise of the XK 120 sports car, the four-cylinder XK 100 remained in development. Suffering from the typical vibration that afflicts all four-cylinder engines (that is, until the balance shaft finally arrived in 1975) the Heynes team even tried to use an extra, square-shaped, anti-vibration lobe (left) on each camshaft to cancel out some of the vibration. Later four-cylinder XK prototypes even incorporated Jaguar's proprietary harmonic balancer, all to no avail.

Square Anti-Vibration Cam Lobe
Picture Courtesy of Tony Brown

(Continued on page 17)

Jaguar XK100 Engine....*continued*

(Continued from page 16)

Nevertheless, the idea for the XK 100 sports car labored on. The factory continued to allocate chassis numbers to right-hand drive and left-hand drive four-cylinder versions. The Jaguar Experimental Department even created a four-cylinder fixed-head XK coupé (chassis number 69001, two-litre XK four-cylinder engine number Y 0502), but the coupé was ultimately dismantled in August 1953.

Gradually, it became apparent that Jaguar's image had moved beyond the four-cylinder market and the XK 100 was quietly shelved. Instead, the company continued to work on shrinking the dimensions of the 3.5 litre six-cylinder engine, eventually producing a 2.5 litre engine that went on to power the 1955 Jaguar 2.4 compact saloon (later referred to as the Jaguar Mk I).

Coming back to the XK 100, only a handful of XK 100 engines, and one complete XF engine, are known to exist today. Other than the 'Gardner Special' XK 100 engine on display at the Jaguar Daimler Heritage Trust museum, the others are privately owned.

Which brings us finally to the four-cylinder XK 100 engine on display at Revs Institute. Here, the trail becomes more difficult to read. Miles Collier Collections acquired the engine as part of the Cunningham Collection and the accompanying paper file is rather sparse. In it, there is a single June 1966 letter from R. Graham Reid, of the Jaguar New York Parts and Technical Services Division, in reply to Briggs Cunningham's request for history about the XK 100 engine. Although Mr. Reid said he would contact the factory about this, the file does not contain a reply.

The R. Graham Reid letter acknowledges that Mr. Cunningham had obtained the engine from Max Hoffman. We know that Max Hoffman became Jaguar's first North American distributor in 1947 and probably acquired the Miles Collier Collections XK 100 as a display engine for his New York showroom. We also know that William Lyons himself appointed Briggs Cunningham the north-east US Jaguar distributor in 1955, likely because of Hoffman's Mercedes-Benz aspirations, and Hoffman's frequent insistence that his Jaguar dealers take several new Volkswagens with each Jaguar delivered. It seems that Cunningham acquired the display XK 100 engine from Max Hoffman as part of the business transition.



Physically examining the actual XK 100 engine on display tells us little more. It is a rather complete engine, at least externally, compared to other survivors and it is denoted by a serial number (left) stamped into the lower edge of its thermostat housing: "**X.K. M.K.3. NO.1.**", a rather strange number indeed, as it matches nothing else in the Jaguar record of XK 100 designations.

(Continued on page 18)

Jaguar XK100 Engine....continued

(Continued from page 17)

Unlike other XK prototype engines known to exist, the display engine does not have any identifying numbers cast into the cylinder block or the DOHC head.

Interestingly, it's not a runner. We know from a recent internal examination that there are no pistons or connecting rods in the engine.

Continuing the search for its origins, this author followed a fascinating trail of breadcrumbs, starting in the Jaguar-lovers forum, where there is quite a thread on the XK four-cylinder engine; to a Jaguar author, enthusiast and Lynx-Jaguar XK SS owner in Le Mans, France; who then initiated correspondence with the son of one of the XK designers, who in turn noted:

"This appears to be an XK rather than a XJ 4 cylinder engine. There are one or two additions. A Mk V gearbox, camshaft oil feed pipe off a six cylinder? [sic]. I would say this is a real XK engine as it has 2 litre cast onto the block. And could well be genuinely XK 100 experimental number one."

The Le Mans enthusiast then forwarded the April 2021 article "POWERING THE FUTURE" by Francois Prins, a volunteer author at the magazine editor at the Jaguar Daimler Heritage Trust. The Prins article included this JDHT photograph (viewed at right) of a specially-prepared, four-cylinder XK show engine, complete with gearbox, likely being readied for the 1948 London Motor Show. A comparison of this photograph and our XK 100 engine has led this author to believe that they appear to be, other than the replacement of the 1948 ignition distributor and repositioned fuel bowls, remarkably similar

To be specific, we now have visual evidence that our XK 100 could well be the same four-cylinder show engine that was displayed at the launch of the XK sports car at Earls Court in October 1948.

Fame indeed, and anonymous no more.

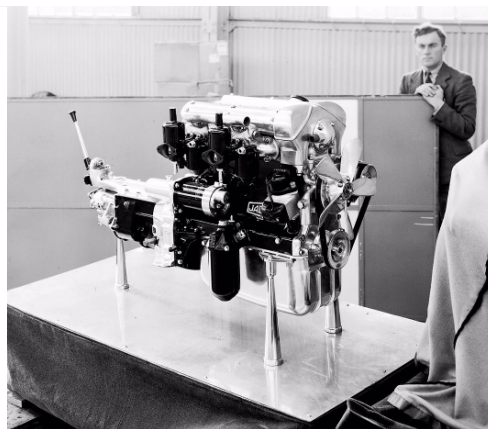
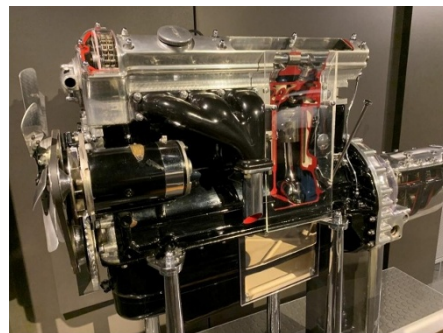


Photo Courtesy of the Jaguar Daimler Heritage Trust and Francois Prins

XK Six-cylinder Cutaway

And what of the XK six-cylinder motorized display engine across the aisle at Revs Institute? That one is easy. Jaguar used this same display at various motor shows, as revealed by a [1953 Pathé newsreel](#). The six-cylinder XK "show engine" was then gifted to Briggs Cunningham by Jaguar, in January 1966, for his new automobile museum in California.



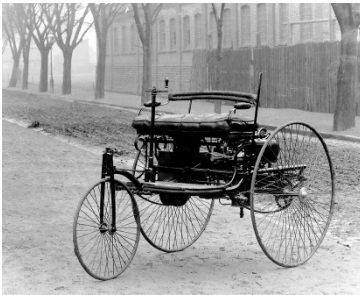
TAPPET TECH

Steering Basics

Or One Good Turn...

By Eric Jensen

One of the basic requirements of any moving vehicle is the ability to steer that vehicle in your preferred direction. When your horse-drawn carriage needs to turn, the driver's task is to turn the horse and the horse's task is to turn the carriage. That large animal provides the very first power steering.



Carl Benz's first automobile did not have a horse to provide the muscle to power that steering. That job was left to his capable wife, Bertha, to steer the 3-wheeled Benz Patent-Motorwagen (left). A short tiller and a linkage to the front wheel allowed Bertha to steer the low-speed, light-weight auto with little effort.

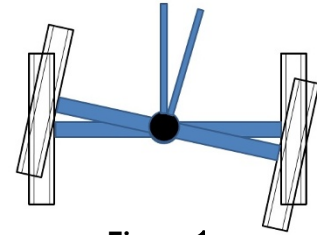


Figure 1

As automobiles got heavier, they gained a second front wheel to carry the load. This presented a new problem to be solved. A horse-drawn wagon would have an axle that pivots at the center turning the entire assembly at once (Figure 1). While light enough for horses, this is too much for a human, so the pivots for each wheel are moved to the ends of the axle and a linkage added to steer them. The linkage allows additional leverage so that the effort is low enough for a human to steer (Figure 2). A long tiller fitted, like the one fitted to the 1896 Panhard et Levassor, would give the driver enough leverage to steer nearly twice the weight of the early Benz.

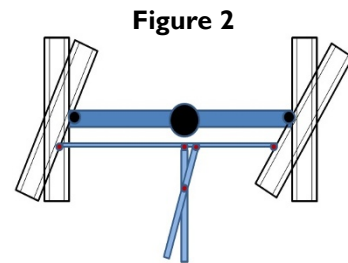


Figure 2

While this is a solution to the larger steering forces, the long tiller creates a few new problems. Bumps in the road kick the wheels which then cause the tiller to also kick back into the driver or front seat passenger. Higher speeds make this much more unpleasant and dangerous. The angle of the wheels themselves must also turn at much the same angle as the tiller causing a long reach for the driver in tight maneuvers. Five degrees of tiller angle may give five degrees of road wheel angle or a steering ratio of 1:1.

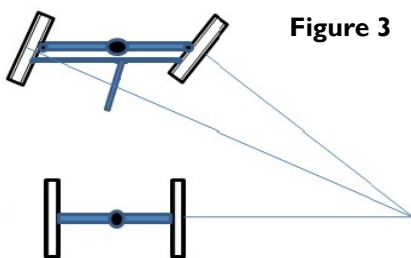


Figure 3

To complicate matters, the inside wheel must turn more than the outside wheel to negotiate a corner. Figure 3 clearly shows why; The inside wheel is closer to the center of the turn. This mechanical solution to this problem is known as Ackermann steering geometry.

(Continued on page 20)

TAPPET TECH

Steering Basicscontinued

(Continued from page 19)

As cars again get heavier and speeds again get higher, the tiller become inadequate to the job at hand (pun intended). It became apparent to many automobile manufacturers that a steering wheel attached to some gears to reduce the effort would help the driver to steer a heavy car. The steering wheel would turn 20 degrees to the road wheel turning only one degree; or a ratio of 20:1; but the effort would be 20 times less. This would also protect the driver's hands if the wheel kicked back; It would just slip from the grip.

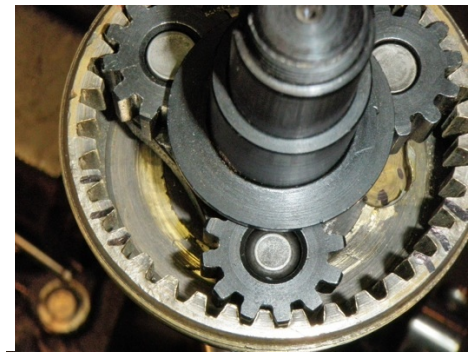
Different types of gears were used to reduce this kickback; bevel gears, hypoid gears, the Model T used planetary gears (right), worm gears (below) and ball screws were tried with varying degrees of success. Later versions, of course, had power assistance systems added to further isolate the driver from anything happening on the road.



As the science of steering progressed in parallel with suspension and tire technology, the problem of kickback evolved into the desirable feature referred to as "steering feel" or "road feel."

This allowed the creation of a very direct type of mechanism called rack-and-pinion steering (right). The steering wheel turns a small gear, the pinion, the pinion's teeth engage a toothed rack (sort of an un-rolled gear) that takes the place of the steering link to turn each wheel. This is similar to the steering system used on the 1884 Columbia bicycle for a single wheel. An old idea is new again.

It is a very direct system that allows a sporting driver to "feel" the tires grip on the road and improve the experience. Rack and pinion steering allows racing drivers to feel when their tires are just about ready to lose their grip on the road so the car can be kept right at the limit for the fastest lap. This type of steering would not have been acceptable 100 years earlier, but today it is the preferred technology. Steering follows a convoluted path from your steering wheel through to your automobile's wheels as it does along the path of history.



TAPPET RIVIA

And now, the answers...

1. In the model designation for the 1929 Mercedes-Benz SSK, What does the "K" mean?
Answer: "K" stands for "Kurz" which, in German means "Short" for the short wheelbase model. Just 31 Built by Mercedes Benz.
2. In the model designation for the 1966 Ford GT- 40 Mark II B What did the "B" designate?
Answer: The "B" designation meant the GT-40 Mark II B was equipped with two 4 barrel (or throat, or choke) Holley carburetors instead of a single carburetor to boost the horsepower to 500.
3. And a 3 part question; Who designed the body of the 1958 Scarab? How old was he? How much was he paid?
Answer: Chuck Pelly, an American industrial designer and founder of noted design firm, Designworks/USA, designed the aluminum Scarab body when he was 18 years old. He was paid \$200

A Bobby Unser Video Treat

To celebrate Bobby Unser's amazing life upon his passing, it seems appropriate to offer a video treat of his interview with *Racer's* Robin Miller at the Indianapolis Motor Speedway Museum. A familiar car was on loan for that special display; Bobby's 1975 Indy 500 winning Jorgenson Eagle. Click [here](#) for the video link.



Events Calendar

Event	Date	Info or contact
Florida Marathon Car Club Visit	May 8 @ 12:30 am	Whitney Herod
Venice Corvette Club Tour	May 12 @ 10:30 pm	Whitney Herod
SW FL Alfa Romeo Club Visit	May 15 @ 10:00 am	Whitney Herod

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

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Porsche 718 RSK Spyder
Porsche 904 Carrera GTS
Porsche 907
Porsche 910-6
Porsche 911
Porsche Carrera
Porsche Elva
Porsche RS-61L Spyder
Stutz Black Hawk
Vauxhall 30-98 Type E
Vauxhall 30-98 Type OE

Engine: Abarth 1000-TC-R
Engine: Alfa Romeo GTZ
Engine: Cadillac OHV V-8
Engine: Chrysler Hemi
Engine: Duesenberg Sprint Car
Engine: Ford GT-40 Transaxle
Engine: 1965 Ford Indy Car
Engine: Ford Turbo Indy
Engine: Jaguar XK Series
Engine: Porsche Type 771
Engine: Porsche Type 901/20
Engine: Porsche Type 901/22
Engine: Porsche Type 908
Engine: Porsche Type 916
Columbia Three-Track Tricycle
Humber 58" Ordinary Bicycle
Velocipede Bicycle

To adopt a car or engine, contact:

Brian Lanoway
Adopt-A-Car Chair
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