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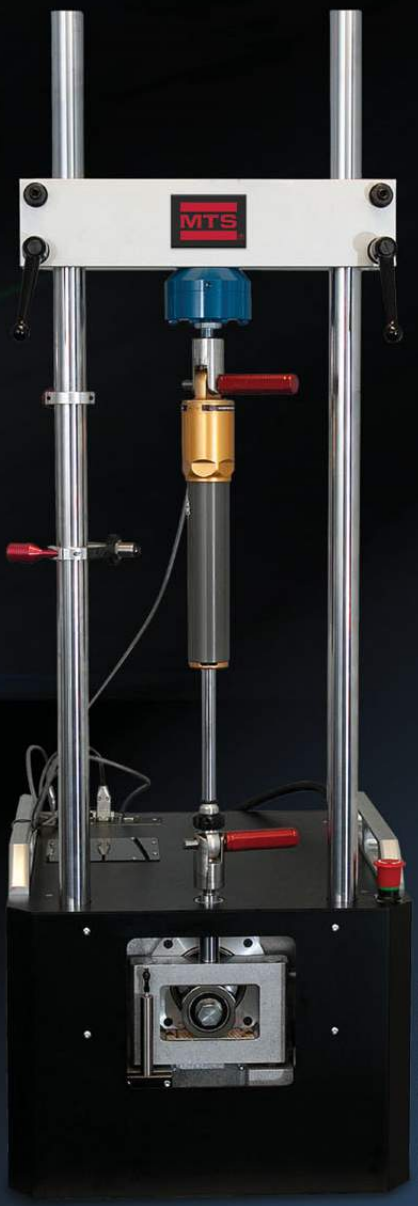
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Purist or Puritan?

OPINIONS are sharply divided on the matter and it seems that there is little middle ground. I am not talking about the Clinton/Trump presidential duel but rather whether a car that has been brought back to life as a racer using modern tools, materials and technologies really should be racing in historic events. One of the criticisms that have come my way as Editor of this magazine is that we seem to be endorsing the manufacture of fake historic racing cars.

When we launched this magazine, the criteria as underlined by the byline is Today's Technology in Yesterday's Cars. What ticks our box are the manufacturing processes, materials and technologies themselves that happen to be aplied to historic racing cars. We do not become involved or make a judgement on whether a car is fake or not or whether it should be allowed to compete in historic races. We leave things like that to those who know far more about the provenance of individual cars than we do.

Having said that, I do have a personal view and that is fake or not, as long as the car is loyal to the engineering principles and practices applicable to the original upon which it is based, that's fine with me. If we take our cover story, for example, the purist would argue that it has no place in historic racing. The chassis plate may apply to a car manufactured in 1962 but to all intents and purposes it is a two-year old car having been built with a new bodyshell, engine and running gear in 2014. While I acknowledge that, the fact that it is being raced and provides great entertainment for the many thousands of spectators who turn up to watch it compete with similar cars is enough to justify its existence in my mind. If we took the purist view and banned it from racing, then the grids would be depleted and in fact historic racing as we know it would quickly fade away. As the price of historic racing cars continues to go through the roof and they are being bought more as an investment rather than something to be driven, so less and less would be raced. In fact, I would argue it would be the death knell of the sport as we know it.

It just so happens that I have been reading about Puritan England in the mid 17th century when the Puritans tried to ban Christmas Day. They argued that it was not a religious day and that in fact it was an excuse for people to get drunk and "pretending the memory of Christ, into an extreme forgetfulness of him, by giving liberty to carnal and sensual delights..."

I am not suggesting for one moment that the historic racing purists are similar to the Puritans of 17th century England, but the principle is the same in that while what is being alleged by them is in fact true, if it is enforced, then you are left with nothing. It's far better to acknowledge that what are being raced are in some cases not true historic racing cars, but the fact that they are providing great entertainment for thousands of people who are prepared to come and watch them, then that should be enough to justify their existence and the industry that has grown up supporting them. The only caveat to this is when a "fake" historic racing car is passed off as the real thing, but that's another story.

I would like to end up by welcoming Sophie Williamson-Stothert to the team at the Kimberley Media Group. A degree in journalism, but more importantly a petrolhead who was brought up preparing Mini engines with her father for racing, the author of a new book on the BMW Mini, and passionate and knowledgeable about all things automotive, she will be a great asset to our team across our titles. HRT

William Kimberley
Editor





ABOVE In recent times finding a replacement shoe lining has been a struggle, so the Aston had been using an extruded roll "industrial material"

Aston Martin reduces lap time with Mintex

Sophie Williamson-Stothert

MINTEX has released its new range of brake linings.

Debuted at the Goodwood Revival, the new linings ran for the first time on a 1955 Aston Martin DB3S/104 competing in the Freddie March Memorial Trophy, reducing its lap time by a staggering four seconds.

Mintex, a premium aftermarket brake manufacturer which has been designing and building brakes for more than 100 years, has launched the Classic Brakes sub-brand to service the classic car market for pads and shoes.

As the pioneer of the brake discs and pads that we know today, Mintex has extended its racing range to ensure parts are readily available on a wide range of classic cars including Ford, Jaguar, Aston Martin, Rover and Triumph. In addition, an exclusive bespoke service for more specialised cars will also be available.

The DB3S/104, which is owned by Steve Boultbee Brooks, was one of the first cars to experience Mintex Classic Brake's bespoke service. The manufacturer's team of experts worked closely with Boultbee Brooks and Blakeney Motorsport to develop the perfect friction material for his car. In recent times, finding a replacement shoe lining has been a struggle and the car had been using an extruded roll "industrial material" which has a relatively high rubber content to make it flexible.

This, coupled with the addition of shoe platforms that were too twisted and bent, had seriously impacted on the car's braking performance, particularly during races where the car reaches up to 140 mph and brake temperatures are 400°C plus.

Mintex replaced the shoes and then completely relined the brakes using an advanced friction material. This has more than doubled the car's overall braking performance and had a significant impact on its lap times.

Lawrence Bleasdale, strategic sales director of Mintex, said: "Mintex Classic race material has been specially designed for the classic rally and circuit racing industry as the pads/linings reach a higher temperature than standard cars. The exceptional results that Steve's Aston Martin DB3S/104 has achieved are testament to the quality of the new Mintex Classic brakes and the unique knowledge from our team of expert technicians. We have also specifically produced a classic road material for the non-racing classic owner, to provide a consistent and quiet road performance."

The brakes use modern materials on historic back plates and platforms to refashion pads from the late 1950s and shoes from earlier, helping Mintex recreate a period of racing dominance.

Boultbee Brooks added: "As someone who is passionate about cars and racing, I have been absolutely delighted with the performance and results achieved by the new Mintex Classic Brakes. While the car still runs perfectly, it was near impossible to find a friction material that performed well under such strenuous operating conditions. Mintex's expert team has been fantastic from start to finish, advising on the best solution for my car. The results we have achieved so far certainly speak for themselves!" HRT

Mintex builds J40 pedal car

MINTEX has turned an old Austin J40 into a miniature pick-up version of its iconic 1939 Morris Z Series E Van, which led young racing enthusiasts out onto the track during this year's Goodwood Revival Settrington Cup.

The scrap metal from an existing, but very dilapidated, J40 was cut in half and the wheelbase was extended by 25 centimetres to allow for the pick-up back to be fitted. The car was revamped with new upholstery and chrome bumpers, as well as utilising the original rear-wheel arches on the pick-up section.

Braked with a bespoke friction material, Mintex has not only created a show-stopping vehicle but has potentially solved a sourcing issue for other J40 owners.

Lawrence Bleasdale, Mintex's strategic sales director, said: "We're extremely proud that Mintex led the way during such an enjoyable race at this year's Goodwood Revival. Fostering the interests of young car enthusiasts is something that we as a company are keen to encourage. We have the adult braking market covered, so it's a lot of fun to be able to use our products on vehicles such as the Austin J40 pedal car!" HRT



ABOVE The J40 Roadster pedal car replicates Mintex's 1939 Morris Z Series E Van



ABOVE Jaguar's XJ220: Pirelli tyre package

Jaguar Classic partners with Pirelli on new XJ220 tyres

JAGUAR Classic is to develop a new tyre package for the classic XJ220 sports car.

Engineered and created in partnership with Pirelli, the new rubber features a bespoke P Zero design that is described as being "perfectly suited" to the unique characteristics of the XJ220, incorporating the latest tyre technology to enhance the car's performance even further.

Produced between 1992 and 1994, the Jaguar XJ220 was originally conceived by a group of Jaguar engineers – the so-called 'Saturday Club' – working in their spare time on their own creations. It overcame a number of complex engineering hurdles and in June 1993, driven by ex-Formula 1 driver Martin Brundle at the Nardo circuit in Italy, hit 217.1 mph (349.4 km/h), for which it was dubbed "the fastest standard production car".

However the XJ220 wasn't just about straight-line speed as it captured the Nurburgring lap record in 1992 in a time of 7:46.36 seconds – a record that stood for nearly a decade.

The original P Zero tyre range was introduced back in 1987 to equip the then-new Ferrari F40, before being introduced to the world's other top cars. Since then, the range has been continuously evolving to reflect the technological arms race between today's supercar manufacturers – right up to the launch of the newest P Zero earlier this year in Estoril, Portugal.

The P Zero name describes a whole family of tyres, each of which is specifically created for the car model it is fitted to. This is once again the case for the P Zero created specifically for the iconic Jaguar XJ220.

The internal structure of the tyre in particular is highly complex, composed of a number of different elements to provide both performance and reliability. The asymmetric tread pattern too is carefully designed to deliver the best possible balance between road holding, durability and resistance to aquaplaning. There are three distinct tread pattern zones for example, each with different patterns to perform different functions.

While the tyre will maintain the classic looks of the original P Zero, it is still very much a modern creation, using Pirelli's latest compounds and technologies. This includes internal damping within the tyre to even out shocks, lessen noise, and provide more precise control while increasing comfort.

Pirelli and Jaguar Classic intend to work together to cover further classic Jaguar models with the same approach.

Tim Hannig, director of Jaguar Land Rover Classic, said: "The Jaguar XJ220 was an instant classic. It is a revered car in the history of Jaguar, and our business is now undertaking various restoration projects for XJ220 customers. This new tyre permits the full performance of the glorious XJ220 to be exploited where appropriate." HRT

Race organiser boosts online presence

Andrew Charman

HISTORIC race meeting organiser Motor Racing Legends has launched a new website aiming to provide results, images and full race reports to competitors in its series.

Information for events visited by Motor Racing Legends races will include timetables, final instructions and paddock plans, alongside a searchable image database.

According to MRL chairman Duncan Wiltshire, the revamp brings the site totally up to date as well as showcasing event sponsors and providing a platform for photos from each race. And the image archive is planned to be extended to past events.

"While the site has just gone live and is up to date with current events, it will take some time to complete the upload of the extensive archive of imagery and results we have going back 10 years or more, but we hope to create a rich archive resource of racing history of who raced what, when and how it went," Wiltshire said.

The site can be found at www.motorracinglegends.com HRT

FIA Historic Motor Sport Commission

AFTER consultation with the competitors, teams and organisers, a number of proposals were made to the World Motor Sport Council regarding the Sporting Regulations of the FIA Historic Sporting Rally Championship in order to improve the success of, and participation in the championship. These were all approved and will be added to the Sporting Regulations for the 2017 championship.

The World Motor Sport Council accepted the addition and recognition in Appendix K of Competition Touring cars of Period G onwards, built in compliance with an ASN's technical regulations for the top multi-marque National Touring Car Championship and subject to the approval of the HMSC.

This follows a number of HTP applications for cars that raced according to specifications issued by a particular ASN but also having raced in competitions registered on the International Sporting Calendar of the FIA. HRT



ABOVE Historic motorsport will be showcased at a dynamic new conference and exhibition

Championing historic motorsport

William Kimberley

BRAND Events, the company behind a raft of successful motoring events including CarFest, Top Gear Live and the recent IGNITION Festival of Motoring, has developed a dynamic new international Conference and Exhibition in London to champion and celebrate historic motorsport.

Supported by *Historic Racing Technology*, Historic Motorsport International at ExCeL London, on 23-26 February will be a platform for engineering and preparation experts, event organisers, promoters and suppliers.

Special features include the inaugural Historic Motorsport Conference. Hosted by broadcaster and journalist Henry Hope-Frost, the ticketed conference will examine a wide variety of topics including the use of current technology in classic race and rally cars and driving standards and sponsorship.

There will be up to 100 competition cars for sale from leading specialist dealers while other exhibitors will include motorsport clubs, governing bodies, officials, sponsors and media owners.

An impressive number of companies and organisations have already signed up to exhibit. These include: competition car sales specialists Taylor & Crawley and Duncan Hamilton & Co; premier championship organisers Motor Racing Legends and the Classic Sports Car Club; plus Dunlop Motorsport, the official distributor for Dunlop historic racing tyres.

Historic Motorsport International will be held alongside the London Classic Car Show, now in its third year and looking to build on the record 33,000 visitors who visited the 2016 event.

Access to both shows is included in the entry price. Historic Motorsport International will open its doors at 10am on Thursday 23 February, while the London Classic Car Show will open its doors at 3.00pm that afternoon.

"Historic Motorsport International will feature many of the most iconic historic competition cars for sale and blend the business-to-business, competitor and enthusiast aspects of the buoyant historic motorsport scene, from classic Formula Ford and historic rallying through to period Formula One, GTs, Sportscars and Prototypes," said show director Ian France. "Whether your interest is in the many fiercely competitive UK domestic championships or marquee events such as Silverstone Classic, Spa Six Hours or the Historic Ypres Rally, this exciting new event will reflect your tastes and opportunities to get closer to the sport." HRT

Race Retro update

RACE RETRO, which last year was acquired by Clarion Events, will also be held over the weekend of 24-26 February at Stoneleigh Park. There will also be more live rally action with Group B and C rally cars in action, as well as the chance to have a passenger ride in one. There will also be the opportunity to take part in the Race Retro Tour in association with HERO, the Historic Endurance Rally Organisation. In the exhibition halls will be found more classic cars and historic motorsport vehicles covering all disciplines from Formula 1 to hillclimbing, rally to GT cars, with displays by motorsport clubs from around the UK. HRT



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RM Sotheby's stages "real" racing experience

Sophie Williamson-Stothert

VISITORS to RM Sotheby's London sale in Battersea Park were treated to a "real racing" experience by Classic Race Simulators.

When guests weren't perusing the 87 examples of the industry's finest classic cars, worth in excess of £21,000,000, they were able to take advantage of four state-of-the-art racing simulators.

The software enables users to compete in historic cars dressed in authentic period bodywork and a range of evocative liveries, either racing against the clock or one another.

The simulators feature replica liveries inspired by Formula 1 cars of the 1960s, including those reminiscent of iconic Lotus, Ferrari, Eagle and McLaren designs.

Classic Race Simulators feature a handmade fibreglass body, a full nosecone with mesh grille, adjustable pedal mounts and seat, a stainless steel roll bar, a Cursive Simulation-designed triple screen mount and bespoke mountings for controls. Each simulator utilises the celebrated rFactor 2 racing simulation software from Image Space Inc to create the most realistic driving experience.

Jim Hill, manager at Classic Race Simulators, said: "Our simulators are perfect for a high-end motoring environment such as the RM Sotheby's sale. They fitted in with the fantastic collection of cars on display at the auction and visitors were really able to enjoy testing their racing skills over the two preview days of the sale."

Greg Anderson, general manager at RM Sotheby's, added: "Classic Race Simulators did a great job of putting on a show for our clients. This isn't something we've done before but it's good to be able to explore new ways of enhancing the visitor experience at our auctions. The simulators are very good-looking machines and the racing experience is incredible fun."

Classic Race Simulators can provide bespoke, custom-made simulators for private buyers and corporate occasions. They have recently been used by JET to provide entertainment at its Silverstone Classic Hub, where the company provided 10 of its 1960s replica F1 race simulators and saw more than a thousand guests give it a go. HRT



ABOVE The software enables users to compete in historic cars dressed in authentic period bodywork and a range of evocative liveries

British Motor Heritage adds Anglo Parts to its line-up

BRITISH Motor Heritage (BMH) – established in 1975 to support the owners of classic British marques by putting genuine components back into manufacture – has announced the addition of the multinational Anglo Parts to its impressive list of Approved Specialists.

Founded in Belgium in 1982 by MG enthusiasts Chris and Bruno Van Gestel, Anglo Parts is now a significant force across Europe with branches in Germany, France, Spain, Italy, The Netherlands, Belgium, Sweden, Poland, Finland, Luxembourg and the Czech and Slovak Republics.

The company supplies 'Quality Parts for Classic British Cars', in particular for Jaguar, MG, Triumph, Austin-Healey, Mini, Land Rover Defender models, and the ubiquitous Morris Minor. In addition to its enormous stock of car spares, the company can also supply a selection of accessories and automobilia, from engine tuning parts to flying helmets and tools to enamel signs. It prides itself on the speed, price and condition of its parcel deliveries, and most items ordered in the morning are delivered the following day.

Commenting on the appointment, BMH's managing director John Yea said: "This union of two well established automotive companies will be mutually beneficial combining, as it does, Anglo Parts' impressive product knowledge, market reach and extensive distribution options with BMH's unique range of original parts and manufacturing skills. I am delighted at the arrangement, which greatly strengthens the European level of our global coverage." HRT

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NEWS



ABOVE The popularity of endurance rallying is reflected in an exciting calendar

Enduro rallies take new roads in 2018

Andrew Charman

NEW events feature in the 2018 calendar of the Endurance Rally Association (ERA), which was launched at the Goodwood Revival.

The first will be the Road to Saigon, which follows the successful Road to Mandalay rally held in 2015. Starting on 4th February in Singapore the route heads through Malaysia, Thailand, Cambodia and into Vietnam, finishing on 27th February in Ho Chi Minh City, formerly known as Saigon.

Following the 10th anniversary Flying Scotsman Rally between London and Edinburgh in April, the third Trans-America Challenge between 27th May and 17th June takes on a new route between Charleston, South Carolina and Seattle, combining deserts, gravel and forest tracks.

The final event will be the Himalayan Challenge between 21st September and 13th October. Vintage and classic cars will compete on their own schedules across a route that runs across northern India, Nepal and the Himalayas, the heights involved meaning the rally will only be open to experienced crews.

ERA personnel believe the three long-distance events in 2017 will also provide an effective warm-up for crews wanting to enter the 2019 Peking to Paris Motor Challenge. HRT



Endurance Rallying
See page 48

- **BRITAIN'S** MSA is warning competitors to be aware of a rise in counterfeit FIA seat homologation labels in the market. According to MSA News, several false labels have been found at events this year. Any competitor suspicious of a label should photograph it and send the images to the MSA Technical Department, which will follow it up with the seat manufacturer and the FIA. HRT

Classic Jaguars and Land Rovers take to the ice in the Arctic Circle

JAGUAR Land Rover Classic is offering the opportunity for customers to experience ice driving at its testing facility in northern Sweden.

The package includes two nights' accommodation at the Hotel Silverhatten, VIP transfers on arrival from Arvidsjaur airport and professional tuition on ice.

Throughout the three days there will be the opportunity to drive a number of classic models at the Arjeplog facility including the XJ, MKII, MKVII and XK150 as well as Series I, Series II, Series III Land Rovers and the Range Rover Classic. The new F-Type, F-Pace and Range Rover Sport will also be available.



ABOVE Throughout the three days there will be the opportunity to drive a number of classic models

"The Jaguar Land Rover Classic business is rapidly expanding and now offers classic car sales, bespoke restorations, parts supply and, in this case, unforgettable driving experiences," said Tim Hannig, director of Jaguar Land Rover Classic.

"Driving a classic Jaguar or Land Rover is always a wonderful experience and having the chance to drive both brands' icons on ice in such extreme conditions is a unique opportunity. I am looking forward to meeting enthusiasts of these two great British brands in Arjeplog for a spectacular driving event." HRT



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Treasure Hunt

Hal Ridge explains how an engine sparked a hunt that resulted in the resurrection of one of the rarest Renault Alpine A110s in existence

To even the most accomplished engineers and automotive enthusiasts, restoring a period racing car is a challenge, and that's if the major components of the vehicle in question are all in one place. When they are not, the task becomes even greater. This story begins with just an engine.

It wouldn't be unfair to call most people fanatical about period machinery 'anoraks'. Such a person generally knows more than one ever thought possible about their chosen speciality. A trip to the famous Monte Carlo Rally for John Wheeler in the 1960s sparked a devotion to a particular car to such an extent that if he does indeed own an anorak today, it must be lined with Renault's diamond emblem.

Wheeler confesses to being besotted with arguably Renault's most gorgeous creation and is responsible for the resurrection of one of the rarest Alpine A110s in existence. Obsessions and addictions are quite often a negative, but in this case, it's more than excusable.

Having already owned Alpines, Wheeler began to seek an investment project in the 1980s, based on the quirky French cars, and became aware of a rare ex-works Renault Gordini engine for sale in Holland. He promptly crossed the English Channel to purchase a 16-valve 807-G4 twin-cam 1774 cc motor, but the search went on for the chassis from which it came.

"I went to the Monte Carlo Rally in 1968 as a penniless student and fell in love with these funny little blue cars, and I've been in love ever since. Sad really, but true," says Wheeler. "I've had quite a number of Alpines and knew that there were some very rare cars even at that time. I spotted the engine in a little advert in *Alpine Post*, a German club magazine, and to cut a long story short I went to Holland and bought it from a guy called Willem Van Dalen, because I knew then it was out of the ordinary. It was from an age when Renault mainstream didn't have any 16v twin-cam engines. The best engine they had was the Renault 16 push-rod, so 16v double overhead cams was pure race technology."

The engine in question *is* special. Created in 1973 by Renault's sporting arm, Gordini, by 1975 it had been all but forgotten amid the obsession with V6 technology for Le Mans, which Renault Sport (having subsumed Gordini) won in 1978 before attaching a turbo to the V6 unit for Formula 1 in the late 1970s-early 1980s. Approximately a mere 50 807-G4 engines were built.

With the engine in his possession, further investigations followed, and Wheeler discovered that Van Dalen also owned the Vialle A110 that it had come from. That car was one of only two competition A110s fitted with the 16v engine and Wheeler eventually managed



ABOVE Thirty years after the A110 was rolled to near-destruction, the advent of retro competitions opens the door for the Alpine to return to rallycross

to persuade the Dutchman to part with the car. However, being a rallycross car, this Alpine had worked hard, very hard and its competitive career had come to an abrupt end with a five-time barrel roll, leaving Wheeler with the task of a full restoration rather than just reuniting engine with chassis.

PROPER RACE ENGINE

"It's a late '74 car, but the Dutch Vialle Autogas team actually put it together in '76 for the 1977-78 season," explains Wheeler. "It was all about advertising for Vialle LPG, and getting coverage on television in Belgium, Holland and Germany. They ran four cars, and interestingly they were great exponents of this engine. Three of them had this type of engine fitted, principally because this was for rallycross not rallying. The push-rod engines probably gave more usable torque, but for rallycross they wanted a proper race engine."

In the hands of the youngest winner of an FIA European Rallycross Championship round at the time, Piet Kruythof, the A110 won the Dutch round of the European series in 1977, and was victorious again at the Belgian event in 1978. Ninth in France, third at Lydden Hill in the UK followed, as did the Dutch Rallycross Championship title. Victory in Germany, leading home a podium lock-out for the Vialle outfit, brought the end to its campaign. The car was subsequently acquired by Andre Albers (father of former F1 driver, Christijan) before Van Dalen bought it to race, until he near-destroyed it with the big accident.

"The car itself was in a very poor state," admits Wheeler. "It had done 10 years of rallycross and then this enormous barrel roll in the mid-1980s. The most amazing thing of all was if you put your hand up to feel the roll cage, instead of being round on the top it was flat as a pancake. It's amazing there was any car left at all. I had it shipped to France to have the body taken off and the chassis rejigged in the early '90s, because there was a lot of rust damage too."

> "It's a cam and pawl-type diff, so on overrun it's fantastically noisy. The first time I drove it, I thought I'd blown it up"

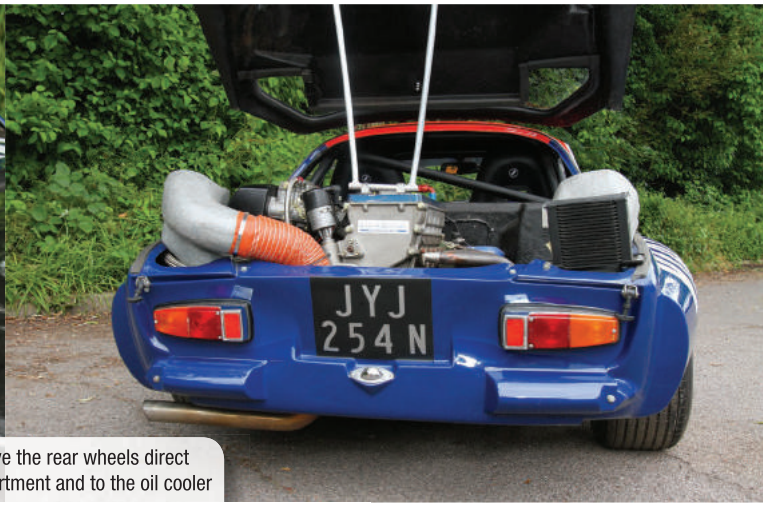
During the restoration process, Wheeler had to make some key decisions, the first of which was whether to return it to full rallycross specification, or adapt it for road use too. "I took the decision to make the car road-eligible. It seemed silly to just keep it in rallycross form; there wasn't a Retro Rallycross category for older vehicles then like there is now," he reasons. "The car now has a complete wiring harness which is also fused and we had to fit an alternator too, to go with it. I'll describe the original loom as 'interesting'. It's got headlights, but I have rallycross blanks you can put over them too.

"It's now got a full size Alpine competition fuel tank too, rather than the five-litre tank ▶



Photos: Hal Ridge





LEFT & RIGHT Vents above the rear wheels direct air into the engine compartment and to the oil cooler

it had under the bonnet when I got it. The original tank looked like it had been taken straight from a lawnmower, but then the car only needed to do four or five laps in rallycross form. Other than that, I've put a slightly different water bottle on it and rather more modern-style brake and clutch fluid reservoirs."

While trying to keep his unique machine as true to original as possible, Wheeler also faced a familiar dilemma for anyone undertaking such a restoration project: how original does it need to be? It's a tug-of-war between originality and making something usable, safe and protecting its longevity.

"There is this huge debate, isn't there: do you conserve; do you restore? How should it be done?" he acknowledges. "Different people have different ideas. I've done it my way. It needs to be safe – you don't want to drive along and hit a bus queue of people, and you want to be able to use it. I know someone who's got an ex-Acropolis Rally A110. He doesn't use it and it still has the mud on from the Acropolis. Okay, that's his point of view, but it just sits in his garage which seems a bit of a shame to me."

With that mindset, Wheeler has also changed the oil cooler, oil lines and fuel lines on his car, and fitted a heated windscreen to accompany the 'race spec' polycarbonate windows attached to the fibreglass body. "The heated screen isn't period. The original screen was destroyed in the huge roll and I was very lucky to find a heated one," he says. "It's nice, it heats left and right sides, but you can decide if you want to use more power to heat the whole thing or less power and do just the driver's side. Being a fibreglass body, the car gets quite a lot of condensation – it doesn't really evacuate much air."

With the car being usable on the public highway, Wheeler has also fitted a pair of seats over the single driver's seat originally installed, but was able to have new versions of the original seat made. "When I first got the car, the whole back of the seat had been severely damaged in the accident," he says. "They were originally made by Corbeau and they were able to copy it. These were the FIA-approved seats of the late '70s and I had a second one made. Corbeau were really nice and helpful; a lot of people were very helpful with the restoration."

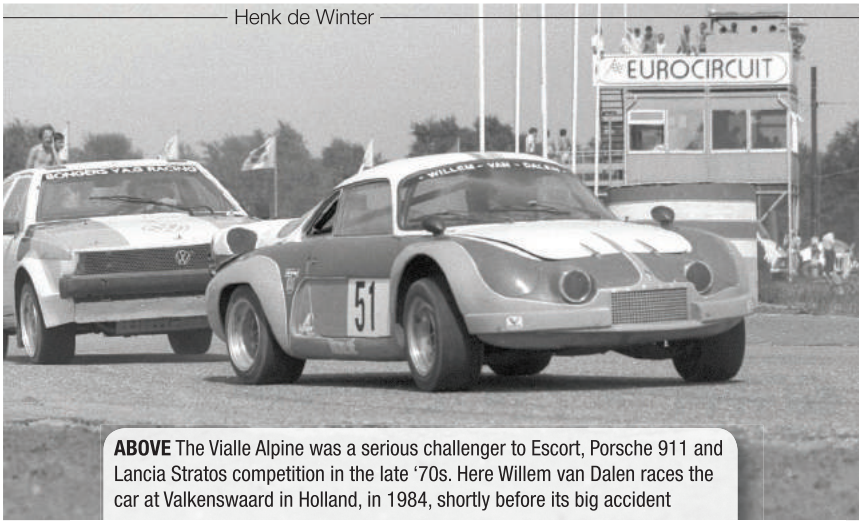
ACCIDENT DAMAGE

The instrument panel on the dashboard is home to a period Alpine speedometer, but the rev counter was also damaged in the accident and is now a Stack unit. The stalks for lights and indicators are also an addition to how this A110 would have been in period rallycross specification. The steering wheel is the original with which Piet Kruythof steered the car to European Rallycross success, while the gear level has a 'works' Alpine arrangement with a bracket to stop the lever heading too far across the gate and reaching reverse in frantic racing conditions.

Underneath, being a late A110, Wheeler's Alpine has double-wishbone suspension similar to that found on a Renault 5 Turbo, with its engine mounted behind the rear-axle line, similar to a Porsche. "The A110 has a long spine tube chassis, with a subframe front and rear. A lot of people regard the swing axle arrangement as being the true A110; this is effectively the same as they used in the later A310, but this is more racing technology," he says.

The car is fitted with Koni dampers all round, with the front suspension concept borrowed from the Renault R8 Gordini, emphasising that the Alpine machines developed following introductions into the main Renault range at the time. The brakes are also sourced from the R8, which was one of the first road-going cars to have discs at each corner, although the front brakes on Wheeler's machine are a mix of Renault and Ford Escort. "I'm quite sure the front brakes broke the homologation in period, but obviously they wanted two-pot callipers instead of ▶

Henk de Winter



ABOVE The Vialle Alpine was a serious challenger to Escort, Porsche 911 and Lancia Stratos competition in the late '70s. Here Willem van Dalen races the car at Valkenswaard in Holland, in 1984, shortly before its big accident

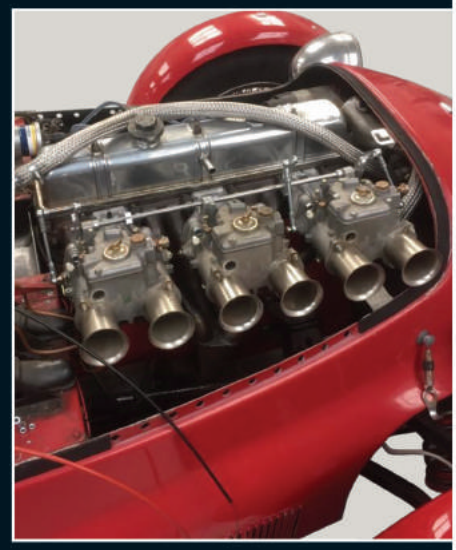
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the single-pot usually used," he says.

Single-pot items are retained on the rear with single-skin discs, while up front the discs are vented. The 13" wheels are wider at the back than the front, due to the car being rear-engined, and are of a split-rim construction from Gotti, a brand synonymous with Alpine.

Drive is sent to the rear wheels from the engine via the longitudinally-mounted five-speed gearbox, which sits in front of the engine and houses a Hewland slip differential. "It's a cam and pawl-type diff, so on overrun it's fantastically noisy," says Wheeler. "The first time I drove it, I thought I'd blown it up. It's a crude system but it works and that's absolutely as period."

The car's rare engine sits behind the rear axle axis, much like in a Porsche. But unlike the Porsches of the era, against which the Vialle Alpine competed, this car only weighs 700 kilograms, and as such held the upper hand when conditions were wet or slippery.

Externally, the car is in the identical livery to that with which Kruythof had contested the European Championship, even down to the paint codes and minor details of the stickers. "Everything is exactly correct; that's how I wanted it," says Wheeler. "In the photographs of when the car was racing, it often ran without the front spoiler. For certain tracks where it wasn't too bumpy, Piet said it did handle better with the front spoiler on, but for a lot of time it was just running with the bits of bodywork that stick out to hold it. I can imagine it was regularly knocked off!"

Vents above the rear wheels direct air into the engine compartment and onto the oil cooler at the rear, under ▶

Moment of inspiration

THE Vialle ex-European Rallycross A110 is unique because of its history, but Wheeler also owns another special Alpine – this one very much of his own making.

"There are a few things about the A110s I don't like – positions of brake cylinders and that sort of thing – so I had a notion to build a better one," explains Wheeler.

The result, 'MC220 003', is a monocoque-chassis Alpine with a turbocharged engine. The car was born out of a long association with Tim Duffee, who builds Darrians, and the work of a friend who made a set of A110 moulds.

"I had a moment of inspiration on holiday," Wheeler recalls. "In the history of the A110, back in 1974 they actually built a turbo engine. It used an English truck turbo, because at that time turbos were just creeping into the truck industry. The engines we'd used in two earlier 'recreations' were the same as you would get in a Renault 20, and there is also a Renault 21 turbo."

Having measured the engine bay for size and ensured it would fit in the 'hole', Wheeler approached Julian Godfrey Engineering to build the engine. With a MoTeC ECU, it now produces around 400 horsepower with 365 ft.lbs torque. The four-cylinder 1995 cc engine is Renault's J7R 720, with an aluminium block, JE forged pistons (giving an 8:1 compression ratio), steel conrods and a billet steel crankshaft.

The car is driven by a Renault UN1 transaxle with an ATB Quaife Engineering differential and uses a single piece mainshaft; it's connected to the engine via a billet steel flywheel and Sachs competition clutch. Godfrey's renowned experience with rallycross Supercar Cosworth engines means the car uses a specialist Cosworth throttle body, custom made inlet plenum and Garrett turbocharger.

"It's very light (at under 700 kilograms) because it doesn't have a spine chassis; it's monocoque," explains Wheeler. "It's got McPherson front suspension and trailing arm rear suspension, with rose joined anti-roll bars. Everything is fully adjustable.

"It's very quick. We've upgraded the turbocharger now too, with a billet wheel, giving it about 19% more airflow. It's got close to zero lag. I said to Julian I'd like it to feel like a normally aspirated car, and it does. It's a bit like an A110 on steroids." HRT





ABOVE & BELOW MC220 003 features a turbocharged engine

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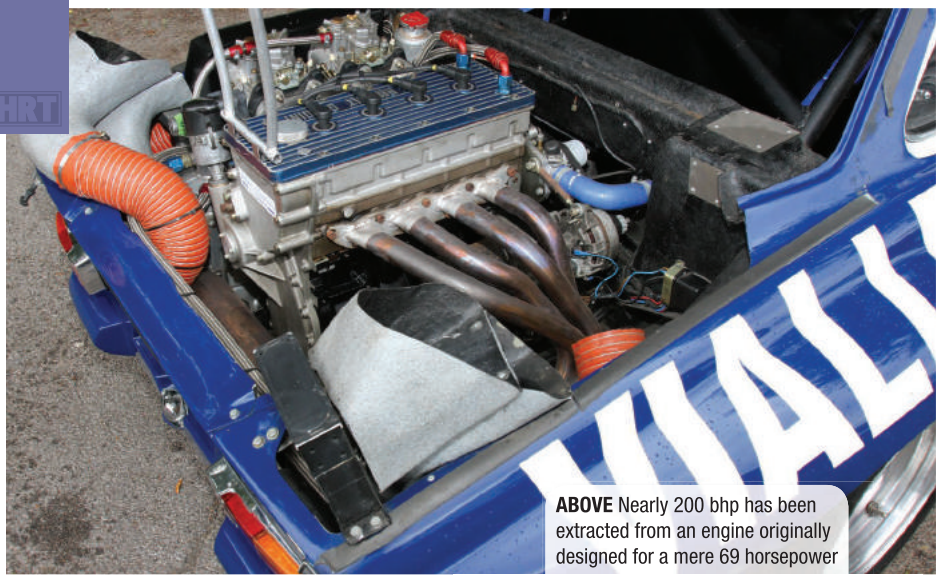
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ABOVE Nearly 200 bhp has been extracted from an engine originally designed for a mere 69 horsepower

the specially made roof section of the car. The dry-sumped 16v engine sits higher in the chassis than the push-rod alternative, forcing the necessity for the bespoke roof.

"The engine technology is pretty crude by today's standards, of course," notes Wheeler. "They claimed around 200 horsepower. The one in the car dyno'd at 193 (at around 8000 rpm), so maybe there's a little poetic license, but not 'Italian style' by any means. The engine it's based on was a massive 69 horsepower, so they did quite a good job to get near 200. It uses little 10 mm spark plugs, and is chain-driven. It also uses a jack shaft arrangement for driving the distributor. It looks like a Renault 16 camshaft, but with no lobes – that's how it drives the distributor and sets the timing."

The engine block is aluminium with wet liners and steel crankshaft, while the four valves per cylinder are in a 'v' formation. The inlet valves are 33.8 mm in diameter, while the exhaust side is 27.3 mm. The motor utilises a pair of 45 DCOE Weber carburettors.

"The car is in very good order. John had it in a museum for a while until recently, but with a service and gentle awakening it fired into life straight away," says Scott Reed, who works for Julian Godfrey Engineering, which keeps a watchful eye over the engine of the Alpine. "It's interesting that the car shares similar parts to the Group 4 Escorts of the same era, even to the front brake pads.

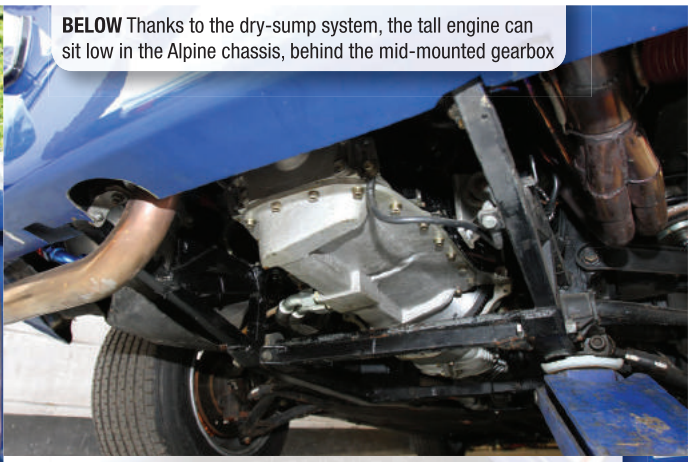
"OVER 3000 RPM IT FLIES"

"Most things we deal with these days are in the world of modern electronics, so it's almost therapeutic to work on this kind of engine. Yes, it does hesitate when you pull away, which you would map out on a modern car, but once it gets up to temperature and over 3000 rpm it really flies. It's no surprise it was a race winner."

The result of Wheeler's restoration is glorious, a genuine piece of rallycross history that will only increase in value now the sport is growing worldwide. Although the man himself won't do the car's original builders the disservice of admitting it, the Vialle Alpine A110 is probably more beautifully finished now than it ever was. HRT



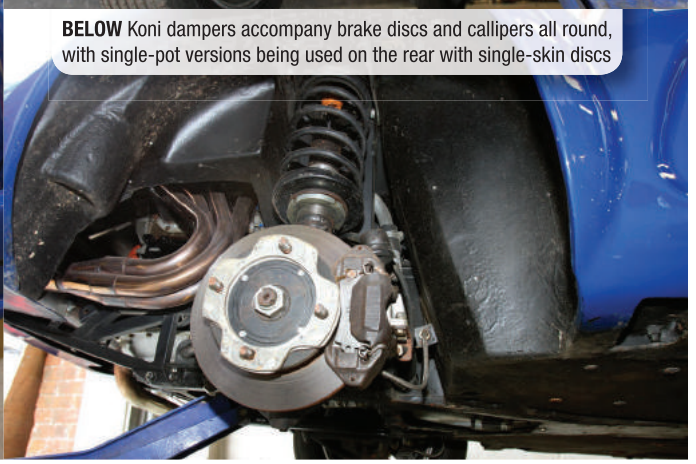
ABOVE The stalks for lights and indicators, like the extra seat, are recent additions



BELOW Thanks to the dry-sump system, the tall engine can sit low in the Alpine chassis, behind the mid-mounted gearbox



ABOVE Front brakes are a mix of Renault and Group 4 Escort



BELOW Koni dampers accompany brake discs and callipers all round, with single-pot versions being used on the rear with single-skin discs

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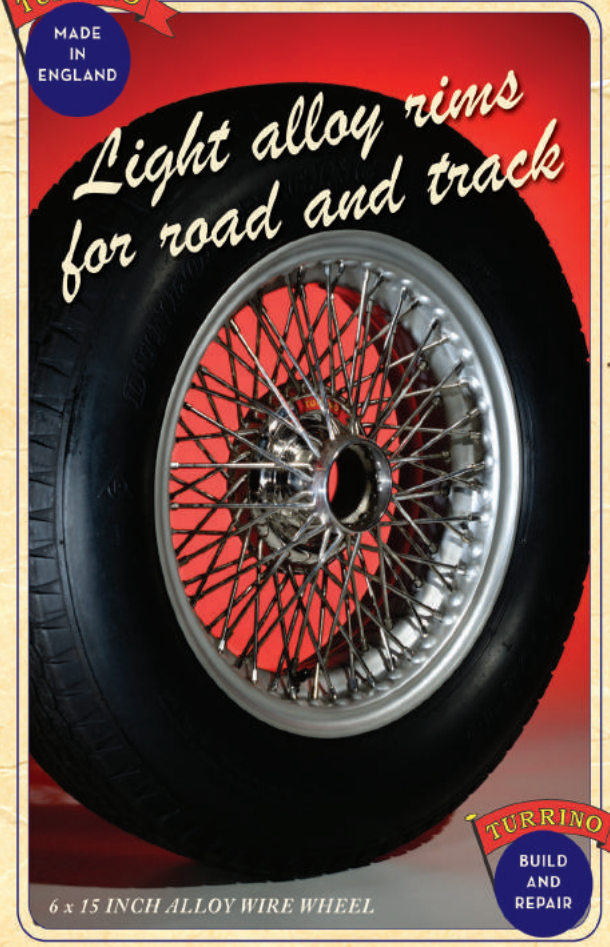
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DRAG QUEEN! Restoring a legend

What does it take to prepare Europe's first ever dragster for its first run along a strip since 1964? **Ian Wagstaff** finds out

FIFTY-two years is a long time in motorsport, perhaps especially so in a form of competition that lasts mere seconds. However, until this year, the last time that Europe's first ever dragster had run down a strip had been at Blackbushe in 1964. At Santa Pod on July 17, the Allard dragster once again completed the quarter mile, thanks to a band of enthusiasts who had restored the National Motor Museum-owned car to working order.

The first time that the Allard ran under its own power in its restored state had been 11 days earlier when it had been driven 'gracefully' for two laps of the arena at Beaulieu. "We needed to do some work on the engine, get the tuning and timing right and check out the transmission," recalls Brian Taylor, founder of the Allard Chrysler Action Group (ACAG). "At that stage we did not really know if we had done enough to get the car to run under its own power but thankfully the test run was very successful.

"The project was started in 2007. We needed to acquire a replacement engine, clutch and gearbox along with some other components. We managed to get the recreated engine running and on "cackle" displays although we had never had the gearbox working. However, at Beaulieu, after a two-year engine, clutch and gearbox rebuild, it all came together on July 6. It was quite an emotional moment for those of us who had been working on it for so long."

Prior to the event a couple of days had been spent getting the dragster ready, dressing cams and lifters with Zinc Additive, applying Lucas lube products, installing push rods and checking the valve lash to 12 thou. Soft valve springs were also installed for the initial start.

There was a struggle to install the magneto, which had been 'hibernating' in team member Syd McDonald's airing cupboard to keep it dry but after 'some fettling' it slid into place. On the day, several short fire-ups on petrol took place, a few fuel leaks were fixed and the car was switched to methanol in the main tank. The fuel flow was set to half a gallon per minute at idling and the timing set to 30 degrees advance. Prior

The Gavin Allard Collection



ABOVE & BELOW Glory days: Blackbushe 1964, above, was the last time the dragster had run until its outing at Santa Pod this year. Below, heading to Brighton for its first appearance in 1961

National Motor Museum, Beaulieu

Photos: Ian Wagstaff



ABOVE The moment the team had dreamed of: the Allard returns to the strip, at Santa Pod, after an absence of 52 years

to the run the correct valve springs were installed. History was then made with one lap of the Beaulieu arena before the temperature was checked and a second lap with a little more throttle carried out.

"We weren't burning rubber or anything like that," says Taylor. "It never will be run under full power." The team try to keep the Allard as original as possible and the safety regulations that existed in the 1960s were nowhere near as stringent as they are today. "Nobody in their right mind would want to drive this car fast these days and, anyway, it's too valuable to risk."

TALL ORDER

Martin Dunks, a member of the team who works for Alan Mann Racing, drove the car on both occasions mainly because, says Taylor, "he's the tallest of us". That makes sense as the car was originally built for the very tall, broad framed Sydney Allard to drive. However, for Dunks there would be no repetition of what Sydney Allard's son Alan once described as "a wild and rough ride."

As previously mentioned, the engine has been rebuilt over the last two years. "We had already had about two and a half years of it 'cackling'," states Taylor. "We had been running it on a mixture of nitro and methanol, which was quite difficult to come to terms with. The car does not come with a manual and we had not always done the correct things. We learnt as we went along – what you needed to do to prep before each fire up and how much you had to keep things clean and tidy afterwards. All that is now written down and we have a check sheet like a pilot in an aeroplane. 354 Chryslers are old school and very few people now work on them, so it has been a long learning curve to get where we are."

> **"Nobody in their right mind would want to drive this car fast these days and, anyway, it's too valuable to risk"**

Silverstone-based ICE Automotive carried out the rebuild. The company's Rob Loaring is, as Taylor points out, "very much into drag racing nostalgia as well as historic circuit racing. He has been able to mentor us, teaching us in more careful ways of handling the engine."

A complete strip down took place, including re-boring and crank balancing. New pistons from the USA were supplied by Race Tech, which supplied the original pistons for the first replacement engine built by Booth Arons in the USA. A new Crower cam and lifters were also acquired. "The American suppliers have been very useful to us. They love this particular car because they see Sydney Allard as being the man who enabled them to spread the drag racing message to Europe." (Former British Hillclimb champion and performance car constructor, Allard had been an avid reader of *Hot Rod* magazine, a publication that had inspired the idea of building a 354 cubic inch Chrysler Hemi powered dragster, the first of its kind this side of the Atlantic, and initially designed, says Taylor, to "put a bit of jazz" into British sprinting rather than bring the sport of drag racing to the UK).

Given its inspiration, it must have meant something to Allard when his dragster was featured in *Hot Rod* magazine in 1962. The article written by John Blunsden, who sadly died this July, was one of the few about UK-built cars ever to feature in this periodical.

When a methanol engine is fired up it ▶



ABOVE The Allard required a full restoration, including soft valve springs for the initial start

is necessary to squirt in some petrol to get it going. That is fine if there is an easy access to the injectors. However, the 'blower' is mounted on the front, rather than the top of the Allard's engine. The fuel pump is also there which means that the injectors go straight into the side of the 'blower'. The car was built when there were no drag racers in the UK, only sprinters, and is fully covered in front of the driver. Existing sprint car rules required moving parts to be under cover and that led to the 'blower' being mounted at the front, rather than the top of the engine, to aid streamlining. Allard was, anyway, a sports car manufacturer, so having full bodywork would have been the right thing to do. (*Motor Sport* magazine described it at its debut as "a sort of gentleman's touring version of the skeleton American slingshots"). Other than this, the Allard dragster was mainly built along the lines of standard US-practice, but all this bodywork meant that what should be a simple matter of getting the squirter bottle into place is not easy.

There were different views on what should happen. The team want to keep the car as original as possible but the National Motor Museum's manager Doug Hill said he would be perfectly happy if a panel was cut for easy access. However, the majority view of the team members is that this would be detrimental to the Allard's originality. Taylor says, "Sydney Allard must have had the same problem, so we will suffer the same! It's part of our enthusiasm."

"The injection system on the Allard is really difficult," adds Taylor, "because the injectors go straight into the 'blower', which then takes it into the engine." However, by the time the fuel has got there it has, as Taylor colourfully points out, "got a bit knobbly". This means that there is over-fuelling in some cylinders. The problem still exists and the team are looking at ways to re-atomise the fuel. It is all about originality. Taylor points out that in the USA, where similar nostalgia cars are being run, the answer is sometimes to use port injection. Problem solved, maybe, but that wouldn't keep the car in original spec.

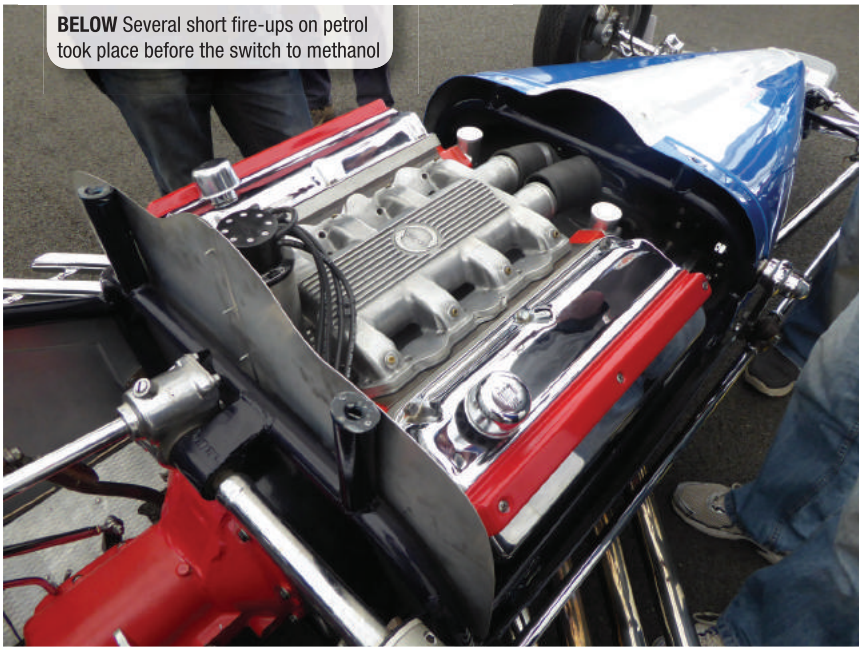
The Ford gearbox has three drive gears and one reverse but one of the drives has since been blanked off. "It's a drag racer, you don't need all the different gears," Taylor observes.

After the original, recreated engine was installed, a problem arose with the thrust bearing where the gearbox and clutch are mounted into the engine. The bearing was making it difficult to change gear. The pressure that the engine was putting on the bearing was one of the reasons why it had to be rebuilt. The clutch also had to be rebuilt and the thrust bearing altered to give it sufficient movement "so that it drives like a saloon car".

HISTORIC RUN

Following the initial drive at Beaulieu, a seat belt from Retro Parts Group was fitted so that the Allard could legally make its historic run up the Santa Pod strip. A throttle stop was also installed for safety. The team also now had its new procedures with fire-ups logged with opening block temperatures, fire-up duration and closing block temperatures.

On the Friday at Santa Pod, the intake manifold and valley cover were removed and Zinc Additive re-applied to the cam and lifters. The intake manifold gaskets were also replaced. A four-minute test fire-up was carried out and block temperature and fuel flow checked. The rear right hand cylinder was leaking un-burnt fuel so the NGK plug was checked. ▶



BELOW Several short fire-ups on petrol took place before the switch to methanol



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ABOVE In the future hotter plugs may be used for both rear cylinders

Plugs were swapped but a fuel problem that had been apparent during earlier fire-ups obviously still existed. The immediate answer had to be push the car back into its marquee, let visitors have their photographs taken in it and sell some old pistons as souvenirs.

The following day saw a four-minute and 45-second test fire-up, the engine still minus any liquid coolant. Oil was noticed coming out of the breather and, after checking the levels, one quart was taken out. A second fire-up showed that the problem of overfuelling remained but the team took some comfort when Bob Muravez, who made over a thousand runs in the famed dragster, Freight Train, said that similar problems had been experienced in North America when front mounted blower setups did not have port injection. Fuel tends to gather at the rear of the intake manifold in such cases.

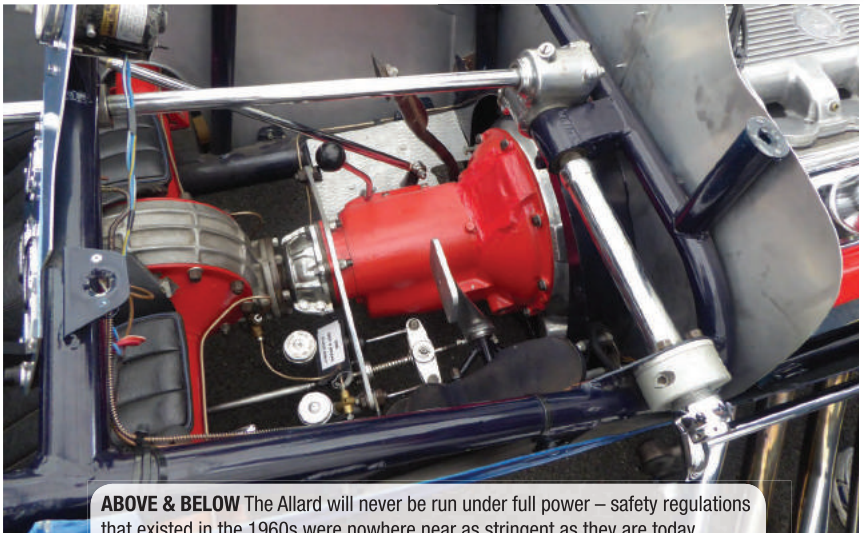
The idle speed was increased and further advice from the paddock suggested a partial closing of the fuel shut off valve when over-fuelling became evident followed by a revving of the engine to clear the surplus. A further fire-up showed that matters had improved but Taylor says that, in the future, hotter plugs may be used for both rear cylinders. A slight leak from the fuel injector proved difficult to fix before teams from the nostalgia drag bike fraternity came up with a large range of seals to choose from.

All was ready for a steady, and particularly well received, run up the Santa Pod strip at 1.00 pm on the Sunday. After the run, the fuel was drained and the lines cleaned with WD40, the oil drained, checked and replaced ready for the return to Beaulieu.

It had been hoped to make a parade run again at the Brighton Speed Trials where the Allard Dragster had first run before the public back in 1961. However, the car has eight open exhausts, which would upset the good members of the Brighton Council. Now that they have seen their car run once, though, the National Motor Museum, Beaulieu, is hardly going to be content to let it sit quietly in its halls. Museum Manager Doug Hill's philosophy is that the best way of preserving older vehicles is to keep them in working order. At the time of writing the Euro Finals meeting at Santa Pod was on the radar. Surely, there will be more runs to come for Europe's first dragster. Fifty-two years has been a long time to wait. HRT

Join the ACAG

BRIAN TAYLOR says, "We are always looking for people who are available to work on the dragster." If you live within a drive of Beaulieu and think you would like to join the ACAG crew, why not contact him on brian@allardchrysler.org? HRT





ABOVE & BELOW The Allard will never be run under full power – safety regulations that existed in the 1960s were nowhere near as stringent as they are today

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Puff The Magic Wagon

A restoration workshop has taken on not one but two British Leyland-built rally contenders to prepare them for endurance competition. **Sophie Williamson-Stothert** uncovers the unlikely tale of "Puff" and "Beauty Box"

HISTORICS. It's one of those phrases that instantly prompts nostalgia, putting you in the mind of "The Bentley Boys" in full cry at Brooklands for example, or Italy's finest Prancing Horses. You're instantly taken back with an overwhelming aroma of Castrol R and shredded rubber.

It's not always this glamorous, though, and why should it be? Let's not forget that some of the most iconic and, in some cases, infamous racers – even the underdogs – earned their spot in the motorsport hall of fame by competing out in the sticks – or, to be more precise, on endurance rallies. Not on a grid sporting more than one or two million pounds-worth of classic sports cars.

Take the wondrous Morris Cooper S piloted by Paddy Hopkirk in the Monte Carlo Rally, for example, or two little Austin and Morris cars named "Puff" and "Beauty Box". If you're familiar with the London to Mexico World Cup Rally of 1970, you'll probably recall the two cars in question – a five-door Austin Maxi and a famous Morris 1800 MkII – and they're back on the scene.

The 1970 World Cup Rally from London to Mexico covered 16,000 miles – through Europe and South America – over the duration of six weeks and, with approximately 100 entrants, every major manufacturer saw the event as the ideal publicity stunt to prove the reliability and durability of their vehicles. After all, driving thousands of miles across the world, especially in British Leyland derivatives, almost sounds absurd today. But these little warriors are more than capable of fulfilling the challenge, even some 40 years later.

It was the first of only two World Cup Rallies to be held, not to mention the second of four marathon rallies to run in a nine-year period beginning with the 1968 London-Sydney Marathon, that was won by Hannu Mikkola and Gunnar Palm, driving a Ford Escort. The event was the brainchild of Wylton Dickson and was launched to mark the announcement that the 1970 FIFA World Cup was to be held in Mexico. Dickson approached renowned British rally driver Paddy Hopkirk and together they persuaded the *Daily Mirror* to sponsor the event which was eventually organised by members of the RAC in collaboration with the MSA.

A restoration workshop, based in the depths of the Oxfordshire countryside, has taken on not one but two fine examples of British-built rally contenders – even if they weren't champions of their time – with an objective to not only revive and restore two British Leyland motors to their original state, but to also prepare them for endurance competition once again.

Known as Project Shop, the independent firm has been restoring, servicing and preparing vehicles since 2008. Director Simeon Cattle says: "We use our own classics regularly and know what it takes to make sure that they perform correctly and remain reliable.

"That's why we've developed a well-organised and fully equipped workshop, which allows us to carry out routine maintenance and complex restorations efficiently and to a very high standard. Every car that comes through our business is treated with the same care and attention we would expect others to show to our own cars."



ABOVE Puff and Beauty Box are reunited for the first time in 46 years

"PUFF"! AND THE WAGON WAS GONE

Born in 1969, the Austin Maxi wasn't quite what you would describe as "eye candy", nor was it described as a



ABOVE The Beauty Box in her prime once more

born racer. Quite the opposite, in fact - although we couldn't possibly divulge the *ugly* truth...

Nevertheless, of the approximate 450,000 models that were manufactured between then and 1981, we know of at least one particular 1970 example which remains alive, and it's a real tribute to an all-women team of three adrenaline-junkies that drove it on an epic, 16,000-mile adventure.

Bearing the registration plate 'MCE 7G' and entry number 20 – one of the first 500 Maxis to leave the British Leyland Motor Corporation production line – this little five-door hatchback, which was later converted to a bootlid for the event, contested the 1970 *Daily Mirror London to Mexico World Cup Rally*, which was flagged away on 19 April by Sir Alf Ramsey from the hallowed turf of Wembley.

The Maxi was professionally-prepared for the event by Peter Baldwin at British Leyland Motor Company (BLMC) dealer, Marshalls of Cambridge, with



ABOVE Director of Project Shop Simeon Cattle with Beauty Box

the assistance of the works motorsport department, Special Tuning division in Abingdon. En route to Mexico, the Maxi was crammed with the essentials. These included spares wedged amidst tools, food and drink packed with a change of clothes and, the most vital component in the package, a trio of drivers named Tish Ozanne, Bronwyn Burrell and Tina Kerridge at the helm.

Their mission was simple, but the task in hand formidable. In fact, of 106 starters, just 26 finished and the Maxi made unwelcome contact with a hedge and succumbed to glutinous mud during the middle of the night in Argentina, which meant they were out of time when they reached the control point, forcing them to retire.

Today, the little Maxi, also known as "Puff: The Magic Wagon", has recently ended up back in the loving hands of Burrell and is receiving a little tender love and care from the Project Shop team.

MCE 7G was discovered in a chicken shed in need of reviving. It was sold to Italian Mini specialist, Giovanni Percossi, and later passed on to rally fanatic Robin Shackleton, who used the Maxi as a daily school run commuter. Before returning to Bron in 2016, it ended up in the hands of penultimate owner Trevor Ripley.

Cattle says: "Bron bought back Puff, which had been amateur-prepared using period parts and on a tight budget. Aside for the Tulip Rally of 1972, Puff hadn't been in competition since 1970. So our job was to prepare for endurance racing once more.

"We met Bron at Race Retro, where she ▶

told us that she had been offered to buy Puff. For me, Bron is still 18 at heart so it was, therefore, no surprise when she told me that she'd only buy Puff back if the Maxi could be prepared for competition again – and that's where we came into the picture."

Presented in its original *1970 Daily Mirror London to Mexico World Cup Rally* livery and bearing the original specification in which it left Wembley Stadium - with the exception of a 1750 cc engine, which replaced the 1500 cc it competed with and appropriate upgrades such as contemporary tyre – Puff is a perfect example of the international rally car genre of its day. Following the World Cup Rally, Puff's original 1,500 cc, four-cylinder powerplant was upgraded to a 1,740 cc unit – the same engine that was installed as standard in later production models. The work was commissioned by driver Tish Ozanne, in order to compete European events.

Inside, you'll find that Puff is still a spitting image of what she was more than 40 years ago. It's equipped with all the original rally equipment, which bears testament to its London to Mexico journey and the adventures in encountered later in competition life, including the work carried out by its original builder, Peter Baldwin.

With 38,000 recorded miles on the odometer, Puff is actually one of two Maxis to take part in the 1970 event in existence – and possibly the only road-legal example – worth approximately £24,000. In fact, Puff is a fine example of a car that's become a rare sight on Britain's roads, with only 88 models left in the country and 163 worldwide. The HRH Prince Michael car, number 72, resides within the Heritage Motor Centre, Gaydon, and is sadly undriveable.

"We first got our hands on Puff at the Heritage Motor Centre back in July, before bringing her back to the workshop, with Bron," explains Cattle. "We did what we do with every car that comes here – take a dispassionate look at it.

"That means we make a checklist on what needs doing and what is likely to go wrong, so we can ensure these parts and components won't fail during competition. Then we make a list of improvements. Essentially, our job is to take a car that is renowned for breaking down within three of four miles and make sure that, when it leaves our workshop, it can at least drive to the South Coast without any issues – this wasn't a case of preparing a freshly restored car, but an example of awakening an old, rusty motor."

The modifications include a glass fibre bonnet and doors, plexiglass rear and side windows, a welded tailgate with a modified boot opening, and the fog and spot lamps are now easily

> **"It's like piecing together an old dismantled puzzle"**

detachable via the rare Lucas rubber plug. Puff also features strengthened and guarded suspension, front and rear telescopic dampers plus hydrolastic suspension with hydraulic pipes routed inside the car.

Its 29-gallon, flexible fuel tank (dated back to March 1970) has been refoamed and it rides upon its original magnesium wheels with a further two being secured on the roof, all shod with new ▶



ABOVE The original 1,500 cc 4-cylinder engine was uprated to a factory 1,750 cc



ABOVE Beauty Box's points and condensers system was replaced with an electronic 123ignition

A girl's best friend

Bronwyn Burrell – Co-driver

"BUYING Puff back has been the most amazing experience – I feel like I'm 24 again!

"I saw Puff for the first time in 43 years at the Fenland Fair outside Cambridge, where I drove the car in the parade.

"It was at the 45th Anniversary Show for the *London to Mexico World Cup Rally* at the Heritage Motor Centre in Gaydon where the current owner of MCE 7G Trevor Ripley asked me if I'd be interested in buying Puff.

"The official handover was timed perfectly for the BMC and Leyland Show, also hosted at Gaydon, in July this year. I couldn't wait to grab the keys out of his hands!

"The 1970 World Cup Rally was my longest and toughest rally of all time. The girls and I took a trip to the factory in Oxford to see Puff roll off the ramps, which was built to the same specification as the works team cars. Once Marshalls had the car in Cambridge, most of the work was carried out by Peter Baldwin, the star mechanic.



ABOVE The Girls - Left to right - Tish, Bron, Tina

SLICK WHEEL WORK

"We had to practise various tasks, including changing the wheels. Being the tallest, I would get the spare off the roof, while Tish and Tina would jack the car up and remove the faulty one. I would then put the wheel on and, as they tightened up the wheel nuts, put the punctured tyre back on the roof and release the jack. We were quite slick by the end, and it was just as well we practised because we had two punctures; one in Yugoslavia and one in Uruguay.

"Endurance rallying usually meant you would go up to five days without one night's sleep! By the end of the second day, we had arrived in Sofia having already covered 1,800 miles across Europe – and our overnight stop wouldn't be until Milan! We didn't plan ahead like the Beauty Box crew and book a room. But we were young, so it didn't matter if we didn't get any sleep after a 14-hour drive!

"On the 8th May, the rally re-started in Rio. 71 cars made it to the re-start, and we were in a respectable 35th place – not bad considering 106 cars started in London nearly three weeks earlier.

"When we arrived in Argentina, we drove 125 miles from Buenos Aires to Saladillo. It was here that we asked the British Leyland mechanics to look at our car as the exhaust was blowing. Eventually, at nearly 10 pm, they started work. They stripped the head down, took out the gasket and then found there was no spare for it. They also thought to replace the manifold, but when they tried to fit it, they realised it was the wrong one. Therefore, the original manifold had to be welded and refitted, costing us valuable time.

WORKING AGAINST THE CLOCK

"We were now running late for our check-in to the Pampas Prime – a 200-mile stint in three hours and 30 minutes. As time slipped away, we got a tow to the start, then back to the garage to finish the repairs. The idea was that we could book into the control as though we had started the Prime. But, as rally regulations state the car must leave the control under its own steam, we had to dash back to get the mechanics to fire her up. They got the Maxi running but we had to decide whether to carry on or withdraw; there were now no cars in front of us, or behind us, and 320 dangerous kilometres in the mud. Nevertheless, we decided we had to give it a go.

"Once the rain started, the roads became extremely greasy and, at about 2am, we slid off into one of the ditches. Tish tried to drive back on the road but it was impossible. We had winches in the car for such an emergency, but we couldn't drive the stakes into the ground and there wasn't a tree or anything solid to attach the winch to.

"Eventually, a truck came along and pulled us out. We carried on and arrived at the end of the prime – only to be told it had shut some 20 minutes earlier.

"Yes, we were out of the rally. But we had covered some 6,000 miles in six days across Europe, and completed 2,500 miles in 41 days in South America. It really was the adventure of a lifetime." HRT



ABOVE Beauty Box and Puff are similar cars, both coming from the British Leyland stable



ABOVE MCE 7G was discovered in a chicken shed in need of reviving

competition Maxsport tyres. Meanwhile, the original 1500 cc engine and gearbox have been changed to the 1750 cc unit, coupled to a rod-change gearbox for the 1972 Sherry Rally, which is said to dramatically improve performance.

"One of the most challenging aspects of working on the Maxi was sourcing the parts, including every rubber component on the car, the suspension bushes, Cooper fluid lines, brake lines, shoes and pads, and wheel cylinders," says Cattle. "The shock absorbers were originally custom made for the Maxi to do the rally by Koni, which is now Spax – so they made us a set of four brand new ones.

"The wheels are, of course, magnesium Minilites, but the car has different sized hubs. This meant we couldn't actually find any modern wheels to fit Puff and this was quite a worrying realisation – for us and Bron – since we believed the originals to be beyond repair. It was only later that we realised we could, in fact, revive them by taking them to Pristine Alloy Wheels in Milton Keynes. They had eight or nine coats of paint on them, so they were put into a chemical bath for two weeks to remove the paint and corrosion.

"Like the wheels, we also had a bit of a tough time replacing the original fuel bag (rather than a tank) from the 1970 rally. In order to make the car rigid enough for the event, they had to weld the tailgate shut – as you can imagine, with the boot welded shut, that left us with a tiny aperture to squeeze in the new one. Nevertheless, we managed to replace it with a shiny new, hand-fabricated, stainless steel tank.

"On top of those key upgrades, we also fitted Puff with new gearbox mounts and linkages, carburettors and suspension, as well as carrying out a complete cooling system overhaul. The next step is structure welding the rear arches, sills, floor pans and roll cage. We're going to make proper mounting brackets for the roll cage because, if it rolled over now, it would just go through the floor.

"Carrying out the work on Puff hasn't necessarily been a challenge, but finding the right parts at the right prices most certainly has. But that's the beauty of working on this car. It's like piecing together an old dismantled puzzle."

Puff isn't the only rally 1970 World Cup Rally contender to visit the Project Shop for a little tinkering this year, though...

> **"When David told me how much he was investing in the 1800, I have to admit, I nearly passed out!"**

A LITTLE BEAUTY

Beauty Box is a fully restored 1968 Morris 1800 Mk2, the very car which competed against Puff on what is often described as the most gruelling rally of all time.

Beauty Box, race number 91 and bearing the registration plate NOB 284F, was the sixth Mk2 model ever produced. Before being famously prepared by the Special Tuning division in Abingdon for the London to Mexico challenge, the Morris was selected by BMC as a demonstration vehicle.

Of course, many of the big names competing in the rally were already well-versed in taking a professional approach to such an event, ensuring everything from the routes to the dietary planning were nailed prior to arriving at the start line. Not to mention the fact that the cars in question already featured strong shells and perfect ground clearance – the key ingredients for a rally car.

Perhaps a little unusual for its era, Beauty Box was sponsored by *Woman Magazine* and piloted by a team of three women – Jean Denton, Pat Wright and Liz Crellin – much like its rival, Puff, and explaining why the Morris was dubbed with its chosen sporting name.

Unlike poor little Puff, and against all odds, Beauty Box actually made it across the finish line in Mexico to claim a respectable 18th position. But what became of her afterwards? According to records, the Morris was found in a rather sorry state in 1991, in which it was almost instantly recovered and restored back to health and its original spec – everything from the twin fuel tank and to the Halda instruments and electrics.

Beauty Box later went up for auction at ACA before being offered by dealer Bicester Sports and Classics, before exchanging hands once again earlier this year to end up in the care of David Scothorn. It was at this point that the Project Shop team were called in for their assistance.

"When David told me how much he was investing in the 1800, I have to admit, I

nearly passed out! But as I began to hear more about the car, I got more excited, so we went with him to the auction in Bicester to buy it," explains Cattle.

"Beauty Box has only covered 1,800 miles in the past four years. Yet, this year, its big challenge was to compete in the Terre di Canossa – its first outing since the 1970 rally. However, unlike Puff which is completely original and never come off the road, Beauty Box has been completely restored – including a brand new shell, so we've been working with a clean canvas."

Cattle explains that the aim of the game isn't to produce concours show cars, but to revive their spirit, so they can get back in the racing game once more.

"We're not necessarily building show queens here," explains Cattle, "but we are ensuring the cars that leave this workshop are well-engineered to a level where they can compete in an endurance event. These cars can be used, both on the road and in competition.

"The two 'landcrabs', as they were called, remain in period livery, but they're not necessarily re-engineered using original parts. In some cases they're either extremely difficult to come by or simply too expensive. Beauty Box, for example, had what you might refer to as a heart transplant, replacing the points and condensers system with an electronic 123ignition – but all of our alterations are sensible upgrades, ensuring we don't lose the essence of the original car."

Cattle adds: "Beauty Box and Puff are similar cars, both coming from the British Leyland stable. There's only six or seven years development between the two – the only difference today is the fact that the Maxi has been restored as a modern motor, whereas the 1800 is still very much reflective of its era. We didn't want to modify the Maxi too much until we got the car running again – we had to identify the improvements that Beauty Box has and whether they'll work on Puff."

Seeing Puff and Beauty Box side-by-side for the first time in 46 years is awe-inspiring, and to know they'll soon be back in competition is nothing short of astonishing.



ABOVE Puff with driver Tina-Kerridge



ABOVE Beauty Box pre-WCR at Wembley



ABOVE Puff en route through Italy in the WCR

Since the process of reviving the two sisters in crime has been such a privilege, Cattle is ensuring their owners are just as involved with the development as his mechanics.

"We strive to make our clients a part of their car's restoration journey, and working with Bron on Puff has been a prime example of this," says Cattle. "It's wonderful to see the look on peoples' faces as they watch their pride and joys being restored to life and eventually crossing the finish line.

"Having Beauty Box and Puff here together has been a pleasure and it's actually quite surreal they've met again after all this time. These are the very cars that helped pave the way for reliability in the future."

He adds: "We've been working on Puff for more than six months now, but you can't rush these projects – there's certainly magic in our mechanics' hands, but magic can take time!" HRT

STEALTH MACHINE

The Can-Am series produced some of the most outrageous and powerful machines ever seen in circuit racing. **Glen Smale** examines the restoration of one of the most innovative examples



THE Canadian-American Challenge Cup, run between 1966 and 1987, was originally inspired by the rules covering Group 7 sports racers, which allowed unlimited engine capacity with few technical restrictions. In short, engineers were encouraged to push the limits of physics, and this resulted in some of the most powerful, and unusual, racing cars ever constructed. Turbocharging and supercharging were permitted, which saw the Porsche 917/30 producing up to 1500 bhp in 1973 in qualifying trim, and for a while even the Chaparral 2J 'Sucker' car was permitted.

Most of the manufacturers involved



ABOVE A big block Chevy V8 provides the punch



ABOVE Black magic: The Shadow Mk 1 restoration project is unravelling the mysteries of a car that evolved week-by-week in period

Photos by VIRTUAL MOTORPIX/Roland Harrison

in this series looked for more power, and this led to ever-wider bodies to accommodate bigger tyres for increased grip. This of course resulted in bigger front-end dimensions which impeded the search for higher speeds, but the thinking that bigger engines would overcome this aerodynamic principle seemed to rule the day. Not so for constructor Don Nichols though, who was sufficiently impressed by a proposal from freelance designer Trevor Harris, whose idea it was to install a big-block V8 engine into the smallest possible chassis. Nichols, a former military intelligence officer, had worked in motorsport as a supplier of parts and tyres, and had also been a race promoter in Japan.

The story of the Shadow Mk 1 started back in 1968 when Nichols moved to California and founded Advanced Vehicle Systems (AVS). Harris' proposal was to reduce the frontal area by approximately 35 per cent in comparison with normal Can-Am cars, which would require both a much lower and narrower chassis and bodywork. This meant components that would normally be located up front, such as the radiators, were now relocated to the rear, resulting in a very different package.

At a very early stage in the design process, Mario Andretti and Jacky Ickx were shown the full-size clay model, and no doubt both were quite intrigued by the concept. It would, though, be around the end of 1969 and the beginning of 1970 that the first track tests were carried out at Riverside and Laguna Seca with Parnelli Jones and George Follmer behind the wheel.

FASCINATION

Harm Lagaaij, now the owner of chassis #70-4, has been fascinated by the innovative and radical Shadow concept ever since a report on the race car was first published in the American magazine, *Road & Track*, back in 1969. It should be noted that Lagaaij, now a retired automobile designer, worked for Porsche, Ford and BMW during his career, and was responsible for some notable and ground-breaking designs. Such cars as the Porsche 924, 968, Boxster, 993, 996, 997, GT1, Carrera GT, BMW Z1 and the Ford Escort, Sierra and Scorpio are amongst his list of achievements. So how does a car designer fall for a car that essentially has a flat top and sides? Lagaaij smiles and says, "It has a lot of concave shapes and I found that very interesting!"

In period, engine overheating was always a problem, as Lagaaij recalls, "From the car's first track test and also in all its races, the Shadow always overheated because they didn't know what the problem was. I solved it, but it wasn't just a single thing, as always, it was a combination of things." One of the key factors in solving the overheating problem was to always run the car with its rear spats fitted, as this allowed the air to flow smoothly past the rear wheels and into the radiators. According to Lagaaij, the team would often run the car in period without these spats, and that simply destroyed the airflow which was an integral component of the cooling philosophy.

The twin water and oil coolant radiators were located on either side in the area immediately behind the rear wheels, and faced out sideways. Air for these radiators was collected by means of two air scoops, or ears, which protruded out from the sides of the rear bodywork. Once the air had passed through the radiators, it ▶



ABOVE The car's philosophy dictated an unusually reclined position for the driver

escaped through a full-width gap on the upper deck, at the rear of the vehicle. This setup, along with the 20-litre water coolant capacity, resulted in a 32/68 front-to-rear weight distribution which introduced further problems when it came to braking, but more of that later.

Another challenge resulting from the extremely low bodywork was the fitment of springs and dampers. This problem was solved by abandoning convention, and instead a three-spring set-up operated by rocker arms was installed on each corner in combination with compact friction dampers. Having such a low front end required specially made 10-inch tyres (11 inches wide) with 12-inch tyres (16 inches wide) for the rear. These bespoke tyres came courtesy of the relationship Nichols already had with Firestone, and were good for well over the car's (theoretical at this stage) 250 mph top speed.

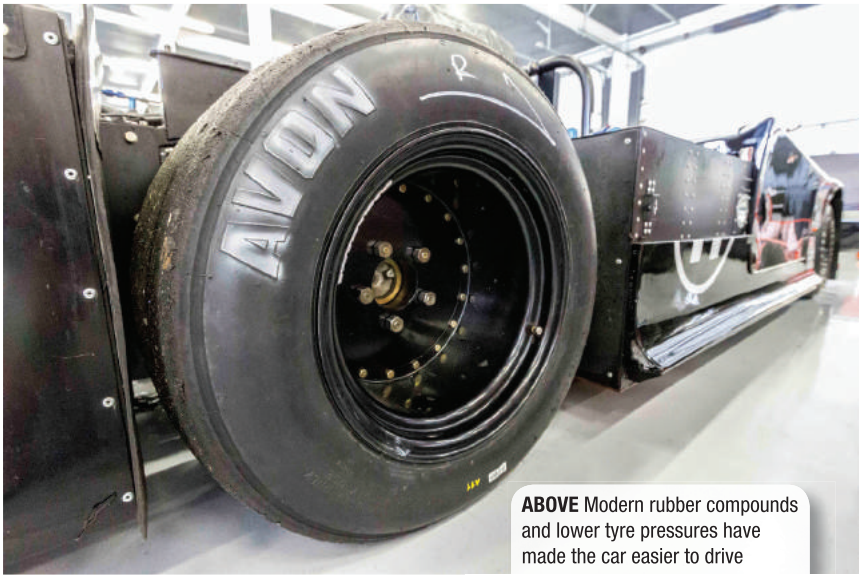
Due to height limitations and tight packaging, conventional brakes could not be adequately cooled, and so an alternative system of braking had to be sought. Harris thus developed three separate movable air brake systems for the Shadow. This consisted of two vertical flaps in the front, two flaps on each side integrated into the side air scoops at the rear, and one horizontal flap on the rear deck. These brake systems were to be activated by normal brake pedal pressure. But before the first car was completed, a change in the rules banned

> **"To meet the goal for the 35 per cent reduction in frontal area, the driver lay, as opposed to sat, in the car"**

the use of all movable aerodynamic aids, and so the airbrake systems were summarily abandoned. With a crucial element of the car's original concept suddenly removed, a substantial change of plan was needed, and quickly.

This meant that the Nichols/Harris team had to come up with a more conventional braking system, and this resulted in extremely small front brakes, but the inboard rear brakes had to be as big as possible. But getting air in to cool the brakes was difficult due to the very tight internal packaging. To aid cooling of the front brakes, instead of directing air onto the brakes to cool them, the team fitted a pair of fans to the front wheels which came from a Chevy Corvair engine. This arrangement extracted hot air from the brakes which proved adequate. About the rear inboard brakes, Lagaaij has this to say, "Brake cooling remained a problem and no further improvements were found until later in the 1970 race season."

Two additional, extremely radical ▶



ABOVE Modern rubber compounds and lower tyre pressures have made the car easier to drive



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features, were to be included. In an effort to meet the goal for the 35 per cent reduction in frontal area, the driver lay, as opposed to sat, in the car. To make this practically possible, the steering wheel was set at an almost horizontal angle, similar to that in high-speed go-karts. The other step was to eliminate one of the foot pedals, namely the clutch, and have the brake (left) and accelerator (right) pedals laying over at an angle to reduce the required height in this area.

The clutch was to be a hand-operated lever mounted on the frame to the driver's left. The result of this setup was that there inevitably came a time when driving at high speed, that the driver's left hand would be operating the clutch, while his right hand would be changing gears which meant that he had no hands on the steering wheel. This was far from satisfactory and resulted in the driver changing gears without the clutch, which didn't do the gearbox any favours.

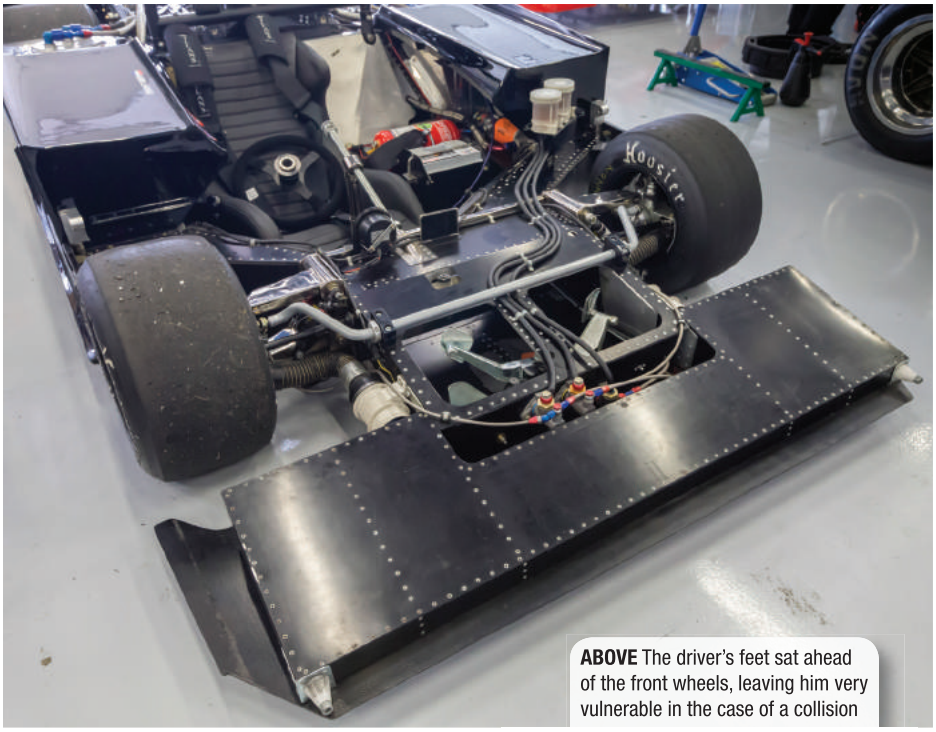
Clearly the whole concept was quite radical in most areas. Regarding the horizontal steering wheel, Lagaaij has this to say, "That was the first thing in early track tests that the test driver, George Follmer, said that he didn't like." Follmer, who would later go on to become the Can-Am champion in 1972 driving the Penske Racing Porsche 917/10, was a Firestone-contracted driver and as such, was roped in to test the Shadow.

Due to the low cockpit shrouding, the driver was exposed and therefore experienced extreme buffeting, and so a higher windscreen was made. This allowed the rev counter, which had been placed out of sight under the shrouding, to be relocated to a position in front of the driver. Testing also revealed that rear downforce was wholly lacking, and so a high-mounted rear wing with deep cord was fitted to the rear bodywork. With the 32/68 weight distribution, driving the car was made more difficult by the wide tyres and the high pressure (60 psi) needed to keep the tyre tread horizontal.

There were, however, three components in the car that were conventional, and these were the engine, the monocoque and the gearbox. The engine was a big block V8 sourced from General Motors, the aluminium monocoque was black anodised for additional strength, and the gearbox was a Hewland unit. The gears in the 'box were of a bespoke size and ratio, as these had to compensate for the small diameter rear wheels.



ABOVE A high-mounted rear wing was the response to the discovery in testing that rear downforce was limited

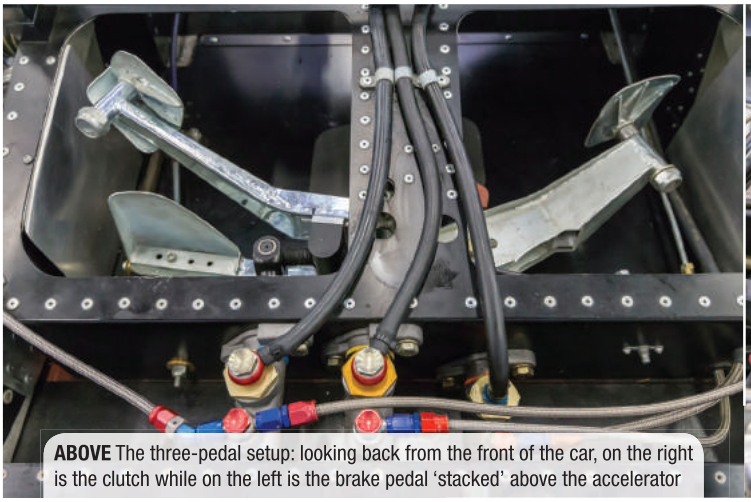


ABOVE The driver's feet sat ahead of the front wheels, leaving him very vulnerable in the case of a collision

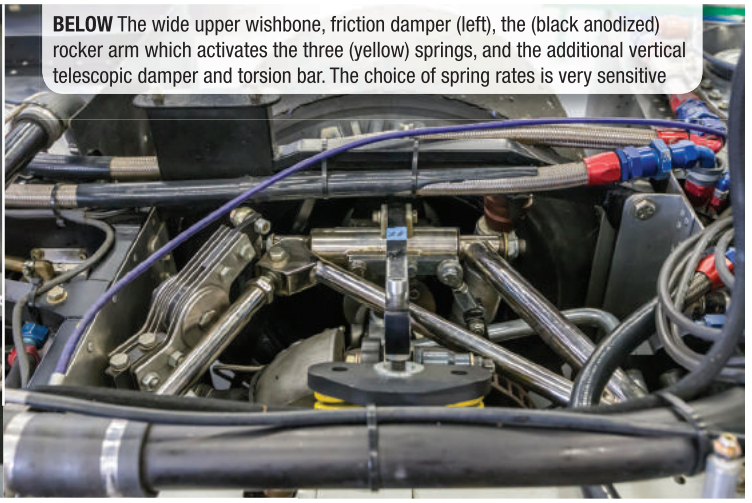
SECOND CHANCE

Presented with the opportunity in 2009, Lagaaij purchased the car from Dennis Loscher who had owned it for just three years, the first owner being Don Nichols, the car's original developer. Nichols had allegedly built four identical cars, this one being the fourth of the series, with a fifth being completed for a museum display in 1990. But the dilemma facing Lagaaij, whose intention it was to completely restore the car, was what version he should return the Shadow to.

Back in 1969/1970, the cars being tested were chopped and changed almost weekly as the team discovered what worked and what didn't, or for instance when the regulators outlawed the airbrake system. Lagaaij was always convinced that the first configuration



ABOVE The three-pedal setup: looking back from the front of the car, on the right is the clutch while on the left is the brake pedal 'stacked' above the accelerator



BELOW The wide upper wishbone, friction damper (left), the (black anodized) rocker arm which activates the three (yellow) springs, and the additional vertical telescopic damper and torsion bar. The choice of spring rates is very sensitive

should have been given more time and research. After some deliberation, he decided to restore the car to its state as tested at Riverside (late 1969) and Laguna Seca (early 1970). Although this version of the car never actually raced, it is one of the most original and authentic early versions of the Shadow. This allowed the car to receive FIA certification in the form of an Historical Technical Passport (HTP) as a Development Car.

In order to keep the car true to its roots, Lagaaij in many ways has his hands tied as the car has to retain its originality. For instance, with the weight distribution being 32/68 front-to-rear, the brake distribution is currently 40/60, but Lagaaij is trying to bring this ratio closer to a 30/70 balance, more in line with the car's weight distribution. Lagaaij explains, with some humour, "The rear callipers get red hot because the gearbox heats up the brakes, and the brakes heat up the gearbox, so that doesn't help, does it?" In time, more brake balance will be diverted rearwards as improvements allow.

VULNERABLE

"I have to say, when I first drove the car I thought I was really exposed at the front and extremely low, and I felt very vulnerable. Today I am more comfortable about this, but I wouldn't like to hit anything though. But then again, it was similar to any Formula 1 cars of the day, it was a very dangerous period," Lagaaij points out.

The very early version featured a long canopy where only the driver's head stuck out. The steering wheel and instruments were underneath the canopy, but the driver couldn't even see the instruments. It was for these practical reasons that Lagaaij decided to go for the track test version of the car, as the team had relocated the instruments and steering by the time the car was tested. Even so, Lagaaij admits, "I discovered when you are in a lying position, you get a completely different sense of cornering speeds than when you are more upright. You feel that you are going fast but actually you are not going fast enough, so I had to adapt my driving style. It has to do with the balance in your ears, because when you lay down you feel vulnerable, so I just had to find my way around those problems."

Some modifications have been incorporated that make the car safer to drive. These include the installation of a three-pedal setup, with a foot-operated clutch on the left, and the brake pedal ▶

Specifications

Year	1969/1970
Make	Shadow
Model	Mk 1
Chassis	70–4
Engine	Chevy 'big block' with many special (non-Chevy) internal performance parts
Displacement	8.1 litres (494 cu.inch)
Bore x stroke	107.9 x 111 mm (4.25 x 4.37 inches)
Horsepower	700 bhp
Lubrication	Dry sump (Weaver oil pump)
Induction	Hilborn/Kinsler constant flow
Ignition	Vertex magneto
Gearbox	Hewland LG 500
Ratios	4 gears: 1st – 24/50; 2nd – 31/45; 3rd – 34/40; 4th – 37/38
Limited slip diff	Cam/Pawl, final drive: 33/10
Brakes	Disc
Front	203 x 28 mm, Girling or Hurst-Airheart four-pot (outboard)
Rear	300 x 28 mm, Girling or Hurst-Airheart four-pot (inboard)
Front wheel	10" x 9"
Front tyre*	18.0/7.5 (only available from Hoosier)
Rear wheel	13" x 14"
Rear tyre*	13.0/23.0 (available from Hoosier or Avon) *Original Firestone tyres no longer available
DIMENSIONS	
Wheelbase	2210 mm
Track front	1026 mm
Track rear	1230 mm
L x W x H	4102 mm x 1830 mm x 850 mm (measured at roll bar)
Weight	850 kg (w/o oil, water and fuel)

slightly above and at an angle to the accelerator, on the right. Tyres of the original size and spec were no longer available, and so the closest racing tyres available being slightly narrower, were fitted. This tyre spec, combined with the modern rubber compounds and lower tyre pressure, has made the car much easier to drive.

The first engine bench testing in 1969 showed that the Slimline Induction system was causing an obstruction, reducing engine power. As a result, a Hilborn/Kinsler constant flow fuel injection system with conventional ram tubes was fitted in period instead of the original Lucas fuel injection. The team also discovered during the track tests that they were losing 60 bhp because the exhaust manifold was conventionally placed, low down in the body, and so the exhaust was routed up and over the rear bodywork. Lagaaij has returned the exhaust manifold to how it was originally fitted for the track tests, with the exhaust pipes exiting low down in the body. The dry sump was also fitted as low as possible in the chassis, in an effort to lower the centre of gravity as much as possible.

Lagaaij explains his dilemma, "I have to find the so-called best compromise, or the sweet spot of a concept, a configuration of parts and technology where it would work best. That is my mission. I cannot do anything new, so I have to live with certain things which were maybe a bit too radical, but I must find the best compromise."

At the Silverstone Classic in July, Lagaaij met and spoke with Clive Chapman, son of Colin Chapman. Lagaaij recalls, "Clive Chapman said you should never look at cars like this as being mistakes; they are never mistakes. They are an attempt, a discovery, or a vision, but never a mistake. You can succeed or fail, but it is not a mistake and, therefore, I look at the solutions that I am working on and I think, 'Well, why did they do it that way?' But that is how it was; it is a state of the art design from those days. But I am not the originator of this car, I'm somebody who has picked up an underdeveloped project, and is trying to finish it as they would have done, if they would have had more time and money."



ABOVE On the left is the 'swirl pot' for the cooling system, while on the right is the magneto for the ignition system

With the support of Shadow founder Nichols and designer Harris, Lagaaij has spent 3000 hours restoring the Shadow. Using all original bodywork panels, the Shadow was given its first demonstration run in 2010, after which an additional 1000 hours was invested making it race-ready for circuit racing.

LAST OF ITS KIND

This car is not a replica, a recreation or a continuation version of the original Shadow Mk 1, it is an original car (chassis #70-4) which has been restored back to its original configuration. Since all other chassis are either incomplete or destroyed, this one is the only fully operational, original Shadow Mk 1 in existence.

"I went back in history, and because they made changes almost every week, I had to 'de-evolve' what it became, so I have about 45 years to catch up," he laughs. Lagaaij's task today is to extrapolate their thinking, and the result of his work is a spectacular and competitive car. This proves that the Shadow's radical and innovative concept can work, bringing to the public an unforgettable part of Can-Am history. As if confirmation was needed, the Shadow Mk 1 was awarded 'Most Admired Race Car of the Event' at the 2016 Silverstone Classic... job done! HRT

> **"I'm trying to finish it as they would have done, if they had more time and money"**

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First love

Julian Thomas talks to **William Kimberley** about why his E-Type Jaguar is so special

AS a serial lover of the E-Type, it was a red letter day when Racelogic founder and CEO Julian Thomas purchased one in July 2014.

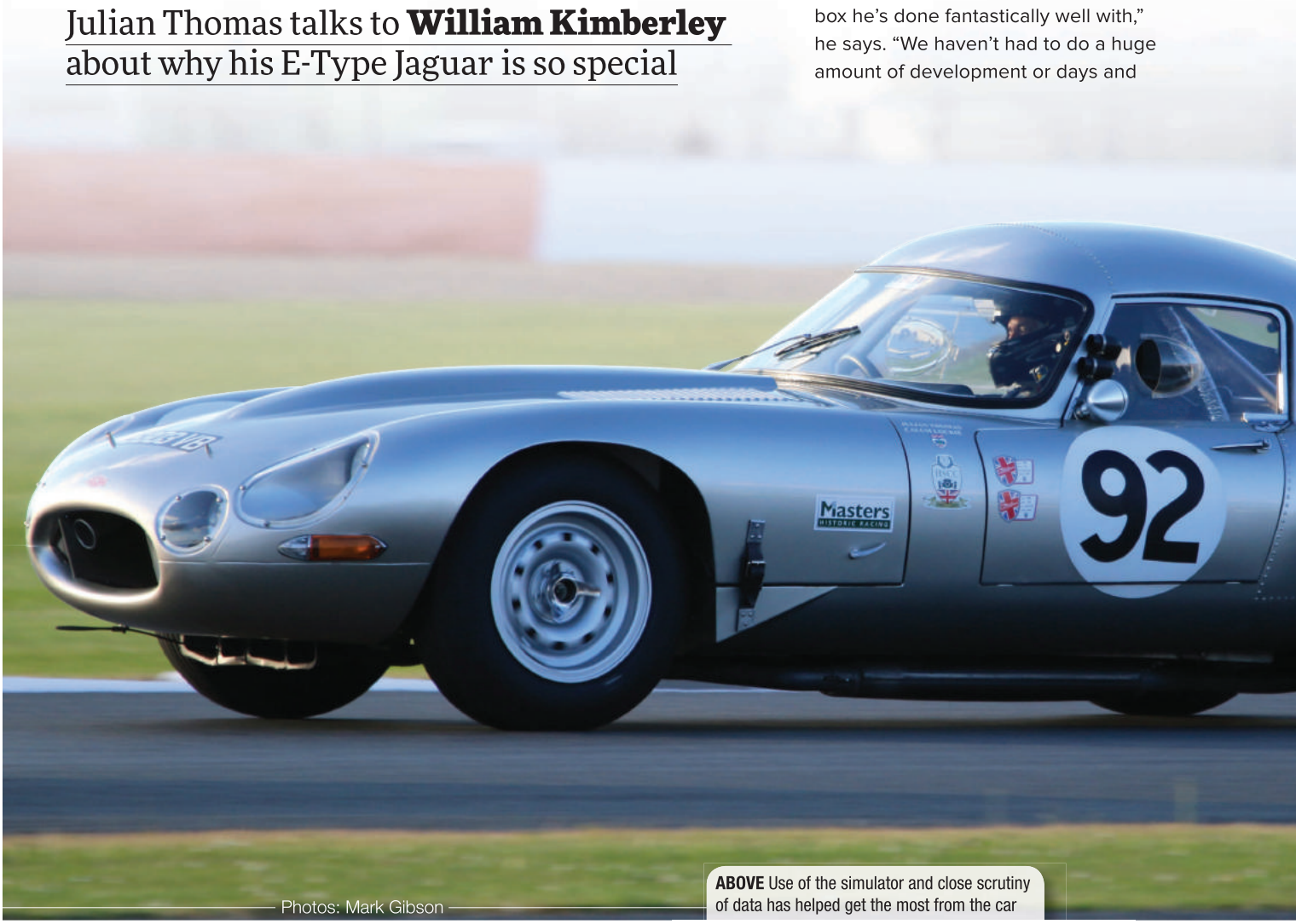
"I was at Silverstone Classic when Nigel Greensall, my co-driver at the time, introduced me to Jeremy Welch of Denis Welch Motorsport who had one that was looking for a new owner," he recalls. "However, I was particularly fussy and didn't just want any one; I wanted a really fast one. So he showed me a picture of a low-drag one with the Lindner Nocker bodywork with all the rivets but the smoother rear and roof he had that looked absolutely gorgeous.

"Jeremy told me that one of his customers had commissioned him to build it but he had run out of money. It was still in bits but he offered to build it up. So it was a bit of a risk, as the car wasn't yet completed and I was paying the full price, but Jeremy's reputation is second to none."

The car was built in time for Thomas to compete with it in 2015, which he took to be the shakedown year as there were a number of issues that needed to be sorted out. One of them was vents not being drilled in the tank by the supplier, which meant that heat built up in the engine and led to the block being warped and the head gasket blowing.

"In a way it was good because it gave me a while to get up to speed with the car," says Thomas. "The first time I drove it I got out shaking like a leaf. I told Jeremy that there was something wrong with the car because it was trying to kill me on every corner with oversteer. He then got in and drove it and told me that it was exactly how it was meant to be. It meant I had to recalibrate my brain! There's so much power and torque and because they're big, tall section crossply tyres, some of the tread moves so much that when you turn into a corner, you're sliding. It means that you have to balance it all the way in and all the way out and can't use full throttle until you're in a straight line."

Welch is very complimentary about Thomas' driving skills, saying that he drives what he's given and does so quickly. "What we gave him out of the box he's done fantastically well with," he says. "We haven't had to do a huge amount of development or days and



Photos: Mark Gibson

ABOVE Use of the simulator and close scrutiny of data has helped get the most from the car

days of testing, it has all just clicked. I think many teams would be envious of that because you can spend weeks of testing to keep a driver happy and get to where you need to be."

Denis Welch Motorsport builds many Jaguar engines, manufacturing all the components in-house, the only parts outsourced being the block and head castings from Crosthwaite and Gardner. "The parts we make are not special items. Julian's engine has all the parts in it that we sell to anybody," says Welch. "Some people in the paddock are spending hundreds of thousands of pounds developing their own bespoke stuff, but by no means is it one of those. However, when we run a car we do put a lot of resources behind it."

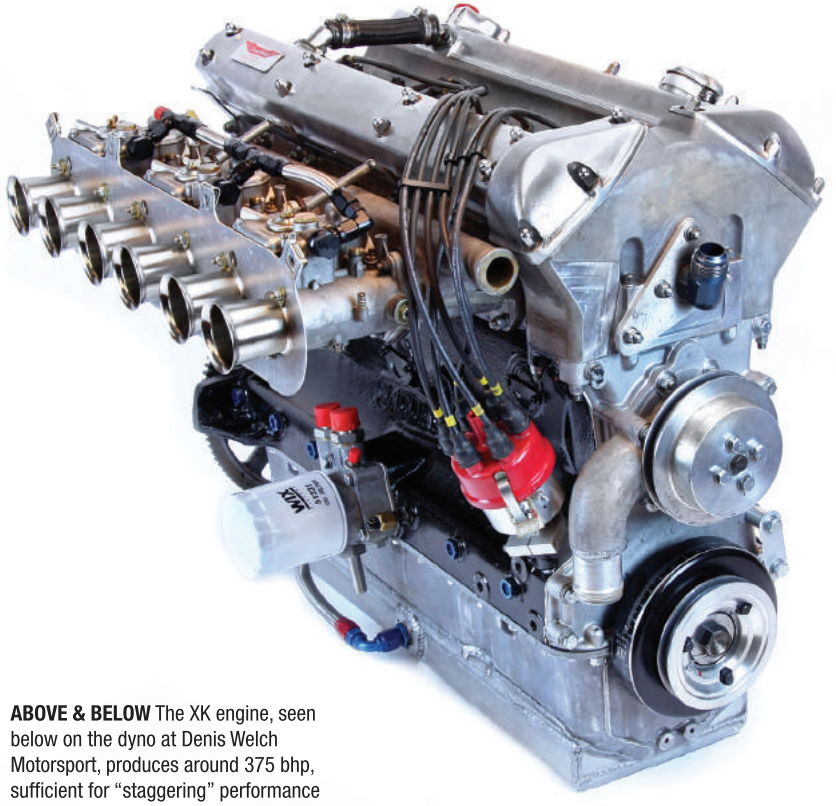
The engine produces around 375 bhp which, in a car that weighs just under a tonne, leads to what Thomas descibes as a staggering performance. The car is within touching distance of 150 mph.

Certainly Calum Lockie, co-driver of the E-Type Jaguar, is impressed. "My first run was a real eye-opener," he admits. "I have driven E-Types before but this was in a different league. The powerful engine hurtled it down the Donington straights and the handling was well ahead of expectation with Craner Curves nearly flat out!"

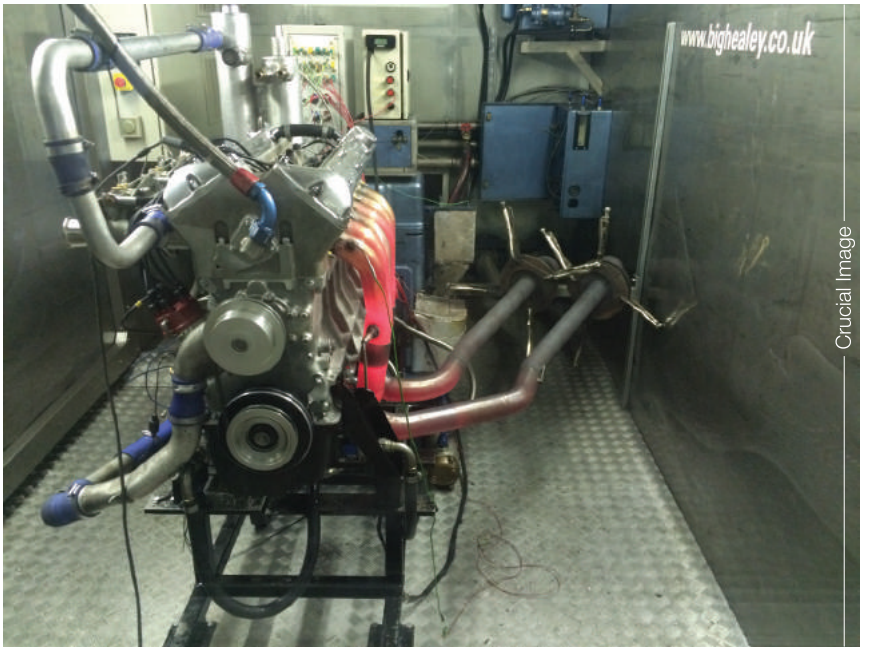
"The brakes pull around 0.75g," says Thomas, "which when you are doing 150 mph feels like nothing. It means you have to recalibrate your brain and brake so much earlier than in a modern car. However it can still pull 1.1g when cornering so it's just the straighline braking that's the weakest part."

The gearbox is original with modern internals with the same ratios that have been manufactured at Denis Welch Motorsport. "We make brand new gearboxes," says Welch. "In fact, there's hardly anything we don't make. ▶





ABOVE & BELOW The XK engine, seen below on the dyno at Denis Welch Motorsport, produces around 375 bhp, sufficient for "staggering" performance





ABOVE Without the newer cars, Thomas argues, grids would dwindle

Newspress

The customer supplies us with the bodyshell and then we make every other component on the car except for the chassis plate and the dampers which are made to our specification.”

As the owner of Racelogic, Thomas has had access to all the driver aids and admits that it has helped him enormously in getting the best out of the car. “It’s accelerated the rate that I can learn,” he says, “because you can go out and try lots of things such as different lines round corners and get instant feedback on the lap time as it gives you a delta, so you know speed of entry to apex and apex to exit and all the way through you can see whether you are gaining or losing with red or green lights telling you.”

In the rain Thomas says that he has to be ultra cautious because at full throttle, even in a straight line, the wheels are spinning: “Last year at Silverstone Classic it was super wet and in fourth gear down the start/finish line it would snap sideways so I would feather the throttle just trying to get the power down.”

Thomas is also a great user of the simulator. “I live by them,” he says. “I hadn’t raced at Zandvoort before and so went on the simulator. We had no testing there, just straight to qualifying and on my second flying lap got P4 on the grid and that was only because I’d spent about five hours on the simiulator. It was the same at Le Mans. You can’t test on the full circuit and as qualifying was going to be the first time I would drive on the track, I spent a couple of weeks beforehand practising on the simulator, getting to learn the circuit. It’s got to the stage nowadays where the signs and bits of roofing and buildings I was using as braking points were identical when I got to the track.”

CRITICISM

Responding to the criticism by some that while he is driving a 1962 E-Type Jaguar it is in fact a 2014 car, Thomas says he understands the viewpoint. There could be different race series where that is applicable, he argues, but the grids would just get smaller and smaller with the original cars rocketing in value and owners refusing to race them.

“Different people are unfortunately buying such cars as an investment and they have no intention of letting them out on the road, let alone race them, so the chance of seeing one of those on the track is diminishing each year, which ▶

The Lindner Nocker E-Type

JAGUAR built just a dozen of the famous all-aluminium Lightweight E-Types for racing. Of these, just one was modified by the Jaguar factory for owner Peter Lindner, the German Jaguar importer, to Malcolm Sayer’s Low Drag body design. It was raced by Lindner and Peter Nocker at Le Mans in 1964 before being involved, a few weeks later, in a massive accident.

The car was then impounded and locked away for many years. Subsequently, the car was recreated using all the mechanical components in a spare Lightweight tub because the mangled original body was thought to be unrepairable. HRT

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is a great shame. Seeing an original car and thinking that it raced at Le Mans is absolutely fantastic, but if the grid is consequently very small, it's no fun.

"We generally now have between 50 and 60 cars on the grid and while there will be be recreations in the mix, you can't tell them apart from the original as they're exactly the same, make the right noise and so on. If you have an accident with an original, it's a big deal whereas I've had a couple of dings this year, but you just make the repairs and get on with it."

Now having completed his second year having dominated the Jaguar Classic Challenge, ending up as champion with Calum Lockie, it could be thought that Thomas has proved a point and would want to move on. However, he has no intention to do so, having fallen deeply in love with his Jaguar. "It's a car that means so much to me," he says. "It's good looking, fast, a race winner and needs to be driven hard ot get the best out of it. Not only is the E-Type the epitome of what a great sports car should be, in my car I have what I think is the ultimate." HRT



ABOVE The Lindner Nocker bodywork, featuring the rivets, was an attraction



BELOW Thomas admits he had to recalibrate his brain to adapt to the car's handling



ABOVE The sleek lines of the E-Type made for love at first sight

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ABOVE Endurance rallying is one of the fastest-growing branches of historic motorsport – and maybe the most spectacular

The Ultimate Test

Endurance rallying can pose some unique challenges to both man and machine, as **Chris Pickering** discovers

Do you suppose any of the people who take part in regularity rallying have ever paused to consider the name? Waiting nervously on a frozen Scottish hillside, the sound of the previous car echoing off the glen, it must seem like a laughably tame description of one of the toughest tests in historic motorsport.

Granted, it's a little bit different to stage rallying. You'll never have the co-driver barking "100 K-left over crest, don't cut" but it's still a formidable test of skill and endurance. For a start, you can get loose surface sections and driving tests on private land, which do resemble special stages, with an emphasis on speed and car control. Even on the road sections, maintaining the allotted average speed can be far from straightforward with twists, turns and the small matter of navigating across hundreds (or thousands) of miles of unfamiliar terrain.

This is one of the fastest growing branches of historic motorsport, and it's also one of the most inclusive. While you can turn up in an ex-Mille Miglia Bugatti, you're just as likely to find someone in a Triumph Herald or an MGB. Some events are suitable for completely standard road cars, although a huge amount of preparation work can go into others – particularly the long-distance rallies with lots of rough roads.

For those looking to combine historic motorsport with a sense of adventure there are a number of dedicated organisations. Among them, the Historic Endurance Rallying Organisation (HERO) and the Endurance Rally Association (ERA) are perhaps the best known.

HERO operates as far afield as Iceland and Greece, but a lot of its rallies are run in the British Isles, often spanning a work-friendly long weekend. You can even hire from a fleet of fully prepared cars.

NOTHING HANDLES LIKE A RENTAL

To find out more we paid a visit to Maulden Garage in Bedfordshire, which provides preparation and support for the HERO events.

"The first priority is always to get the car running reliably," explains proprietor Dave Smith. "It sounds obvious, but silly little things like a coil breaking down or the wipers failing can end your rally. The trick is to get into the habit of refreshing the components before they might fail."







ABOVE & BELOW The HERO Cortina 1500GT uses a Brantz trip meter and features an enlarged fuel tank from a Capri, moved to the boot. Note the twin 40s and the addition of an MGB brake servo

Chris Pickering

Parked up outside is the 1965 Mk1 Ford Cortina 1500GT from HERO's fleet. The paintjob is a tribute to the Alan Mann Racing Cortinas that appeared on events like the Monte Carlo rally in the mid-sixties in between their circuit racing commitments. Fully caged with a sump guard, Minilites and spot lamps it looks every inch the rally car.

Things weren't always that way, however. It started life as a standard 1500GT, before Smith had it stripped and sandblasted to begin preparation. In went a six-point Safety Devices roll cage and a front strut brace, along with a set of bucket seats and five-point harnesses.

The engine is a relatively mildly tuned 1,498 cc pre-Crossflow, prepared to fast road spec by Cortina specialist Throbnozzle Racing. As with all aspects of the car it's intended to reflect the sort of modifications that a club-level competitor might have carried out in period. To that end, it now has twin Weber 40 DCOEs with a slightly hotter camshaft, a gas flowed head and slightly larger valves. Combined with lightening and balancing on the bottom end it's now good for about 110 hp – around the same as a standard Lotus Cortina and a healthy increase on the original 78 hp.

"We always spec the engines with durability in mind," comments Smith. "This is probably the most hardworking car on the fleet and it's picked up class wins across Europe, but it's just had its first engine rebuild in three years."

A switchable Kenlowe electric fan has been added to provide extra cooling, while the standard points and condenser have been swapped for a PowerSpark electronic module that sits inside the original distributor. The transmission has also been upgraded with a four-speed 2000E 'Rocket Box' from a Lotus Cortina, but that's about it. There's nothing especially exotic anywhere on the car; instead the devil lies in the detail.

The brakes, for instance, use standard GT callipers, road pads and solid discs, but the pipes have all been moved inside the cabin to prevent damage from stones and rocks. The same goes for the fuel lines and even the tank itself; originally it lived under the rear of the car, but now a larger tank taken from a Capri sits inside the boot. This was a common mod in period and the only concession to modernity is a Facet electric pump to help draw the fuel.

The McPherson struts on the front suspension have been reinforced with welded-on gussets – again a period mod – and fitted with slightly longer springs to aid ground clearance. At the back, the live rear is completely standard, although both ends are now fitted with slightly firmer Gaz dampers.

"It's a question of finding a balance with the suspension," explains Smith. "We generally run the cars a little higher ▶



ABOVE The 1965 Mk1 Ford Cortina 1500GT from HERO's fleet

Chris Pickering

than standard to avoid grounding on the tougher events, but if you go too high they can become a bit wayward."

Generally, he explains, they stick with normal road tyres for HERO events: "Nine times out of 10 they're not in the forest that long, so we tend to run normal summer tyres for most events or sometimes winter tyres for things like Le Jog. The thing people don't realise with gravel tyres is how much rolling resistance they add. We did an experiment with one of our cars and found they were taking something like 18 hp away from the engine!"

A Cortina built to this sort of spec would set you back around £20,000 but you can pick up a competitive MGB for less than half of that. Pre-war cars are actively encouraged by the organisers and they tend to fare well on the rougher events due to their sturdy build and high ground clearance. At the other end of the scale, next year will see cars made up to 1987 eligible for most of the HERO events, opening the door to things like the Peugeot 205 GTi and the Mk2 Volkswagen Golf GTI.

A roll bar and some competition seats with proper harnesses are advised, but essentially all you need is a trip meter and a handheld fire extinguisher. Historic motorsport simply doesn't get any more accessible.

DESTINATION ADVENTURE

For those looking to take on an adventure in an even grander scale, the Endurance Rally Association specialises in long-distance competitions. With destinations ranging from Africa to South America, it organises some of the most spectacular motorsport events anywhere in the world, including perhaps the greatest endurance rally of them all, the Peking to Paris Motor Challenge.

Inspired by the legendary 1907 race of the same name, its scale dwarfs anything in modern motorsport. The route stretches more than 8,500 miles from China, through the Gobi desert into Mongolia, then across the vastness of Russia and on through another eight countries to the finish line in Paris. It feels exhausting simply typing it.

Most events are organised for pre-1975 cars, but again the variety is staggering. Where else would you see a Blower Bentley and a Rolls Royce Phantom II rubbing shoulders with a Hillman Hunter? Inevitably some cars are more suitable than others, though, and pre-war American machines have carved out a particularly successful niche in this category. In fact, since it became a regular fixture in 2007, every single Peking to Paris has been won by one of these robust, uncomplicated machines.

"These cars already have a lot of the ingredients we're looking for; they're strong, they're simple and they were designed to drive across rough roads. Even compared to European cars of the

BELOW An RPS-prepared Fangio Coupe



ERA



ABOVE Pre-war American cars have proved hugely successful on mixed surface events



ABOVE RPS favours leaf springs for long distance events as they are simple and easy to mend

same period you can see a very different approach to the design," comments Simon Ayris, managing director of Rally Preparation Services (RPS).

"We like the looks, we like the heritage... and it has to be said, they're bloody good fun to drive. On top of that, it's good to have the safety of a fixed head car, where you can discretely install a full roll cage – over the years we've had several roll over on events like these and our clients have always walked away."

The 1937, 1938 and 1939 model year Chevrolet Master coupes are particular favourites, he explains. These are the cars that the great Juan Manuel Fangio cut his teeth in, modifying them for competition in his native Argentina during the thirties and forties. Then as now they were chosen for their long-distance ability. The Gran Premio del Norte that Fangio won in 1940, for instance, covered almost 10,000 km (6,200 miles) of dirt roads across the Andes.

RPS now builds replicas of these so-called Fangio Coupes, closely following the mods carried out by the great man himself. Starting with a standard Chevrolet coupe, the bodywork is stripped back to bare metal using shot blasting. The bumpers and the running boards are removed, the wings are cut back to a minimum and the hefty steel boot lid is replaced with a fabric skin stretched over an aluminium frame. Combined, these mods help to shed a substantial amount of weight, although much of it is eventually put back in one way or another.

Most of the Master Coupes left the factory with leaf springs. A few did come with coil springs, but RPS prefers to convert them back for durability. Following Fangio's lead, the hefty front and rear bumpers are actually replaced by leaf springs, carried as spares. RPS also makes its own up-rated shackles and mountings to help cope with the ferocious pounding these cars have to withstand.

A lot of the pre-war cars didn't come with dampers originally, but RPS tends to to fit their own bespoke telescopic units, valved to specific requirements. This usually involves a degree of chassis fabrication, while the areas around the mounting points are also beefed up to cope with the increased loads.

"We shipped 24 clients' vehicles out to Peking for this year's event and none of them had any major suspension issues. A lot of the other teams were coming out the desert with no shock absorbers left, having used all their spares," comments Ayris.

Unlike the predominantly-tarmac events in Europe, out here RPS often fits mud and snow tyres. Careful wheel choice is also important and the teams tend to favour commercial tyres, because of their sturdy construction, using inner tubes so the pressure can be reduced right down for desert driving.

Everywhere you look things are built to last. RPS generally fits twin tanks with independent fuel systems so the crews can switch between the two. With such long distances to cover, Ayris aims for a combined capacity of 150 litres – usually 90 litres in one and 60 litres in the other. It's not unknown to come across bad batches of fuel in the more far flung regions, so drains are also fitted.

The Fangio Coupes use Chevrolet's 3.8-litre 'Stovebolt' inline six, which was in production from the late twenties to the mid-sixties. In period these produced around 85 hp, but the modern rally engines come in at 130 to 150 hp. It is possible to get even more out of them, although RPS tends to err on the side of caution. The engines are meticulously rebuilt with a set of period carburettors and some mild head work, which livens up the performance while preserving durability.

The RPS cars come with two independent ignition systems that use a specially developed 'plug and play' system to allow them to be swapped very rapidly between cars. As with any old car, the electrical system needs particularly careful attention and the Fangio Coupes are all supplied with brand new, custom built looms. ▶

"You have to be mindful of things like copper HT leads and magnetos because they create a massive amount of radio interference. With all the electronic instrumentation that most of the competitors like to have it can give all sorts of issues, so we tend to use silicone leads and points ignition," says Ayris.

WATERLESS COOLANT

Not surprisingly, temperatures can get pretty hot on some events. RPS's fresh builds all come with new radiators, running on rubber mounts to prevent cavitation. In a lot of instances the teams also use waterless coolant, such as Evans. This substantially raises the boiling point, providing effective cooling at higher temperatures, which can improve performance as well as reliability.

"Another bonus is that the waterless coolant runs at much lower pressures, placing less stress on the hoses and components," Ayris explains. "That means the system is less likely to fail and you tend to get a steady drip rather than a sudden rupture if things do go wrong. You can always top it up with normal water too. One of our clients won an international rally despite a water leak, because he was able to manage it with waterless coolant."

It's also useful at high altitude he points out: "Most rally organisers will send you up a mountain at some point, which causes the boiling point to drop. That's not a problem with waterless coolant, though, because the boiling point is so high. The first time we tried it was on a South American event across the Andes and our two cars kept going up the mountains while everyone else boiled over."

Navigation is, of course, another highly specialised area. For the HERO events most teams use a rally trip meter, which displays total distance and intermediate distance to a very high degree of accuracy. These measure the rotation of the speedo cable, the propshaft or the wheels. Most now use Hall Effect sensors, which means they can operate independently of the original (and sometimes rather dubious) speedo drive.



Photos: ERA

ABOVE & BELOW Contrasting challenges: the 1936 Ford Cabriolet of Jeff Urbina and Chris Pike on the Flying Scotsman (above) and the Datsun 240Z of Mark Pickering and Dave Boddy tackling the Peking to Paris

> **"A client won a rally despite a water leak, because he was able to manage it with waterless coolant"**

Multiple sensors increase accuracy, with some of the more serious teams placing six sensors on a wheel.

For the longer distance events a lot of crews prefer to use GPS-driven trip meters. "Their accuracy is more than adequate for those events and they're very straightforward," notes Ayris. "A lot of people are now going over to using mapping on electronic tablets too, so we make sure all the fittings and charging facilities are there."

Preparing the driving environment is also very important. Comfortable seats, a certain amount of exhaust silencing and even simply the space to put maps and other equipment can make life easier when the crews are in them for five weeks at a time. RPS also removes any fabric headlinings and replaces them with vinyl to reduce dust build up, along with removable matting in place of the carpets.

Once the car is prepared there's also the crew to contemplate. Ayris advocates packing light: "You need to prioritise what you pack in terms of spares and tools. Weight is a killer on all of these events. You can live with a faulty starter motor or alternator, but you're absolutely scuppered if you break a half shaft in the middle of the desert."

In between the regularity sections, events such as the Peking to Paris still feature tests, which means the cars can be up to their axles in mud or sand one moment and then on full opposite lock around a racetrack the next. It's all utterly, gloriously mad. And all the better for it. HRT

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ABOVE The Vixen has been given a new lease of life with a 750 cc Triumph Bonneville engine

KEEPING THE FLAME ALIVE

The series may be long dead and the cars few and far between, but there remains a loyal following for them as **William Kimberley** reports

EVEN back in the day in the mid-1960s Formula 4 was a brave move. At a time when motor racing was spreading its wings and enabling youngsters to go single-seater racing without breaking the bank, Formula 4 just did not make the grade. Perhaps it was because it had set its sights too low – initially it had been conceived as a formula for 250 cc Villiers two-stroke engined cars – and so was seen as a glorified go-kart rather than as a stepping stone into singe-seater racing.

At the same time, it failed to attract a major sponsor or backer. When Ford turned its attention to capitalising on its success in Formula 1 with the Cosworth DFV by putting its muscle into Formula Ford in 1967, the writing was on the wall for Formula 4, although it did take a few more years to expire. By this time, the series had gone to 650 cc motorcycle engines, ending up with the 1,000 cc Imp engines from the Rootes Group. The cars that have survived the 50 years are rarely in original condition as they have been used in hillclimbing, sprinting, grass racing and everything in between.

As the owner of a 1966 Vixen that had been specifically built for Formula 4, the last 30 years have been a learning curve for Sean Mooney.

He had no intention of buying the car when on a trip to London in 1986, but an advert in *Autosport* caught his eye that made him go to the Straight Six showroom that was selling it.

"I had no idea what it was," he says, "but it looked to be more or less in one piece and was such a pretty car that I just had to buy it."

The deal done, the car was transported back to Mooney's when he really started to take a look at what he had bought. Being Formula 4, and before the advent of the Internet in wide usage, there was little to no information on either the car or the series. It was still in its original 1966 condition with a 650 cc BSA engine, front drum brakes with a single rear disc brake and the fuel tank integral with the seat.

One thing that Mooney did know, though, and that was the 650 cc BSA engine had to go. There wasn't a race

series for old Formula 4 cars nor any class anywhere that accepted them, so he had no worries about installing a 750 cc Triumph Bonneville engine in its place, especially as he had decided to go hillclimbing, where there weren't any restrictions, with it anyway.

"My only real concern was the BSA engine so I replaced it with the Triumph Bonneville which I thought would be more adaptable, tuneable and easier to get bits and pieces for."

However, although he was very uncomfortable with it, he kept the configuration as it was which meant that his legs stuck out in front of the front axle. "I really didn't like this at all but as I was only hillclimbing with it, I accepted it."

While having some fun hillclimbing, he soon became restless. "A lot of effort for too little result," as he terms it, so the car went into storage. By the time it re-emerged 10 years later, it needed another rebuild, but this time Mooney had circuit racing in mind although there wasn't a class for the car at the time.

It was consequently stripped down, the chassis powder-coated and the engine rebalanced. The fuel system was redesigned with the help of Jedi Racing with an aluminium tank between the driver and engine. The wheels were also replaced with light alloy wire wheels, appropriate for a 1966 car, Turrino Wheels designing and making up the 10" front and 13" rear wheels.

There was no race series for such a car, but the 500 Owners Association was gracious enough to allow it to run in its race series in the invitation class. However, it was a traumatic return to the track.

VIBRATION WOE

"We tested and ran the car only to suffer constant ignition/electrical problems," says Mooney. "The engine/gearbox is solidly mounted and vibrates, so we tried the standard systems but they did not overcome the problems. This led us to go to Racetech Developments which designed a control system that will run the engine despite the vibrations."

While the car has only had a few outings since that time, it has enabled Mooney to discover likeminded Formula 4 enthusiasts to share information and experiences, the only source of information being back issues of *Autosport* and a long-dead magazine called *Motor Racing*.

Formula 4 may be just a footnote in the history of the sport, but with cars like Mooney's Vixen, albeit no longer in original condition, still running, it still keeps the flame alight for what would be a long forgotten formula. HRT

High hopes

"FOR its first time out in serious competition at Brands Hatch it performed amazingly well. In fact it handled so well that I was able to pass Formula 3 cars on the outside at both Druids and Clearways, places where one normally doesn't think about passing. I'm even more convinced now that it's possible on a dry day to get around the Kentish circuit in under the minute in a Formula 4 car."

Nick Brittan, April '67, *Motor Racing* magazine.







ABOVE & BELOW The Vixen has been stripped down, the chassis powder-coated and the engine rebalanced

Old guard faces up to new threats

There is a fine line between fuels and lubricants that increase performance and those that cause more harm than good, as **Seb Scott** discovers

IT requires a wealth of experience to determine the correct fuel and respective lubricants to pair with historic racing machinery, with different factors to assess and consider.

"We have over 35 years of racing experience which is constantly growing as we're still racing," claims Fluids In Motorsport founder Ian Jacobs. "We've always respected a team's right to not disclose its usage of the products that we offer. From our point of view we keep a team's usage a closely-guarded secret as it might not want its competitors to know what is and isn't working for them.

"Gone are the days when the lubricant of choice was to run your car on Castrol R40 or a mineral 20/50," says Jacobs.



ABOVE The ethanol in modern fuels can cause in-cylinder corrosion

"Not only have things moved on, but now manufacturers are blending race oils removing impurities. They are starting with better base oils and adding more detail such as ZDDP, creating more bhp and, vitally, more protection. Yes, we still offer Castrol R40 – you can't beat the smell of that at a race meeting – and various mineral 20/50s, however the question is where do you start? We offer over 16 different manufacturers of engine, gearbox or differential oils.

"In 2017 manufacturers are still producing some favourites, such as Valvoline's VR1 racing 20/50. Morris Lubricants is getting more heavily involved with motorsport now and the company is launching a very high specification brake fluid, a competition 20/50 mineral and two synthetic race oils under its MLR brand. New viscosity oils are always being launched and we will be stocking as many as possible that are relevant to racing."

It can often be the case that the ideal engine oil is from a different manufacturer to that which is suited to the gearbox and also differential. With a wide selection under one roof, Fluids In Motorsport offers savings on carriage and can also provide greases, fuel additives and other related products.

Some historic cars are still using leaded fuel, however others now utilise unleaded fuels which then need additives in order to work to their full potential. "For race purposes we have a number of types, the most popular and well known being a competition valve lubricant containing some octane booster which is also FIA-approved," says Jacobs. "Despite an engine's age, ▶



ABOVE The Fuchs Titan Race range operates in many disciplines



ABOVE Torco's SR-1R, stocked by Fluids In Motorsport, is currently a popular synthetic oil with the historic racing community



ABOVE Morris Lubricants has released a new brake fluid under its MLR brand

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whether it is from the ‘50s, ‘60s or ‘70s, it is not mandatory to use a mineral oil of a 20/50 viscosity. In fact, today’s modern equivalent 50 weight multi-grade synthetics will last longer between changes, saving money in the long run. Thanks to never racing on a cold engine, running a 15/50 or 10/50 can help with the oil being thinner; at cold temperatures it will be able to get around the engine quicker and not strain the oil pump when temperatures have increased as it’s still a 50 weight. Furthermore, a lighter viscosity will give more power in a lot of instances. We took one of our cars to the rolling road and with just a lighter oil swap, it increased the power band as well as the power itself.”

Jacobs highlights one area of concern that he believes is commonly overlooked but is of paramount importance: “Whenever discussing fuels and lubricants I think it’s very important not to forget brake fluids, which these days have very high dry boiling points. It’s not even worth considering DoT 4, as brake fluids depend on the weight of the car, calliper size, type of racing and indeed the use of slick or road tyres. The best thing to do is actually ask a supplier or specialist about a recommended fluid for your application, which is something we would do to help with pre-season preparations.”

‘CLEANER’ BUT HARMFUL

Modern fuels can actually be incredibly harmful to a lot of historic engines, despite actually being ‘cleaner’, with or without higher octane levels. All modern car engines heading to the UK since 2001 have been designed to factor in the use of bio-components in fuel such as ethanol. The problem with using modern UK pump fuel in historic engines is that the fuel system and the engine itself haven’t been designed around using ethanol. Rubbers, plastic, aluminium, copper and bronze are commonplace in a pre-2001 fuel system, all of which react with ethanol. Metals in particular are subjected to the adverse effects of ethanol, with pitting a common symptom thanks to the ability of ethanol to break down the natural oxidation layer of the metal.

“Anglo American Oil Company has supported historic racing with its on-track pump fuel system and has developed three low lead race fuels which ensure issues caused by modern ▶



ABOVE Anglo American Oil Company’s fuels and lubricants trackside support set up, seen here at the Goodwood Revival

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forecourt fuels are totally avoided," explains Anders Hildebrand, managing director of Anglo American Oil. "The R4SR+ and the R5SR+ are low lead and ethanol-free. The R4SR+ is aimed at MSA-sanctioned events and the R5SR+ is for classes running to FIA fuel regulations allowing a higher octane (102 RON). Both are oxygenated with MTBE which improves the cleanliness of the combustion by releasing oxygen from the fuel during the combustion cycle. The R6SR is only designed to protect high compression engines from detonation: it is not oxygenated but has a higher level of lead (TEL) for engines without hardened valve seats."

Anglo American has built in an increased level of fast-burning single hydrocarbons for the R4, R5 and R6 to counteract the slow-burning effects of TEL. An added bonus is that the single bonded hydrocarbons are very easy to break during the combustion phase, meaning these fuels can run at a higher combustion ratio than regular pump fuel.

Not only is Hildebrand proud of the extensive range of historic racing fuels developed by Anglo American, he is passionate about the great lengths that the company is going to in order to deliver an oil of the same calibre. It has been working with Driven Racing Oil since 2004 and demand is increasing.

Hildebrand points out that incorrect lubricant application could impact on performance more so than miss-fuelling: "One thing that is for sure is that if you have a tuned US V8 with a high lift cam and you use off-the-shelf API SN oil, you will find that the camshaft will be worn out in no time at all.

"Driven oils do not meet any standards (as they restrict what can be done to the oils) and therefore can offer a much more interesting design than A to B oils. It is a general misconception that the latest API or ACEA standard means that the higher rated oils are better than those with an older spec. Nothing can be more wrong when it comes to oils for race engines. API and ACEA rated oils are designed for temperatures that are under control, part throttle mostly used and mild camshafts and valve springs.

"The Driven oils are high in ZDDP and will be able to take much more heat before the viscosity additives break down, meaning race cars can use thinner oils than normal with less internal friction and a cooler running, happier engine. ZDDP clings to the metal and it fills every little valley and gap to ensure that surfaces are smooth and strong to take the point to point loads. API SN oils have a typical level of 650 ppm of ZDDP, whereas you need at least 1,300 ZDDP in a race engine.

"Long service intervals mean that there are lots of detergents in the oils, so anti-wear additives such as ZDDP have to be kept low. The detergents are needed to keep the engine from 'sludging' because of high levels of soot, carbon and fuel. As most anti-wear additives are also polar molecules, they also want to stick to the internal surfaces of the engine that are already highly populated by the detergents. The result of this is that the detergents want to wash away the anti-wear additives that stick to the surfaces to protect the metal when the oil film is not 100%."

Another important factor is the ability of the oil to dissipate heat. "Driven is using a new type of base oil called mPAO (not PAO) which has a viscosity index (VI) of close to 200," notes Hildebrand. "A normal mineral oil has a viscosity index of 100 and good quality synthetic oils around 135-150. The higher the value means that the oil doesn't thin out as much under increased temperatures, reducing the need for more viscosity modifiers having to be added." HRT



ABOVE Driven Racing Oil's XP9 is in demand as a fully-blown synthetic oil



ABOVE & BELOW An example of a lifter and cam worn due to a lack of zinc in the engine oil

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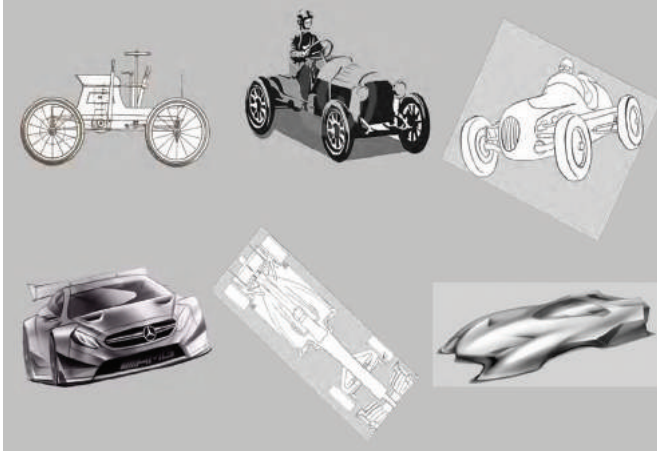
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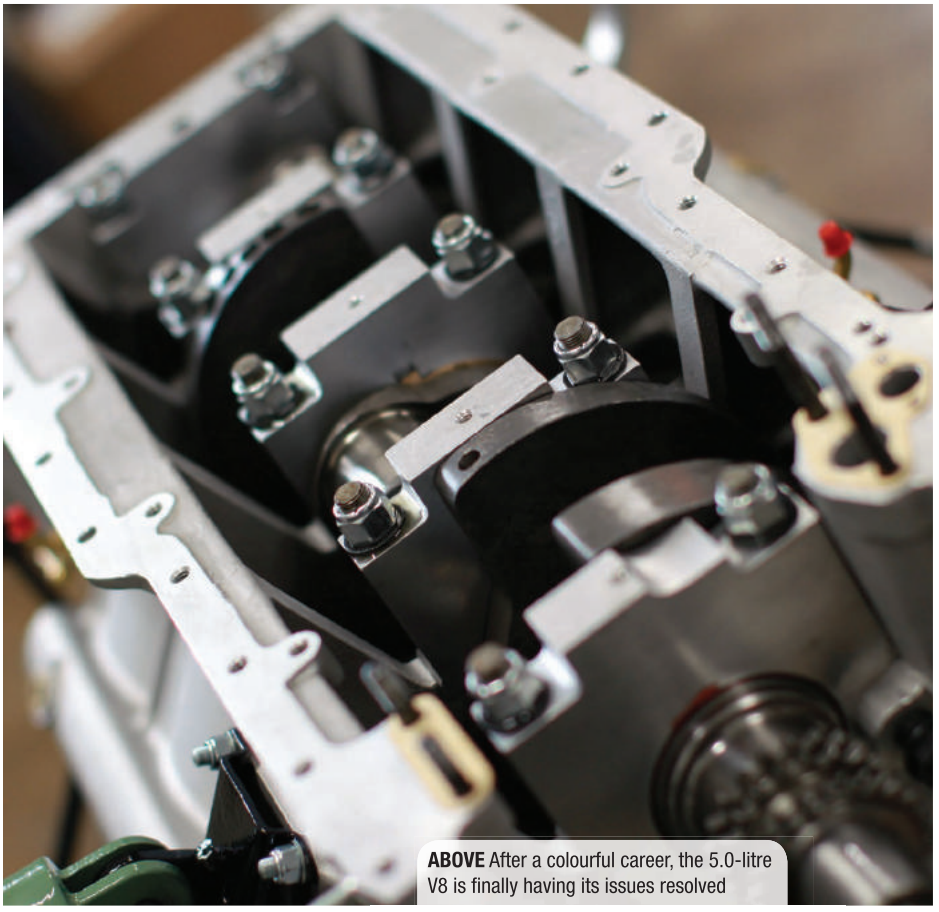
Prototype problems

William Kimberley discovers a prototype engine that had a poor start to life but years later is about to be brought back to life

ASTON Martin engine designer Tadek Marek has been listed in the top 10 of greatest engine designers alongside the likes of Vittorio Jano, Ed Cole and Keith Duckworth. He is hailed for the DBR2 inline 6-cylinder 3.7-litre engine that first saw the light of day in 1956, powering the Aston Martin DBR2, before being found nestling under the bonnets in slightly modified form of the DB4, 5, 6 and DBS. Following customer demand, he then went on to design a 5.0-litre V8 that first entered production in 1969 and powered a succession of models until 1989.

For all that, though, there was a severe learning curve when it came to V8s. While there was experience aplenty in North America, the engine configuration and expertise in designing and building one was lacking when it came to the UK. That, though, was never going to stop an engineer like Marek.

Given the green light and encouraged by the marketing department, he went ahead and produced a couple of prototypes. They were engines that should have been kept well out of the public gaze while being worked upon, but wound up powering a couple of Lola T70 Mk IIIs for Team Surtees in 1967. The trouble was that it proved to be a disaster. The cars were quick but the engines were extremely fragile, and really not yet fit for purpose, insufficient wall stiffness leading to cracks developing around the main bearing and cylinder walls. One car completed only three laps and the other 25. John Surtees' misery was compounded when he was told the breakdowns had occurred because he was using the wrong spark plugs.



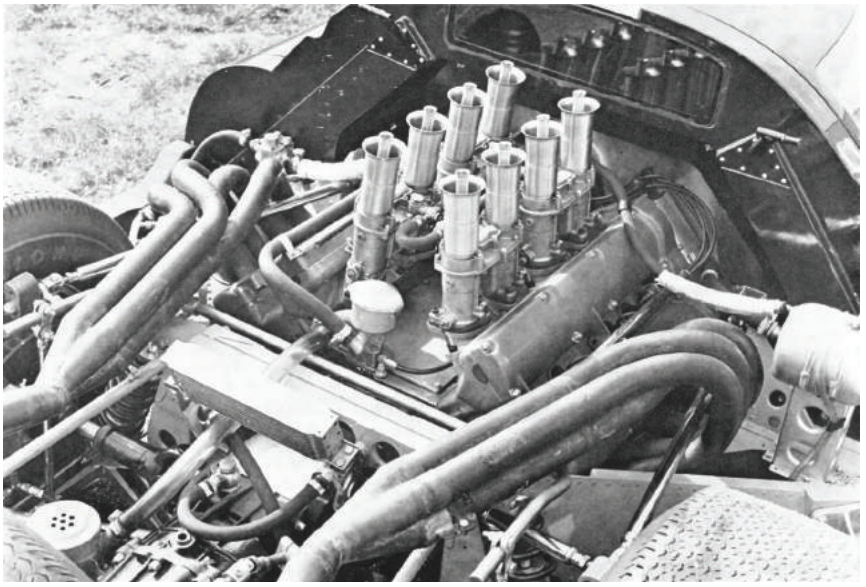
ABOVE After a colourful career, the 5.0-litre V8 is finally having its issues resolved

DISGRACE

Engine V500/002/P is one of those units, the 002 referring to the fact that it was the second prototype which was returned to Newport Pagnell in disgrace. However, that was not the end of the story because it found its way to Robin Hamilton Motors, the Aston specialist, that was developing a race car based on the DBS V8 that was eventually taken to Le Mans, albeit not powered by 002.

It then re-emerged in the late '70s when it appeared in an auction organised by Robin Hamilton that helped raise funds for its Le Mans campaigns. It then turned up in the hands of Dave Preece, who had partnered with Hamilton in the Aston Martin RHAM/1 in 1977.

A dentist by trade, Preece still had ambitions of racing at Le Mans and set about building his own car, the Gipfast DP/801/H that was powered by a mid-mounted Aston Martin V8 in 1980. However, it was badly damaged after its first race of the season at the 6 Hours of Silverstone and was not repaired in time for Le Mans, which led to the creation of the DP/812/H the following year, still with the same engine. Again bad luck was to befall it when it crashed out of the 1000 km at Brands Hatch in the first race of the season in 1982, killing off its Le Mans aspirations once and for all. After a series of owners, the car was acquired by the Hipwell family in 2000. In the meantime, Preece had offered 002 for



LEFT The Aston Martin V8 seen during trials for the 1967 Le Mans 24 Hours. The event proved a disaster, with the engine failing after just short runs

> **“The prototype was returned in disgrace”**

sale after he had found one of the Lola-Astons in Sweden.

Fast-forward to today and 002 is now in the hands of Warren Heath Engineering, which is based in Warwick, and in a sense has come home. Warren Heath himself has had a long career in engine and powertrain engineering. Throughout the ‘90s he worked at Prodrive developing and building the Subaru WRC engines that powered Colin McRae to World Championship glory, while prior to that he served at Aston specialist Oselli. He also worked building historic Grand Prix and sports cars after having served a traditional apprenticeship at an Aston Martin specialist.

GROUP C REBIRTH

Initially his company specialised in preparing historic race cars for private collectors. There were regular class wins in Aston Martin Owners Club racing, which led to greater things with the team preparing and running a Spice Cosworth SE89 at the rebirth of the Group C race series, securing multiple class wins both in Europe and in the US. The company has since carried out development and production contracts with vehicle manufacturers Mitsubishi and Mazda and has also provided specialist engine engineering services to Prodrive and TWR.

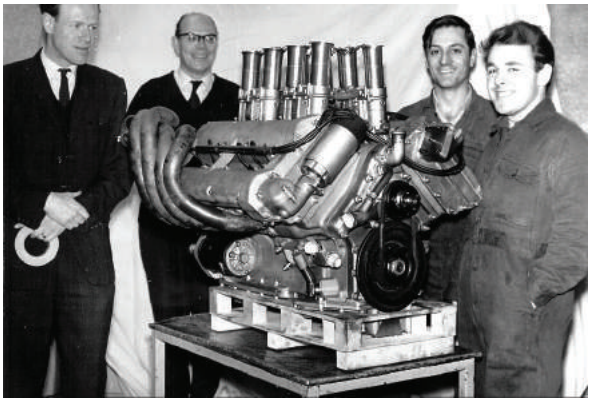
With Aston Martin running through his veins as a third generation owner/enthusiast – he was brought up to clean the wheels of his grandfather’s race cars at the age of eight – James Hipwell joined Warren Heath Engineering as senior engineer in 2014, with one of his jobs working on 002 that had come into the family possession some years earlier. The original intention was to install it into a race car, but after the idea was ditched, it was shoved into a corner of the family’s metal spinning factory where it sat gathering dust.

Now having got to grips with the engine professionally, James can see where its problems are at first hand. “We can now see why this engine had issues,” he says. “Marek had designed it using many parts that were used in the 6-cylinder cars. The head studs, valvetrain and cam profiles are identical to the 6-cylinder engine, probably to keep development costs down. They used poorly located steel main bearing caps which fretted on the aluminium block. The exhaust ports are also much larger than the inlet ones, which is unusual, and flow bench testing shows this didn’t work. The block and head castings are also missing major strengthening webbing, which is present in the production castings.

“In fact the 5.0-litre was well suited to racing due to its relatively short stroke, but the insufficient integral strength of the castings, coupled with crankshaft balancing problems, were the cause of the catastrophic failures. Balancing a V8 crankshaft is a different procedure to an in-line setup and involves fitting eight bob-weights to the big end journals, the mass of which are calculated by applying a formula to the combined mass of the connecting rod and piston. It is understood that the Aston Works was altering the capacity and compression ratio, but the increased mass in balancing the crankshafts was not taken into sufficient account.”

“We use the same dynamic balancing specialist who sorted these problems out at the factory at the time,” says Heath. “It’s widely known that the vibration in the engines was causing cracking to the blocks, crank and conrod failures and crankshaft dampers flying apart.”

The engine is now entering the final phase of its extensive rebuild in time for it to be put on display on the Aston Martin Owners Club stand at the Classic Motor Show at the National Exhibition Centre in Birmingham in November.



ABOVE Far from being shielded from the public gaze while it was being developed, the prototype was thrust into the limelight

Finally, an intriguing part of this story comes from Holland where specialist model maker Wim Van Vlasselaer has taken a total of eight years to build a 1:12 scale model of this actual engine. Much of his build was centred on photographs he compiled through extensive research. His work has been crucial in helping to piece together the history, his photographs clearly depicting the different induction systems with which this engine has appeared. HRT



ABOVE & BELOW Discovered in a barn, this rare Lister Jaguar Mk 1 was completely restored and handed over to new owners Simon Lewis and Guy Conew

Keeping historic race cars on the straight and narrow

William Kimberley reports on the chassis alignment technology proving vital to a well-known classic car restoration company

PART of the CL Group, CL Classics is a classic car restoration and sales company based in Braintree, Essex. Formed in 1970 by historic race car driver Les Ely, CL Classics has been responsible for the repair and restoration of many famous historic vehicles.

As any classic vehicle owner knows, immaculate bodywork, interiors and mechanics count for very little if the vehicle chassis is misaligned; this is where history and technology combine.

In addition to on-premises paint mixing and three bake ovens, including one very large commercial oven, CL Classics uses chassis alignment technology which works based on original manufacturer specifications. As Jaguar specialists, this includes Mk1, Mk2 and E-Types.

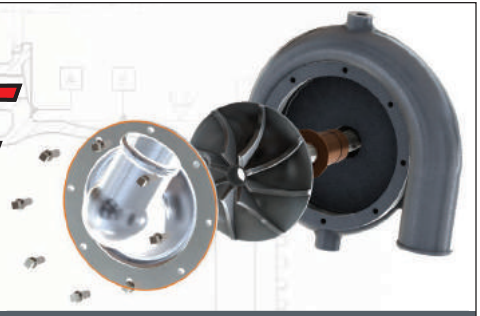
The chassis measuring system used by CL Classics can locate vital alignment points on every model of car, not just historics. The system accurately – to the nearest half-millimetre – measures length, width and height, with measurements taken from the manufacturer's datum line. No mechanical parts need to be removed and no potentially damaging clamps need to be used to hold vehicles in place. With such a precise diagnostic tool, CL Classics can identify any chassis twists or problems and repair them. Once a chassis has been checked and repaired if necessary, additional technology takes care of four-wheel alignment and steering geometry setups.

Historic race vehicles entering the CL Classics workshops are checked, a recent example being the well-known Justin Rocket E-Type Jaguar. On checking it out, the mechanics found the chassis alignment required no correction, which considering the historic car had been raced all over Europe was a welcome surprise. This particular car is now being prepared ready for sale.

CL Classics is often asked by clients to sell cars on their behalf, often once checks and services have been carried out. Currently the cars being sold include a famous Cadbury's Boost-sponsored early narrow grille Jaguar Mk1 and a 1968 left-hand drive Jaguar E-Type. HRT



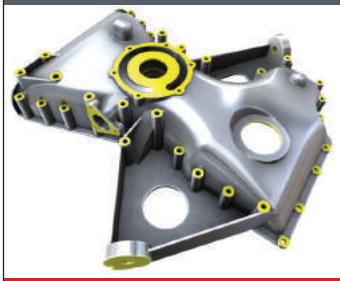
PERFORMANCE PROJECTS

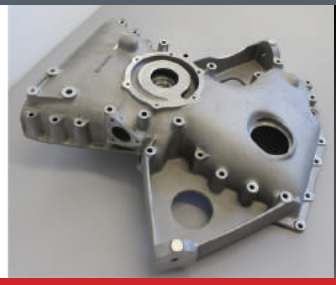


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Gearing up for success in 2017

A manufacturer of bespoke gearing components is branching out into the classic car sector. **Sophie Williamson-Stothert** reports

SINCE 1945, Scottish firm Northern Tool and Gear (NTG) has been producing high quality gearbox components at its site at Arbroath in Angus.

Its committed 50-strong team of engineers produces gears, shafts and bevels on the latest CNC machinery to the highest quality standards. It is one of the only subcontractors to own an onsite heat treatment facility ensuring it has total control of all facets of the production process.

ISO registered with more than 70 years of service, NTG supplies parts into all facets of industry including renewables, mining, marine, oil and gas, printing, material sizing, motorsport, quarrying, pumps, steel processing, defence and railways.

Following the rise in the use of classic cars both on and off the race circuit, the firm has decided to use its specialist knowledge to produce small volume gears, transmission parts and high quality gearing replacements, which are no longer available from the original manufacturer.

NTG also offers shot-peening of teeth after lapping, using an accredited aerospace supplier, while specialist surface treatments and coatings are also available to prevent wear and improve the life of parts.

Noticing a gap in the market to provide quality components for classic racers, the firm is manufacturing hypoid crown wheels for several popular models from the humble Ford Anglia to the more exotic Jaguar E-type. It provides either stock sets of various ratios or bespoke production of specialised ratios for any brand. HRT

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BEHIND THE SCENES

William Kimberley reports on a company using modern design tools for all types of vehicles in historic motorsport

PERFORMANCE Projects specialises in design, development and parts supply for contemporary motorsport, niche vehicles and historic cars.

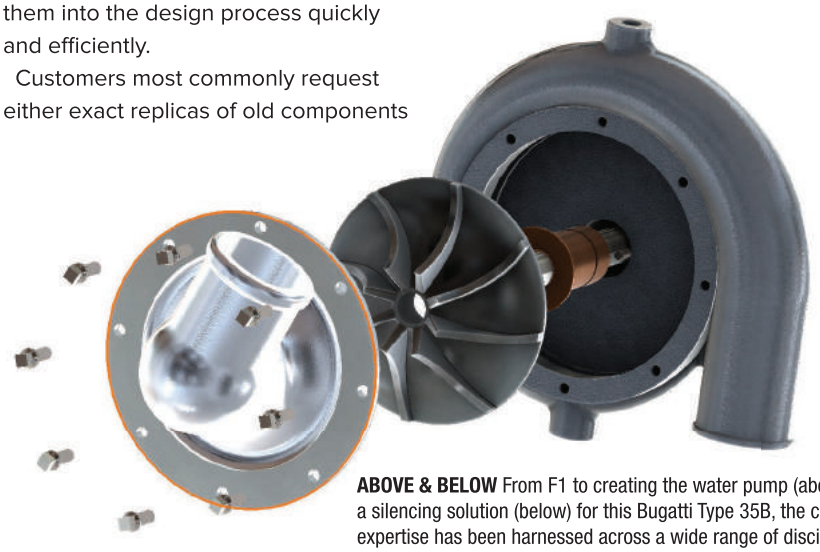
Working discretely behind the scenes, Performance Projects supports many well-known historic car preparation and parts suppliers, undertaking the design work, engineering analysis and component supply to provide the parts its customers need. The use of computer-based design also opens up the range of suppliers, increasing component quality and driving down the cost and lead-time.

The team of Performance Projects engineers have proven backgrounds across chassis, suspension, powertrain, interior and bodywork design, meaning that they cover almost all areas of the car. Since forming six years ago, they have designed for a wide range of marques and periods, ranging from pre-war Bugatti to the current GT Jaguar.

Performance Projects has recently expanded through its membership of the Silverstone Metrology Network. Co-located at Silverstone Circuit, and backed by Hexagon Metrology, the facility offers the very latest in Co-ordinate Measuring Machine (CMM) and laser scanning capabilities. The facility is unique, keeping the hardware updated to the Hexagon flagship products on an ongoing basis. This enables Performance Projects to take any existing items, whether it be a single part or a whole vehicle, and include them into the design process quickly and efficiently.

Customers most commonly request either exact replicas of old components (supplying a variety of used pieces, drawings, images and/or photos) or a unique variant on an original theme. It is rare that a request for a variation from original is performance-orientated. Instead, such updates usually take the form of a core reliability improvement, for instance by addressing known weak points in castings or including modern bearings and seals to replace less reliable originals. In some cases, particularly in classic cars from the 1960s onwards, customers would like to add some modern functionality whilst strictly maintaining the period look and character. Whether or not any donor pieces exist, the new components are designed and manufactured to be sympathetic and in-keeping with the original vehicle.

Performance Projects therefore supports historic car marque specialists with a range of high quality engineering services, from bespoke component design to whole vehicle parts supply. HRT



ABOVE & BELOW From F1 to creating the water pump (above) and a silencing solution (below) for this Bugatti Type 35B, the company's expertise has been harnessed across a wide range of disciplines

Mission accomplished

TIGHTENING noise restrictions can be a real problem, not only during races but also during testing.

Take, for instance, the 2014 Mission Motorsport charity day at the Goodwood Circuit – a great cause and a supportive owner. Unfortunately, however, due to tight noise limits and only bolt-on systems for noise suppression, the day was to end before it even started. Mission Motorsport's Bugatti T35B was unable to run on track after failing the noise test. This was an embarrassing and frustrating position for owner, driver and charity passengers alike.

Following the incident, Performance Projects was commissioned to design, test and supply a new exhaust system. Utilising its design capability, alongside noise suppression experience gained on previous projects, a low profile, low back pressure silencer was developed. This helped to maintain the original character and performance of the vehicle, while achieving the required noise reduction.

The result? Success all round: a happy owner able to enjoy the car in the widest range of events, while free from concerns of breaching noise restrictions. HRT



Masters HISTORIC RACING



2016 EVENT CALENDAR

APRIL	09 – 10	Zolder, Belgium	Masters Festival
MAY	28 – 29	Brands Hatch GP, UK	Masters Historic Festival
JULY	02 – 03	Donington Park GP, UK	Masters Festival
	29 – 31	Silverstone GP, UK	Silverstone Classic
AUGUST	12 – 14	Nürburgring, Germany	Oldtimer Grand Prix
SEPTEMBER	02 – 04	Zandvoort, Holland	Historic Grand Prix
	16 – 18	Spa-Francorchamps, Belgium	Spa Six Hours
OCTOBER	15 – 16	Jarama, Spain	Espiritu de Jarama

PLUS TWO NEW ENDURANCE RACES FOR PRE-66 CARS IN THE USA

NOVEMBER	10 – 13	Daytona International Speedway, USA	Daytona Historics
DECEMBER	01 – 04	Sebring International Speedway, USA	Sebring Historics

Correct at time of going to press. Dates and venues may be subject to change.

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Bespoke damper solutions

BILSTEIN UK is now able to offer its bespoke damper solution services to restorers and race teams, offering an OEM-level product to fulfil the owner's wishes.

The firm's technical division is well known to Europe's car manufacturers and armoured divisions.

Deep within the firm's Leicestershire HQ, clients such as Ariel, Lotus and Caterham avail themselves of the company's unparalleled engineering facility for niche and low volume production lines.

Not quite as well known, however, is that the same team's skill sets are available to private individuals, restorers and race teams.

If you're looking to create an uprated solution for a cherished classic, trying to create a coilover conversion for a race car, or simply wanting to add an adjustable ride-height to a platform that never had one, Bilstein can hand-craft dampers to OEM quality.

In each case, Bilstein will re-create damper tubes from scratch, using the precise architecture of the original part. After this, any additional options or upgrades, such as steering arms and brake line guides, can be added. If the new design needs to incorporate a top mount of threaded body to allow a greater range of adjustment, these too can be incorporated into the design to allow for performance vastly beyond the abilities of the original suspension.

As you might imagine for a fully tailored service, this solution costs a little more and takes slightly longer than Bilstein's "off the peg" damper solutions, but like any bespoke item, offers a level of fit and finish that will outperform any production aftermarket item.

This is the solution for those discerning owners looking to cater for a rare or unusual fitment, or for those seeking to create a result not possible with commercially available parts. HRT

New GaugePilot range breaks cover

AFTER two years of competition in the most gruelling and prestigious motoring events around the world, the GaugePilot instrument has been refined and extended to match the needs of the classic and historic motorist on the road, rally, or track.

GaugePilot, a trademark of Hambly Industries Limited, has added four different models to its new portfolio. Three target the active competitor, while the fourth is aimed squarely at the casual classic vehicle owner.

GaugePilot might look like a traditional tripmeter but it's the ultimate in legal navigation equipment. With a crystal clear, non-reflective LCD display, the GaugePilot is a rally computer with multiple easy-to-use software applications. Dimensionally identical to a SpeedPilot of the 1950s, it looks the part at any historic event.

The setup, calibration and use of a GaugePilot is simple, enabling the user to easily switch between Kilometres and Miles, different tyre sets and between wheel sensors.

The competition range comprises of the Clubman, Rally and Rally Pro. All models feature the GaugePilot Vehicle Protection System providing reassurance with accurate engine monitoring and warnings.

Tested across more than 10,000 miles, the GaugePilot device has been used in some of the world's premier classic rally events, including the Rallye Monte-Carlo Historique, Mille Miglia, Trans America Challenge, Icelandic Saga, Classic Marathon and the Tour Ireland.

The Clubman is a rally focussed instrument to start you pushing on through the stages of any history rally and, like all GaugePilot models, approved for use by all top rally organisations.

The Rally offers a broader GaugePilot experience including additional navigator aids over the Clubman model, datalogging to help improve your performance, vehicle service reminders, and the full suite of gauges and engine data sources including support for external wideband lambda sensors.

Meanwhile, the Rally Pro is regarded as the "instrument of choice" for complex events such as the Mille Miglia and Targa Florio. Its unique Farina application allows pre-entry of stage information and controls the driver's dedicated information display reducing the stress in the cockpit and improving results.

The Classic model shifts its primary focus over to the Vehicle Protection System, with modern engine sensors providing digital accuracy for all gauges and the 4.3-inch colour LCD display presenting the information as traditional analogue gauges; with anti-reflection coatings making the super-bright screen clear to see in all lighting conditions. The Vehicle Protection System can pre-empt a car breakdown or full-on failure potentially saving you from an expensive repair bill and meaning you stay safer on the road. HRT



ABOVE With a crystal clear, non-reflective LCD display, the GaugePilot is a rally computer with multiple easy-to-use software applications

Keeping it in the family



ABOVE The TB5 is a semi-slick tyre with a narrow-treaded central band

MICHELIN'S TB range was a dominant tarmac rally tyre in the '70s and '80s. The range consisted of the SB, a slick for the dry surfaces, the PB, a full rain tyre, and the TB15, a medium-compound, fully-treaded tyre.

Available in 13-, 14- and 15-inch sizes, the tyres fitted a wealth of rally cars from the Alpine A110 through to the Audi Quattro. Produced in widths ranging from 175 to 335, few rally drivers were left lacking in rubber beneath their arches.

With the demise of Group B, the TB range lost its last obvious outpost and the tyres quietly went out of production. However, the range was reintroduced in 2003 when demand for wide, high-performance tyres for historic road-going rally cars began to increase.

Supplied by Vintage Tyres, the TB of today has the same breadth of sizes and widths that made it so useful in its heyday, only all the tyres in the range are now road legal. This means no need for tinkering between stages or events if the rules dictate, and an opportunity for the tyres to make exciting new partnerships with a range of fast road cars.

The multipurpose member of the TB family, the TB15, features a medium compound with a full-width tread. This tyre is good on dry and damp surfaces and has enough tread depth to manage sufficiently on wet roads.

The TB5 was a new addition to the range in 2003, bringing a blend of the discontinued, full-slick SB with the tread of the TB15. The TB5 is a semi-slick tyre with a narrow-treaded central band. It provides dry-road grip and is available in soft "F" and medium "R" compounds — not front and rear as some "experts" will have you believe.

Although the TB5, like the rest of the range, is predominantly a rally tyre, they do get used on the circuits. Where races are under 20 minutes long, avoiding excessive heat build up, the TB5s have proved to be extremely effective for users.

The PB is an incredibly effective wet-weather tyre. It is limited to just two sizes — 18/60-15 and 23/62-15 – but when these sizes cover dozens of serious race and rally cars such as the legendary Lancia Stratos, Opel Ascona 400 and Ferrari 308, the range is by no means limited.

The TB range uses Michelin's motorsport tyre marking system. Taking the 16/53-13 as an example, the "16" relates to the tread band width of the tyre measured in centimetres. In the case of the TB5, this includes the slick sections either side of the central band of tread. The '53' is the overall diameter of the tyre in centimetres, while '13' is the rim diameter in inches. HRT

The quiet revolution

WHEELS are often one of the first upgrades owners make to increase their vehicle's performance. Wider wheels fit fatter tyres, which inevitably increases grip, while also improving the stance of a road car.

The forces generated under extreme acceleration, vigorous steering and heavy braking have a significant impact on the wheels, often causing them to twist or bend. It is, therefore, vital that they are designed and type-tested to withstand such pressure, while also minimising unsprung weight.

As the manufacturer of such wheels, which are distributed in the UK and Europe by Racetorations, Californian company Panasport has more than 38 years experience in the design and manufacture of competition wheels, using quality materials, special heat treatments and precision machining.

The wheels are powder-coated and finished in a variety of colours including black, blue, British racing green, red, silver and yellow. They are professionally presented with a protective glossy clear-coat finish, while the rims feature micro-machined edges. Every wheel comes with valves and usually with centre caps.

There are single piece wheel applications for historic, classic and modern road cars: the Z-Light range and the Prolites range, which addresses unsprung weight and is highly developed for competition purposes, including multi-stud, centrelock, peg drive and split rims.

Stocks for MGB, Triumph, TVR, Alfa Romeo, Fiat, Volvo, Sunbeam Alpine and Tiger, BMW 2002, Mazda MX5 and Datsun 240Z are usually available in the UK on a 24-hour delivery. Each one has been specifically machined to the optimum offset and with close tolerance centre bores and bolt circles as per car. HRT

More Mini mechanicals

THERE are now no genuine 25 toothed second gears for the classic Mini MPi available. However, the good news is, Mini Spares has tooled up for production of a precise, brand new version of this gear and will have stock by the time you read this.

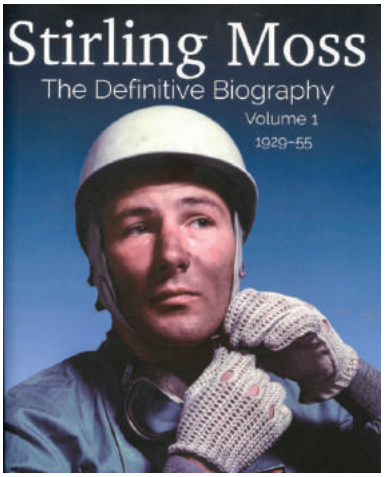
The standard gear can be recognised by the two identification grooves on the 25 main teeth, which will also feature on the brand new version manufactured by Mini Spares. This gear is also suitable for late SPi models.

Mini Spares has also announced that, after a long period of unavailability, it can once again supply injectors for the MPi models that are made from the original tooling and are exactly the same as those fitted to the MPi models when new.

It is now offering Evolution electronic distributors that are specifically designed to match the Mini Spares Evolution cam profiles on modified and updated classic Minis. There are three types available: C-27H7701 for standard to 276 lift profiles up to Mini Spares Evolution Cam MDM276 and the Piper equivalent. HRT

Stirling Moss

The Definitive Biography
Volume 1 1929-1955
Philip Porter
Foreword by Murray Walker OBE
Published by Porter Press International
ISBN 978 1 907085-33-8
672 pages
£35.00



THIS is a book that has to be at the top of the 'to read' list for any student of motorsport history. Despite the many books on Stirling Moss over the years, this looks to be the definitive one; the one that will become a collector's item.

Author Philip Porter has done the well-loved British racing driver proud in his biography. What could have been a dull chronology of events that has been churned out before, is instead a book in which every page springs to life with anecdotes and stories, many of which have not been heard or read before.

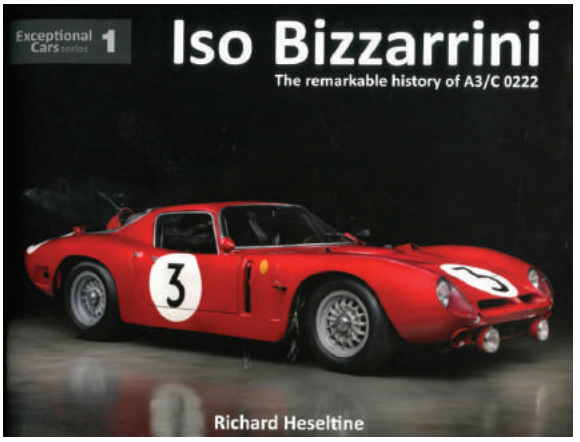
As the book is focused on the earlier part of his life and career, the text is peppered with the likes of Fangio and Ascari, Hawthorn and Gonzalez, among very many others behind the scenes who were instrumental in shaping his life and career, with Moss sharing his views on them as part of the narrative. It shows the enormous amount of research that the author has put into the book, obviously with a large input from the great man himself. Porter has also put right some of the myths and mistakes that have swirled around for too long, while also adding new information into the mix.

The meat of the book is the 625 pages of text supplemented by 15 pages of a bibliography and index, but there are also eight sections of colour plates, which really add to the publication – especially the really early ones that show him driving his father's BMW 328, and racing in a Cooper Mark III at the 1949 British Grand Prix, as well as a Formula 2 HWM and the V16 BRM.

In the supporting blurb for this book, Moss is described as the James Bond of motorsport, something that is hard to deny. As Murray Walker says in his Foreword: "Now read on – you are going to like it." HRT

Iso Bizzarrini

The remarkable history of A3/C 0222
Richard Heseltine
Published by Porter Press International
ISBN 978 1 907085-54-3
128 pages (landscape)
£30.00



WRITTEN by Richard Heseltine, this book is the first in Porter Press International's Exceptional Cars series, the brief being to focus on cars that have an exceptional history and, as the first one, Heseltine's book sets the pace.

For those that don't know, Giotto Bizzarrini is inextricably linked with the Ferrari 250GTO – the Italian engineer and test driver instrumental in developing the car before leaving the company ahead of completion and having been caught up in what has been described as the 'Palace Revolt'.

After leaving Maranello he became involved in a number of projects, including one with Lamborghini, before meeting Renzo Rivolta, who was in the process of setting up a moped business which evolved into a low volume car production company, starting with the tiny 236 cc two-stroke Isetta in 1953. This in turn led to other models, which led to the creation of '222' specifically for racing.

In the chapter dealing with a technical analysis of the car, there are plenty of wonderful in-period pictures of the car being built; men in vests and rolled up overalls beavering away to bring it to life. It also includes a number of modern colour pictures of the engine and the front and rear suspension.

The car was campaigned in 1964 and 1965, its participation in the '65 Le Mans 24 Hours a chapter to itself, the race in which the Rover-BRM turbine car competed as captured in a picture where it is following '222'. There is also another one of it ahead of Claude Dubois/Jean François Piot in their 1147 cc Triumph Spitfire. '222' finished the race in ninth place overall and first in the over 5-litre Prototype class ahead of much more fancied cars. The rest of the book is taken up with chapters on the 200 miles of Zeltweg in 1965, the restoration and revival, among others.

A fascinating book in its own right, it covers a car and everything that surrounds it that not many people will know about and so should be a welcome addition to anyone's library. HRT

Ferrari 512 S/M

1970 onwards (all models)
Owners' Workshop Manuals
Glen Smale
Published by Haynes Publishing
ISBN 978 0 85733 787 0
156 pages
£22.99



THE *Owners' Workshop Manuals* will be familiar to readers of this magazine as we are continually reviewing them, as will author Glen Smale, who is a valued contributor. For anyone who bought the Porsche 917 in the same series, this has to be a compulsory purchase, because the two go hand in hand. However, there are many more reasons to buy this book, not least because the work that Smale has put into it is astonishing. It is full of anecdotes and snippets that catch the eye.

The book follows the usual series format whereby there is a potted history of the 512 story, followed by an anatomy of the car where Smale delves down into the nitty gritty. He looks at the body and design and how the shape evolved, illustrated with some wonderful colour pictures and a cutaway drawing. There is also a section on the chassis and, of course, the 5-litre V12 engine, complete with another cutaway drawing and many more colour pictures. The transmission, steering and suspension, wheels and tyres, the fuel tanks, lamps and lighting and the electrics are all covered in great detail, accompanied by really detailed imagery.

A chapter on the engineer's view of the model is thought-provoking, with Dick Fritz, team manager of Luigi Chinetti's NART team, which ran the cars, providing the narrative. As Smale records, he remembers when the 512S first arrived at Daytona it had a number of issues that were revealed in practice and qualifying. It turns out that the rear suspension had a number of cracks in it, the reason being the factory was slightly overwhelmed in having to build 25 cars for homologations and so took short cuts. This chapter is full of such stories and is worth alone buying the book.

There is also the owner's view, courtesy of Nick Mason, the driver's view that includes comment from Derek Bell and Mario Andretti back in the day, as well as Brian Redman and Mark Hales today, and a 512S and M chassis record. A great book and very good value. HRT

Ferrari 312T

1975 to 1980 (312T, T2, T3, T4, T5 & T6)
Owners' Workshop Manuals
Nick Garton
Published by Haynes Publishing
ISBN 978 0 85733 811 2
164 pages
£22.99



FOR many, the Ferrari 312T series of race cars encapsulates what Ferrari is all about, with the model's early presence in Formula 1 even overshadowing the Schumacher generation 30 years later – Niki Lauda's World Championships in 1975 and 1977 and then Jody Scheckter's in 1979, for example, both running different versions of the car ahead of the bleak years that followed for the Italian thoroughbred. Also add into the mix Gilles Villeneuve's exploits from 1978 and it is easy to see why the 312T is held in so much affection by so many.

At a time when the Cosworth DFV was tending to rule the Formula 1 roost, Ferrari's 180° V12 was a refreshing alternative. More powerful than the Cosworth and more efficient than either the 12-cylinder Alfa Romeo or Matra engine, coupled to the 312T's chassis, it was a formidable combination.

If we think that politics is a modern phenomenon in Formula 1, an interesting aside in the book is that Ferrari's rivals had successfully lobbied for the abolishment of the high airboxes, ostensibly on the grounds of safety but actually because it was believed by some that it would rob the V12 of the 'ram air' effect that helped boost its power. However, it backfired on them because the T2 that consequently emerged actually developed more power due to an uprated compression ratio.

As Garton notes, though, the engine architecture changed very little between 1975 and 1980, although its construction did, and Ferrari's unrivalled expertise in casting alloys to reduce weight really came into its own.

Despite Lauda and Scheckter, many readers of this book will want to read about Gilles Villeneuve and there is indeed a short section on him. In fact, it could have been longer, but at least the book is littered with memoirs of him driving in full attack mode for which he is fondly remembered by many.

A chapter on the 1976 season, when Lauda all but lost his life, is followed by another on a chassis-by-chassis history and then one on ownership and historic racing, which ends with a sub section on picking up a bargain. For those who consider the '70s as the golden era of Formula 1, this is the book for you. HRT



ABOVE Paddy Hopkirk with Henry Liddon in the Mini Cooper 33 EJB

Rescued to roar again



Where are the heroes of yesteryear? **Sophie Williamson-Stothert** investigates the preservation of motor racing icons

YOU may have noticed that there is a new addition to the Historic Racing Technology team in the telltale panel at the front of the magazine, and that would happen to be me – a crazed classic car fanatic with a thirst for petrol.

This means you're going to be hearing a little more from me in the forthcoming issues and I've decided to use this column to flag-up topical industry discussions. So, without further ado, I'm kicking things off by looking into the varied maintenance protocols for historic cars.

It pulls on my heart strings when I see a classic car on its last legs; even more so when I find a truly fine example of a British motor racing legend is destined to meet the same fate through neglect.

I think I've lost count of the number of times I've discovered timeless classics wasting away in an underground car park or, even worse, a fine shell sitting in a museum with nothing to show for itself under the bonnet.

I'm sure you'll agree that when components are left dormant they seize. Much like the human body – if we don't exercise, our muscles begin to weaken. With this in mind, is it not obvious that in order for a vehicle to be preserved, it must first be kept in running order?

Sadly, I've come to realise that not everyone shares this view and it's not always protocol to retain a vehicle's mechanisms. It's no surprise, then, that some of the world's finest historic racers – or at least their ability to fire up their own cylinders – are gradually fading from existence. But there is a margin of hope for at least a handful of iconic racing machines.

This rings true for a personal favourite of mine – Sir Paddy Hopkirk's Monte Carlo Morris Mini Cooper S, known as "33 EJB". Many will have encountered the identical replica, but as many of our readers will know, the real McCoy is tucked up safe and sound in the care of the custodians at the British Motor Museum in Warwickshire.

During the launch of the Royal Automobile Club's Rally of the Tests event, which took place in September, Hopkirk touched on the condition of the real "EJB", explaining that the original Monte Mini is "no longer a competition car". How can that be, when it was born and bred for endurance rallying? Intrigued by what I heard I was keen to find out more, so I contacted the team at The British Motor Museum.

"EJB is a running car," explains Stephen Laing, curator at the Heritage Motor Centre. "We have 300 cars in our collection and we treat each one independently.

"No two cars are in the same condition and we're not able to keep all of them in 'working order'. You have to remember that we're not just preserving the cars; we're also preserving each vehicle's individual history.

"EJB, for example, is still fitted with the original windscreen that was chipped during the Monte Carlo Rally. We don't want to replace it because we feel this is a huge part of the car's story and adds to its authenticity.

He adds: "Although EJB is a running car, it won't compete again. The Mini is as close as possible to the original condition it was in when it first came to be in our hands, and so we only prepare it for demonstrations."

Chief engineer at the National Motor Museum in Beaulieu, Doug Hill shares a similar philosophy that the best way of preserving older vehicles is to keep them in full working order.

"We aim to fire up and service every car in the museum," he says. "In my opinion, the only way to preserve a classic vehicle is to keep them in running order.

"The most important thing to remember is that our entire collection is operated with care and constraint. Not all of the vehicles in our collection compete, but a fair few still do – it's very fulfilling to play a role in keeping these cars alive and enjoying their favourite pastime."

I think we can rest easy knowing that, although they may be retired and we may not be able to save them all, a healthy number of our childhood heroes will live on in the hands of Britain's most precious motor museums. HRT



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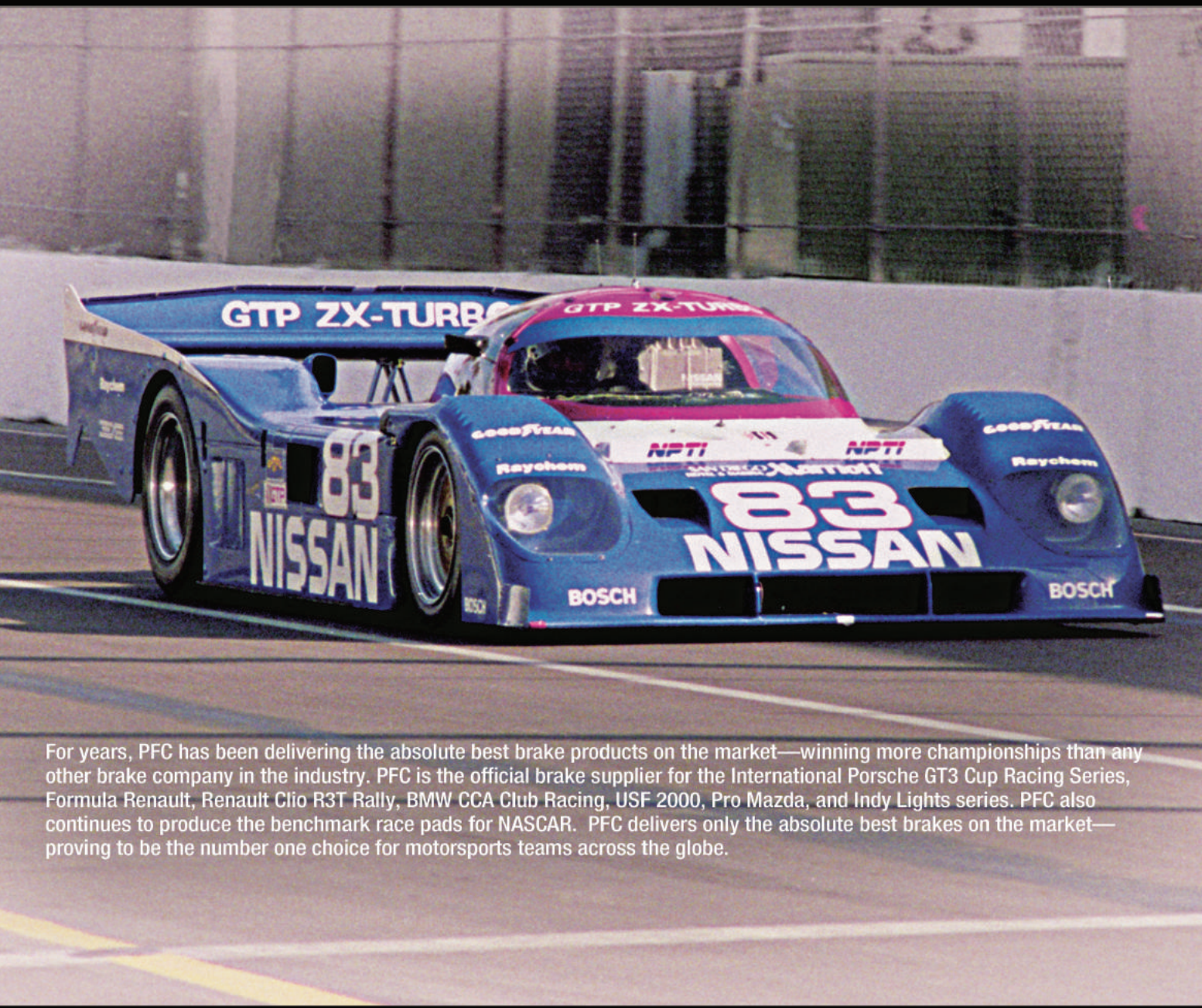
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