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- VW CABRIOLET
- MG MIDGET
- FIAT X1/9

1 BEST SPORTS CARS



6 TOP RESTORATIONS OF THE YEAR

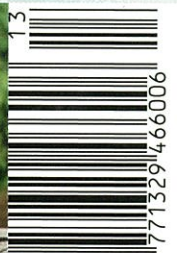


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AUSTRALIAN RACING CARS

■ NOTA MINX ■ MILANO ■ PLUS LOTS MORE!



A question of balance

Lotus Europa & Fiat X1/9

engine layout was originally conceived for racing, but was soon adopted by exotic sports car makers. Although several manufacturers tried to bring mid-engined cars to the masses, Lotus and Fiat were the most successful.

Words Paul Murrell Photos Adam Bruzzone

Racing car designers have long understood the inherently better balance of an engine mounted within the wheelbase. Audi pioneered mid-engine placement with the pre-war Auto Unions, followed by Cooper after the war and Porsche, which placed its engine ahead of the rear axle in its lightweight racing cars. Placing the engine behind the driver and between the axles allows a lower, more aerodynamic profile, with the added bonus of near-perfect front-to-rear balance. Inevitably, innovative road car designers turned their attentions to the mid-engine layout.

Arguably the first to apply mid-engine principles to a road-going car was René Bonnet, whose DB company made its name with tiny cars that performed admirably at Le Mans in the small capacity classes. Bonnet designed the Djet, a two-seater coupé powered by an 1100cc Renault engine mounted behind the driver. In 1964, DB was absorbed by Matra and the Djet became the Matra-Bonnet, before eventually being replaced by the Matra 530 with a mid-mounted German V4 engine. Around the same time Ford released a few





detuned GT40 racing cars, but the real advance came from Lamborghini, which displayed a chassis at the 1965 Turin Motor Show with a V12 engine mounted transversely. Clothed in a dramatic coupé body, this became the superb Miura. Ferrari followed suit with the Dino, first mounting a 2.0-litre amidships, then its 2.4-litre V6.

The Chapman approach

The Djet was rare and odd, the Lamborghini and Ferrari were expensive. It took the genius of Colin Chapman to create the first reasonably affordable mid-engine road car.

Designed by John Frayling, the Lotus Europa was

Project XI/9 was handed to the Bertone design studio and, on his own initiative, Nuccio Bertone authorised a private venture design, a mid-engined sports coupé

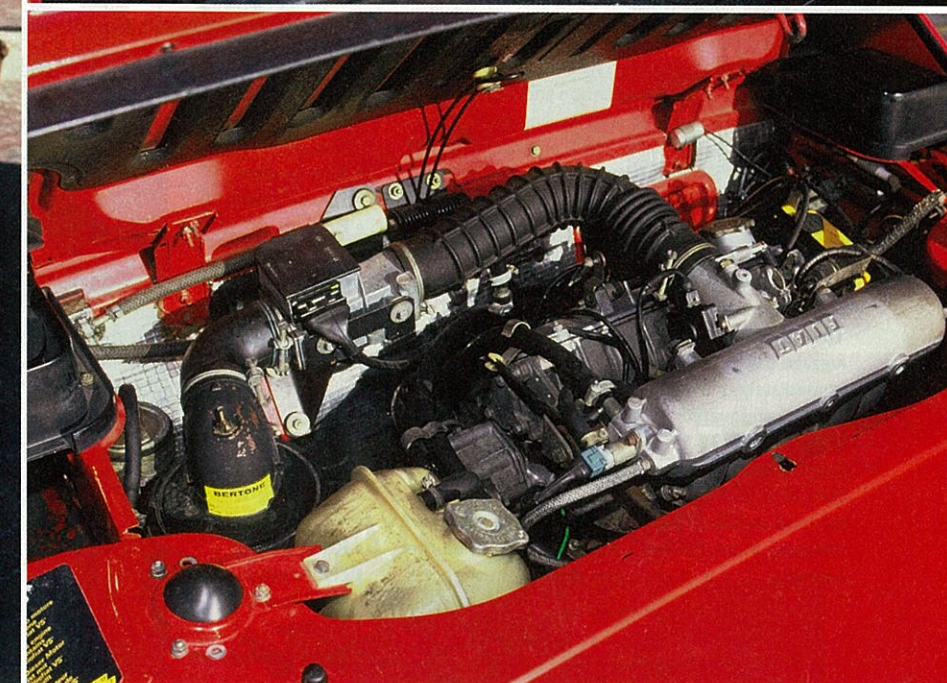
built for enthusiasts and in comparatively large numbers. Chapman was prepared to accept almost any powerplant that would fit, but no suitable British unit presented itself. The 105E Ford engine was an option, but its Ford gearbox wouldn't fit, and reversing the engine made the service items inaccessible. Oddly, the Hillman Imp motor never seems to have been considered.

The solution came in the form of Renault's utilitarian 1470cc 43kW (58bhp) pushrod engine as used in the Renault 16 saloon. With its gearbox in front of the engine, it was ideal for use in the Europa. By reversing the crown wheel and turning the whole unit through 180 degrees, the gearbox was behind the engine and therefore all the service items were eas-

ily accessible. Renault was keen to supply engines and, tweaking them to Chapman's requirements, achieved 61kW (82bhp). Although torque was an unimpressive 107Nm (79lb/ft) at high revs, the light weight of the Europa overcame this minor setback. The Europa chassis was derived from the Elan, with the rear end splayed to form a 'Y' shape, the engine and gearbox sitting between the legs of the Y. The front of the chassis was virtually the same as for the Elan, but modified for a lower nose line. Triumph Herald steering and front suspension components were solid-mounted to overcome the suppleness of the unique F1-style rear suspension. Two big radius arms follow the line of the Y chassis legs and,

hydraulics being prohibitively expensive, rods connect the gearbox to the hub carriers. The drive-shafts act as the upper links, with lots of rubber bushing used to achieve even passable refinement. Front brakes came from the Triumph Vitesse, rears from Ford. Parts bin use extended to Ford Anglia bumpers and, on the S2, Alfa Romeo rear lights.

From the drawing board in 1964 to production in 1966, the Europa's price ballooned. Targeted at £650, little more than an MG Midget, the Europa ended up costing nearly twice as much. It was originally to be called the Elfin, but salesman Graham Arnold convinced Chapman that Italian for 'The End' was hardly auspicious, and suggested Concorde. They compromised on Europa. The



Europa was effectively unavailable in its home market, of Britain, until the release of the S2 (July 1969), being offered only in France, Australia, Japan and the USA.

Lotus position

You either love the Europa's shape or hate it. The claimed drag coefficient of 0.29Cd, despite fixed headlights (pop-ups being too expensive), was achieved through the flat rear deck, sharply cut-off tail and low nose. Fixed side windows saved money and weight, and made doors and the body stiffer. You adopt a laid-back driving position, arms and feet outstretched. There's good forward visibility, and even the rear visibility is better than you'd imagine, except for rear three-quarter vision of which there is none. This poor man's Ford GT40 will wander on fast open roads due to the rubber bushing in the rear suspension. And it's noisy. The early Europa desperately needed a bigger engine to deliver on its promise – and, of course, that's what it got with the twin cam.

About 300 Series 1 cars were built between December 1966 and October 1967. A few with twin-cam engine and Hewland gearbox were built to be raced. Series 1A cars arrived in October 1967, and about 350 were built until the Series 2 (Type 54) arrived in April 1968 with detachable body, revised wooden dashboard, improved trim, electric windows and adjustable seats. In late 1968, the indicators were moved to nacelles above the front bumper. Between 1968 and August 1971, 2,750 Series 2 cars were built. Between January 1970 and December 1971, 865 cars were built to US Federal specifications with a higher front wing line (Type 65).

In September 1971, with Europa prices edging perilously close to those of the Elan, Chief Engineer Mike Rudd and ex-Jaguar chassis man Mike Kimberley were assigned to address the Europa's problems. They took the Elan's twin-cam engine, retaining the existing gearbox, re-engineered the rear suspension to reduce bump steer, re-routed the gear linkage, lowered the floor in the cockpit,

enlarged footwell space and cut back the flying buttresses. The result was the Type 74 Twin-Cam Europa. It had a wheelbase one inch longer, and track one inch wider than the previous car to cope with the 18kg (40lb)-heavier Elan engine. Nine hundred were built until August 1972. In addition, 680 Federal Twin-Cams (the US-spec cars) were built.

The final incarnation was the Europa Special fitted with the Elan Sprint (Big Valve) engine, made possible by the new Renault five-speed gearbox: 1080 Specials were built, and 2050 Federal Europa Specials. A promotional model, the Europa JPS Special, was launched to tie in with the Lotus GP Team, and 100 were sold.

Italian flare

In 1969, during the Lotus Europa production run, it was joined by another mid-engined car, the VW-Porsche 914 and 914/6. Perhaps the most practical mid-engined cars, they never really found favour with the car-buying public.

Then came the mid-engined car that once and for all brought poise and balance to the mass motoring market. Fiat decided to create a sports version of the 128 to take over from the successful 850 Spider – and it was decreed that the replacement use as much running gear as possible from the 128, and be front-wheel-drive. Project XI/9 was handed to the Bertone design studio and, on his own initiative, Nuccio Bertone authorised a private venture design, a mid-engined sports coupé. After several false starts, the idea of a front-wheel-drive 128 spider was dropped, and in 1970 Fiat management decided to proceed with Bertone's mid-engined XI/9 concept.

British obsolescence

Fiat delayed the launch of the Fiat XI/9 until a few weeks after the Turin Motor Show of 1972, so as not to upstage its other new releases. The new car was an immediate sensation with its conventional monocoque body/chassis design and up-to-the-minute styling. The 56kW (75bhp) 128 coupé



engine/transmission assembly was tucked in behind the seats, driving the rear wheels. Up front was 128 MacPherson strut suspension and steering gear and 128 driveshafts, but semi trailing lower wishbones unique to the X1/9. The front disc brakes of the 128 were also used front and rear on the new sports car.

The Fiat X1/9 was, and is, a small car but use of the available space is exemplary, with the fuel tank tucked in beside the left-side seat and spare wheel behind the right hand seat.

The roof can be unclipped and stowed in the front luggage bay.

Immediately, the MG Midget and Triumph Spitfire looked antiquated. *Australian Sports Car World* (February 1973): "It will prove to Leyland that its years of stretching the Midget, the MGB and the E-type on until they die of old age is the reason people have eased off buying soft-tops." In April 1974, motoring journalist Peter Robinson reaffirmed the message: "... it is obvious that all other small sports



LOTUS EUROPA S2 & FIAT X1/9 1500

	Lotus Europa S2 (1968-71)	Fiat X1/9 1500 (1978-83)
◦ Engine	in-line four, mid-mounted	in-line four, mid-mounted
◦ Capacity	1470cc	1498cc
◦ Max power	58kW (78bhp) @ 6000rpm	58.8kW @ 5750rpm
◦ Transmission	four-speed manual	five-speed manual
◦ Brakes	disc/drum	disc/disc
◦ Suspension		
Front	independent with coil springs, wishbones, telescopic dampers and anti-roll bar	independent with MacPherson struts, coil springs and telescopic dampers
Rear	independent with coil springs, radius arms, transverse links and telescopic dampers	independent with MacPherson struts, coil springs and telescopic dampers
◦ Steering	rack and pinion	rack and pinion
Dimensions		
◦ O/all length	3987mm	3969mm
◦ Wheelbase	2311mm	2202mm
◦ Kerb weight	664kg	930kg
Performance		
◦ Max speed	177km/h	170km/h
◦ 0-60mph	10.7secs	11.6secs
◦ Total Production	9230 (figures for S1, S2 & Twin Cam)	141,108 (figures for 1300 & 1500)

cars – with the possible exception of the much more expensive Lotus Europa – are hopelessly out of date."

The engine and transmission were replaced in 1978 by the 1500cc unit from the Ritmo/Strada family hatchback – which gave the car an extra 9kW (12bhp), additional torque, a fifth gear and higher gearing. The previously svelte body gained US-spec 8kph (5mph) bumpers, but the interior was improved with a fascia restyle.

In 1982, Fiat sold the entire assembly operation to Bertone, simultaneously selling off the 124 Spider to Pininfarina, and the Fiat X1/9 was rebadged as a Bertone, although still sold and serviced through Fiat dealers. The end of the line came in 1989, with the Gran Finale model fitted with unique multi-spoke wheels, Alcantara seat coverings and a numbered plaque on the dashboard.

It had been a spectacular and successful run, bringing affordable mid-engined motoring to the masses and selling more than 170,000 (although precise numbers were never released).

Carrying the torch

Others would follow the lead set by Fiat and Lotus. The Lancia Monte Carlo (Scorpion in the US) was a bigger X1/9, initially even badged as a Fiat X1/20 before its 1975 launch at the Geneva Show (a Fiat-badged car appeared on the Pininfarina stand). Withdrawn in 1978, it was relaunched in 1980 before dying an undignified death in 1981.

Far more successful was the Pontiac Fiero, Detroit's first mid-engined car, launched in September 1983.

Undoubtedly the most successful mid-engined car of all time has to be the Toyota MR2. The MR2 was almost a Japanese interpretation of the X1/9; compact, cheap, and handling like a mini-Ferrari.

The first generation car (1984-1989) sold 166,000, the second generation sold even more, and the new convertible is still selling strongly and continuing the affordable mid-engine philosophy made popular by the Europa and the X1/9. ■



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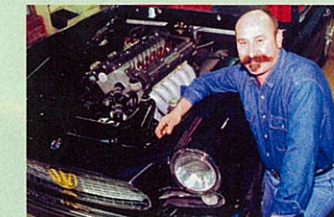
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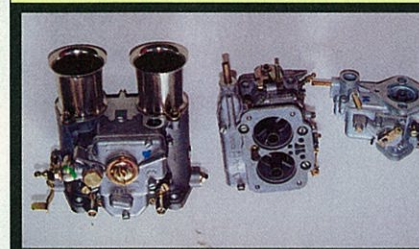


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