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LUS LAMBO URRACO • MIGHTY MERC 500E • BUYING A DB7


1954 COOPER MkVIII (T31)
First with curved chassis tubes; neat extra leaf spring to limit weight transfer. Fuel tank moves onto scuttle. Norton power
1957 COOPER MkXI (T42)
Almost the ultimate refinement of the 500; few changes from 1956-'59. Short-stroke Norton and single disc brake at the rear
1953 STARIDE Mk3
Another of the 10 made by Mike Erskine in '53. Like Martin, once used rubber as the springing medium. Norton-powered again
1953 STARIDE Mk3
Swing-axle design with pushrod-operated rear coil spring, multi-adjustable wishbone/coil front end; 'double-knocker' Norton
1951 COOPER MkV (T15)
Cooper was the biggest maker of 500s, refining the design yearly. Pannier tanks and JAP power; drum brakes on all four wheels

HALF-LITRE HEROES

The 500 formula launched not just hundreds of racers, but an entire industry that's still with us today. **Paul Hardiman** celebrates the handiwork of motorsport pioneers

PHOTOGRAPHY **JAMES MANN**

The single-seater, rear-engined race car formula started here and launched a thousand hopes. Stiff chassis with sophisticated pull- and pushrod suspension? Check. Cab-forward driving position? Certainly. Sequential gearshifts? Across the board. All of these features, first seen in 500 racers in the 1940s and '50s, remain in the modern single-seater – the building and running of which is a mainstay of international motorsport, a global industry. And it all started with a bunch of 'impecunious enthusiasts' near Bristol.

Some of these innovations were dictated by the hardware. Chain drive and separate gearboxes meant that the motor more or less had to go in the middle, because both it and the transmission needed to be on movable mounts so that the tension of the drive chains could be adjusted. Motorcycle gearboxes conferred the sequential shifts. Wheels, brakes and other hardware tended to be pinched from whichever small road cars were in reach, except for Cooper's specialist alloy rims that looked posh, even if their cast-in brake drums were cut from scrap aircraft cylinders.

Expediencies aside, these are proper little racing cars, not overpowered karts, built with incredible ingenuity and increasing sophistication, often as one-offs by men in sheds feeling their way through physics, technology and availability of parts in the austere pre-WW2 years. These flyweights started a raft of famous names in racing, from Bueb through Ecclestone, Moss, Tyrrell and Williams and, more than 70 years after the formula was devised, they're still racing, engendering a huge sense of responsibility among the protagonists to keep them original. In the UK, the 500 Owners' Association combines a huge pool of knowledge with a carefully worded set of Eligibility Standards, which ensures that the cars run – in circuit racing and speed events – as they were in period, preserving these living antiques as a cornerstone of motorsport history.

Quite correctly, as highly strung competition weapons, they're awkward little buggers. They can be reluctant to start and sometimes don't; they won't idle (and you have to manually pump fuel at a standstill or they die on the grid); driving positions can be compromised; and some don't have much in the way of brakes. The clutches are sharp and the gears are tall, so even getting off the line requires sensitivity. But get one hooked up at the right revs, snicking your way through the short-throw sequential gearbox, drifting through the faster corners and it all comes together in a glorious rush, leaving behind the sometimes chronic vibration and the back-of-the-mind worry that a methanol fire is invisible so nobody's going to be rushing to your aid.

500s are as many and varied as the chaps who built them and, as well as the choice of engines (see panel), are broadly separated into swing-axle types and the rest, using wishbones. Delve into the nuts and bolts and you find real innovation.

Cooper was the first to realise that a simple all-independent suspension layout could be achieved by using a pair of transverse leaf springs, basically two Fiat Topolino front ends. Gradually this became more sophisticated; adjustments in roll stiffness came along by clever location of an extra floating leaf at the rear. This type of set-up requires proper articulated driveshafts with universal joints at each end, something the swing-axle brigade avoid because the back axle only had to bend in the middle, and so the half-

Age before beauty – the evolution of the 500 laid out in chronological order. Only Iota has a steering box, the rest have racks. Right: JP's short wheelbase forces driver upright; neat logo; JAP makes c45bhp on methanol, AMC 'box

shafts could both locate and drive the wheels. These designs all feature pronounced negative camber to avoid the dreaded tuck-under, and most now run limit stops for the same reason.

The swing-axle cars are geometrically semi-trailing (just), but it's the various ways in which they are sprung that shows how the builders' technical appreciation was developing. The Martin, for example, has its springs in tension, mounted transversely under the transmission and pulled by chains running over sprockets. Originally the 'boing' would have been provided by rubber cord, of which you added more or less to adjust the spring rate, but 500s leak a lot of oil, which has unhappy effects on the springing medium, so Roy Hunt has replaced the cords on his car with a gang of coil springs. At the front, the Martin uses classic unequal-length wishbones and coils, with steering by rack and pinion.

Coils also feature at the back end of the Starides, which are lengthy-looking devices due to their large, centrally located tanks. At one point races were 100 miles long, which meant that they had to carry 10 gallons. The Staride rear swing-arms compress a single transverse coil via pushrods, but the ingenious feature is that the spring is mounted on a rocking pivot to reduce roll stiffness and maximise grip. At the front, they use wishbones, like the Martin.

The fabulous Owners' Association has brought a representative sample of eight cars to Curborough – so we can sample the evolution of the 500 in an afternoon, which nobody in the club has ever done. Driving them first to last is a fascinating snapshot of how the cars changed though the '50s – from basic JP to the ultimate development of the breed, the Cooper MkXI.

First, though, you have to start them. Pushing is hard work against a diesel-like compression ratio of up to 14.5:1, so everyone uses electric rollers – though even that doesn't mean ignition is a done deal. With the car on the rollers, or at least rear wheels off the ground in the case of the friction starter, the driver sits in, clicks into gear (usually second) and a helper pulls the engine over onto compression by turning a rear wheel.

Clutch dipped, kill switch on, and the helper hits the roller button. As soon as the transmission is up to speed, feed in the clutch smartly but smoothly and apply a little gas. When the motor fires, foot back on the clutch, tickle the throttle to keep it alight and the helper drops the car to the ground. Revs up, clutch in smoothly and you're away, at low speeds able to differentiate each firing pulse. If you can't drive off immediately, you have to keep the fuel flowing, because the pumps run off the back axle. On the Cooper, you maintain the pressure via a simple plastic-coated cable; on the Staride, it's a little pull trigger on the handbrake lever. You don't even need a helper. Mike Wood has configured a system using collapsible jacks and has the roller controls on a remote lead so that he can start the Iota, lower it to the ground and zip off without leaving the seat. The ingenuity that 500s encapsulate doesn't finish with just building them.

First up is the JP, recently acquired by Robin Shackleton, who organised this group for us. With its plain steel disc wheels it reminds you of a Communist-country Cooper, with which it