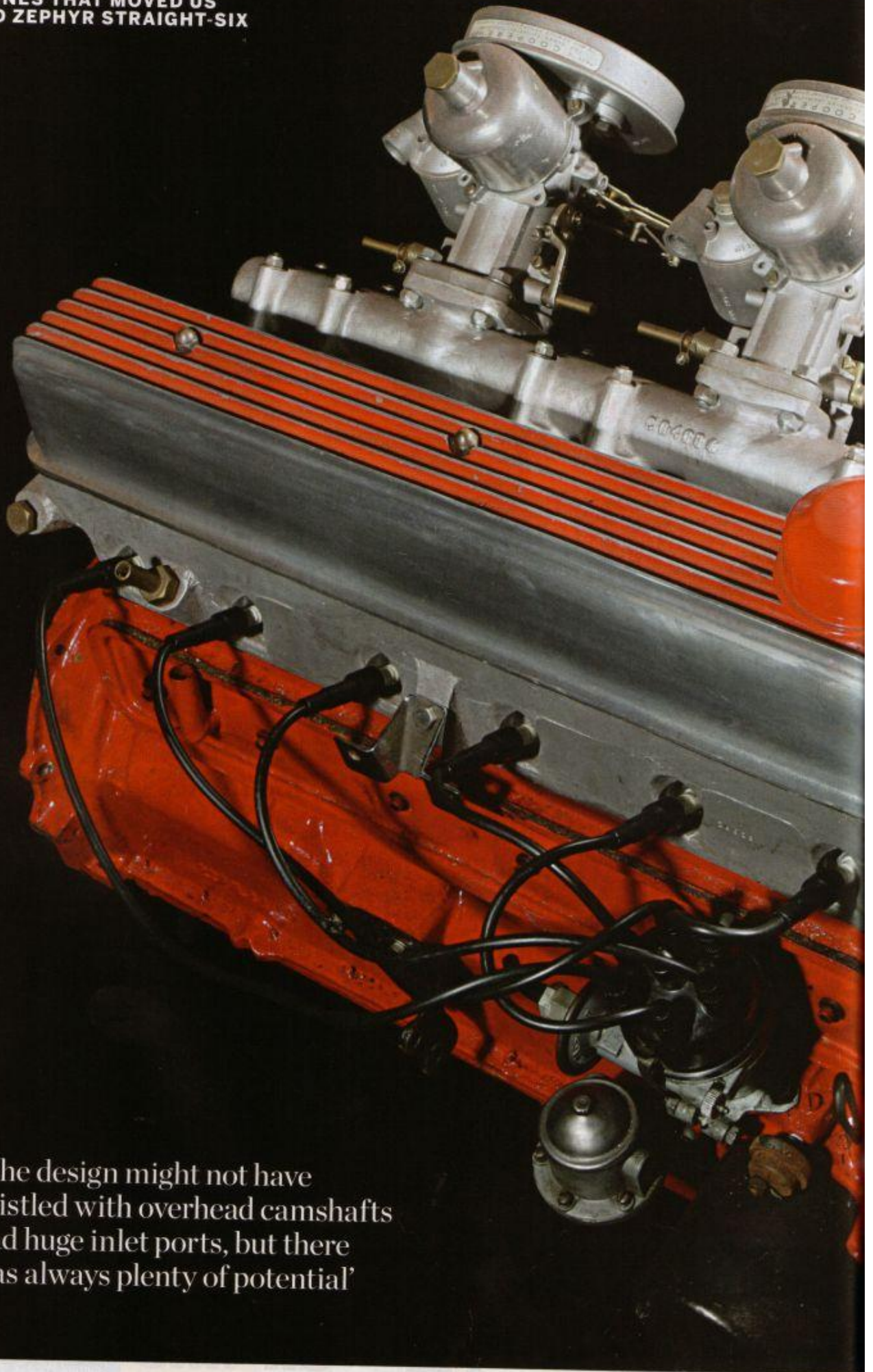


Supplied By Karl Schluter

ENGINES THAT MOVED US  
FORD ZEPHYR STRAIGHT-SIX



“The design might not have  
bristled with overhead camshafts  
and huge inlet ports, but there  
was always plenty of potential”



# SIX APPEAL

A mass-produced pushrod straight-six from the Fifties doesn't exactly ooze glamour – yet Ford's Zephyr engine radically improved some very glamorous cars as well as powering three generations of a favourite saloon

WORDS NIGEL BOOTHMAN PHOTOGRAPHY LYNDON MCNEIL

**T**HE MONTE Carlo Rally of 1953 had 404 entrants, covering almost every model on the roads in the early Fifties. The weather for the event was unusually lenient, favouring (you might suppose) the nimble two-seaters with performance to hit demanding average speed targets through the Alpine hairpins. But at the finish the first-placed car was a dumpy Ford saloon with a live rear axle and drum brakes, eased to victory by Dutch rally ace and inventor Maurice 'Maus' Gatsonides. He and co-driver Peter Worledge beat Ian and Pat Appleyard's Jaguar MkVII into second and the 354 other entrants which made it to the finish.

Beneath the bonnet of Maus's Ford Zephyr was a 2262cc straight-six with an iron block and cylinderhead and overhead valves. Maus was getting a few more brake horsepower than standard thanks to the new higher-compression engine launched in the Zephyr Zodiac that year, plus (perhaps) other tweaks not available in the showroom. But standard or otherwise, it was clear that Ford's new 'six was one of those happy motors that actually delivered more than it promised on paper.

And whatever else its designers had in mind, charging over the Alps to rally victories hadn't been a priority. In a forward-looking piece of transatlantic cooperation Ford had sent a group of engineers from Dagenham to Dearborn

in 1948 to discuss plans for a new British Ford. The latest US models were too big and thirsty for austerity-hit Britain, so only a vague styling resemblance survived to the new compact monocoque that would become the Consul and Zephyr. And while Ford's American designers were also working on a family of pushrod straight-six engines, they too would be larger than required in the UK. So Dagenham's engineers came home and set to work on their own four- and six-cylinder versions of a new engine.

Britain's horsepower-based tax system had been abolished in 1947, and it was a timely change for the new power unit. The old tax penalised large piston areas, which meant most designs using a long stroke and a narrow bore; good for low-down torque, but very bad for advances in lightness, small size, and efficiency. Even reliability was compromised – long stroke designs are more prone to undesirably high piston speeds and flexion in the crankshaft.

Not so the new Ford. It was oversquare, meaning the bore was greater than the stroke, and that was a big step forward in mass-produced passenger car engines. It was also Ford of Britain's first overhead-valve engine – which seems hard to believe as other British marques such as Morris, Alvis and Sunbeam had been selling cars with overhead valves *and* overhead camshafts way back in the Twenties.

## ‘There’s no mystery about the engine’s popularity in motor sports – it simply worked well’

In a quest for lower weight the first prototype castings were apparently too thin and, according to project executive engineer George Halford, considerably more ‘meat’ was introduced early in the development programme. As related in Michael Allen’s book *Consul, Zephyr, Zodiac, Executive*, ensuring even and effective cooling in all conditions led to Halford’s team circling each individual cylinder with a water jacket. This, together with the large-bore design, led to a slightly longer engine than anticipated, though the weight saving over a much taller block of the pre-war style was still considerable.

The result was a flexible, free-revving unit that performed well when teamed with the unsporting set-up of a four-door saloon body, a three-speed manual gearbox and a column change. This was partly to do with the torque – its 108lb ft @ 2000rpm was much more important to usable performance than its 68bhp @ 4000rpm. But that was just the start. The design might not have bristled with overhead camshafts and huge inlet ports, but there was always plenty of potential, not least from raising the compression ratio from the original 6.8:1, necessary for smooth running on grotty post-war petrol. Simpler still was an increase in choke size from the strangling 30mm of the first Zephyr Six’s single Zenith VIG downdraught carburettor.

Aftermarket tuning options soon sprang up. Most notable were Raymond Mays conversions, from twin- and triple-carburettor manifolds right through to aluminium cylinderheads with bigger ports and valves. Even the basic Mays twin-carburettor package turned an 85mph car into a 100mph one – quite an achievement with the Zephyr’s tuck-box aerodynamics. This apparent potential, plus the engine’s reassuringly conventional design and ready availability, made it a natural choice for use in other applications, especially boats.

Sports car makers took note when the 1956 Ford Zephyr and Zodiac MkII models were given more urge from a new 2553cc version of the engine. Torque was up to 133lb ft at the same low 2000rpm, while power leapt to 85bhp @ 4400rpm. The same cylinderhead conversions were available to push output a lot higher – Aquaplane and Ken Rudd’s Ruddspeed produced the most startling increases, and Rudd was involved in the engine’s transplant into the AC Ace (see *Powered by Zephyr*, opposite).

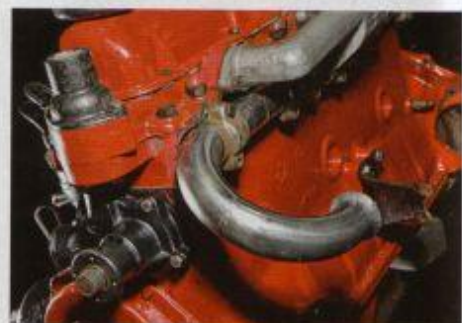
Why were sports car manufacturers opting for a humble Ford motor? One factor that



Aftermarket tuners were quick to exploit the ‘six’s latent potential



Raymond Mays two-carburettor conversion transformed 85mph Zephyr workhorse into a 100mph stallion



Crude ‘hockey stick’ exhaust manifold was improved in later versions

made this engine more suitable than most other ‘sixes’ of the time was its relatively short stroke. A short block makes for a low overall engine height, so it’s easier to fit under a low, sporting bonnet line. Compare a Zephyr engine to other pushrod straight-sixes of similar capacity from that era (Alvis three-litre, Austin C-series, Rover IOE three-litre) and the opposition looks more at home in a ship than a sports car – ironic, given the Zephyr’s successful use as a marine engine.

A short stroke also means high revs are easier to attain, which is important in motor sports and makes for much more enjoyable press-on driving in an AC Ace or Reliant Scimitar coupé. But that was about the only architectural advantage the Ford engine could claim. It’s otherwise very conventional, to the point of appearing distinctly hampered in performance terms. The inlet and exhaust ports are on the same side of the cylinderhead, and the inlet ports are siamesed – there are only three of them. The exhaust manifold, if you can call it a manifold, is the famous Ford ‘hockey stick’, which is little more than a piece of pipe blanked off at one end with six holes in the side to meet the exhaust ports and a 180-degree bend at the front to send the gas back and down to the exhaust pipe. It completes a tortuous journey through the ‘head, and any engine tuner will tell you that’s a bad start.

This situation was partially remedied as the Zephyr and Zodiac models progressed: from

the tiny 30mm choke on the MkI’s single Zenith carburettor, the MkII gained a 36mm unit and the MkIII in Zodiac form rose to 42mm. More air/fuel mixture in, more power out, and the Zodiac MkIII had a modified exhaust manifold with two smaller sections of pipe feeding into two collectors which in turn went off to the exhaust downpipes. To make the most of this improvement, MkIII cars had bigger valves too.

But Ford’s own improvements were minor tweaks compared to the measures created by Mays, Rudd and Co. And these were not the only interested parties exploring the engine’s potential: Jeff Uren was a privateer racer whose attempts to talk himself into a works Zephyr in 1957 had failed, leaving him to campaign his Ford Anglia in the British Saloon Car Championship. But he entered a Zephyr at Silverstone that September and, when his entry was accepted, dashed out and bought one new. He stripped down the engine and balanced all the rotating components before re-assembly, using a modified single SU carburettor in place of the standard Zenith. Sure enough, he led home the works cars, beaten only by the 3.4-litre Jaguars.

Uren contested the whole 1958 season as a privateer in the Zephyr and finished second overall, which led to works support for 1959. This was directed towards a Raymond Mays light-alloy cylinderhead, a compression ratio of 10:1, three twin-choke Weber carburettors, twin fuel pumps, a Servais six-branch exhaust

## 1956 FORD ZEPHYR STRAIGHT-SIX

2553cc, in-line six-cylinder, ohv,  
one Zenith 36W1A-2 carburettor

Bore 82.6mm

Stroke 79.5mm

Power 85bhp @ 4400rpm

Torque 133lb ft @ 2000rpm

Weight 170kg (374lb)

Length 68.5cm (33in)

Width 53cm (21in)

Standard 'six has a single  
carburettor, with choke size  
growing from 30-44mm  
over the years

manifold and a large sump with cooling tubes to keep it safe and well-lubricated. This produced 168bhp at 5800rpm: exactly 100bhp more than the Zephyr Six arrived with in 1951.

Far less radically modified engines had also taken Zephyrs to victory in the 1955 and '58 Safari Rallies, 1959 RAC Rally and numerous Coupes des Alpes, plus class wins over the years in the Monte Carlo and Alpine rallies. There's no mystery about the engine's popularity in motor sports - it simply worked well.

Yet not even the works department tried a crossflow version of the 'head. Sending the gases from one side of the combustion chamber to the other is a far more potent solution, but you could argue that a Ford Zodiac engine making more than 170bhp is a good enough result for anyone, and you'd be right. For one thing, the engine showed itself capable of such increases without needing extra capacity. Even now, tuners will only bore out to 2.8 litres and retain the same stroke, using Volvo B18 pistons. More surprising still, the engine could handle more than double its original output using the standard cast crankshaft and rods.

Ford made very good steel at its own foundry at Dagenham (it even made tank tracks during World War Two) and the bottom end of the Zephyr/Zodiac 'six is extremely tough. To this day the valve seats in most roadgoing examples of this engine survive use on unleaded fuel without problems.

Indeed, you have to be pretty lazy and cruel to destroy a Zephyr/Zodiac straight-six in normal use. Skip the oil changes, and the supply pipe to the rocker shaft will clog and starve the valve gear of oil, leading to rapid wear; but everything else should last well, even by modern standards.

In later decades Ford and other large manufacturers established an unwelcome reputation for building cars with a short lifespan, either through corrosion or frailty. Think of the trim or build quality of the Cortina MkIII, the flimsy fibre timing wheel

in the Essex V6, or the speed at which the Pinto engine can eat its camshaft lobes. Admittedly, the Z-cars weren't exactly rot-free, but those powered by this six-cylinder engine did at least come with a motor containing great reserves of power and strength and built from the best materials available. And it made a pretty nifty sports car engine too. **EE**

Thanks to: John Blythe of Ford Consul/  
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(01603 881155).

## POWERED BY ZEPHYR

**THE FIRST SPORTING CAR** to adopt the Ford Zephyr straight-six was the Allard Palm Beach of 1952, featured in last month's *Classic Cars*. It was intended as a civilised, affordable and sporting tourer, but the unmodified engines and unsophisticated underpinnings didn't persuade many, especially when the Austin-Healey 100 appeared at the same price.

Other car manufacturers waited until the enlarged version of the engine appeared in the Zephyr MkII of 1956. One of these was AC, whose masterpiece was the Ace, a

beautiful barchetta-styled dream in aluminium, but with obsolete engines first from AC and later Bristol. By 1961 the factory was offering Ken Rudd's triple-Weber version of the Zephyr engine, making the Ace a 130mph car, though relatively few were built along with a handful of Aceca coupés and longer wheelbase AC Greyhounds with Ford 'sixes.

Reliant also chose the Ford unit for its new Sabre Six. This fastback was a little crude for the price and only 77 were

built. But the next model, the SE4a coupé, built Reliant's reputation and stuck with the Zephyr engine for a reliable 110mph until the MkIV Zephyr arrived in 1966 along with the Essex V6 found in later Scimitars.



AC Ace was transformed by Ford's 'six