SCI ROAD TEST: THE MORGAN TR3

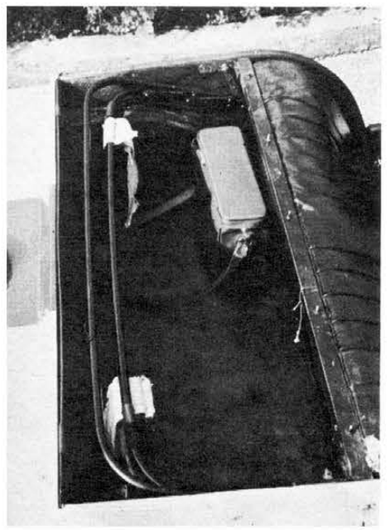
IT'S LONG been an axiom among students of racing that the first cars of a new concept are invariably beaten by the more highly developed products of an older school. Grand Prix cars got through this stage back in 1934, when the radical new German machines were being trounced by the classic Alfa P3's. Since then each year has seen more converts to the scientific approach to car design, but somewhere there has always been a cart-sprung, loose limbed veteran showing those whippersnappers how it should be done.

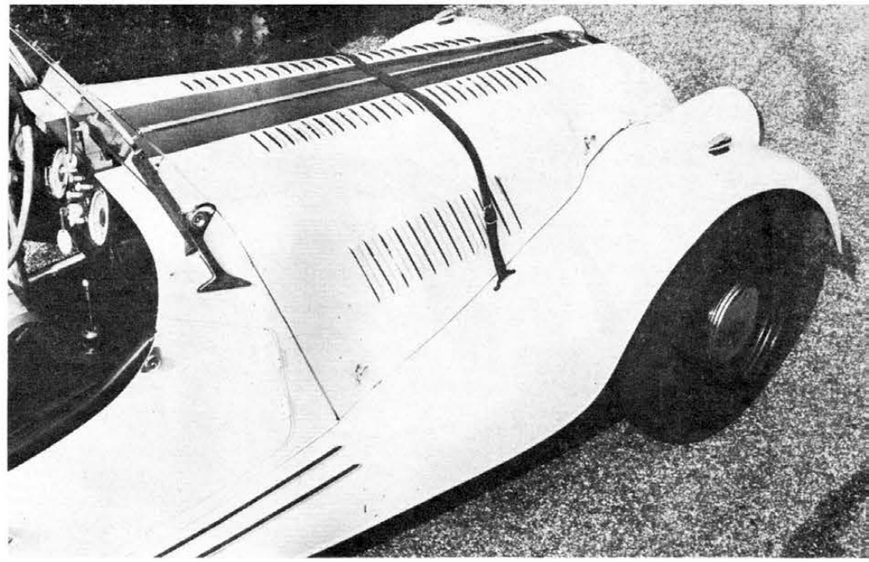
Due to its unique road conditions, England has been the traditional stronghold of the classic sports car. With the HRG "gone modern" in a big way, the Morgan remains the sole representative of a superseded era. Some may quibble that independent front suspension takes it out of this class, but the Morgan system has remained substantially unchanged for forty years and even today is "independent" in name only. Though Production Class E has seen the arrival of many promising newcomers, such as the Triumph, Doretti, and Arnolt-Bristol, a sharply-tuned Morgan will still lead the way to the line.

Since many prospective Morgan owners may have racing in mind, then, we were particularly fortunate in being able to test a car that had been prepared for this purpose at the Morgan works in Worcestershire. As an entry for Sebring, 1956, the TR3 engine on this car had been cleaned up, tuned and balanced within stock specifications, at an additional cost of $270. In Florida it was rolled in practice with minor consequences which have since been rectified, and it now being used daily and in competition by Joe Ferguson, Jr., Vice President of the eastern importers, Fergus Imported Cars, Inc.

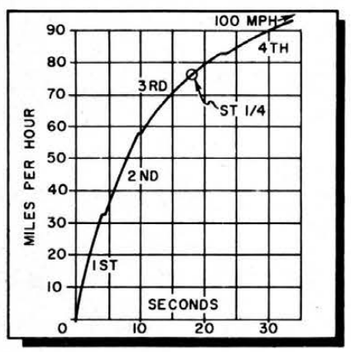
The 1956 versions of the Plus Four Morgan have been lightened by fitting one angled spare wheel at the back instead of the old double vertical arrangement, and rubber-bushed shackles have finally replaced greased sliding trun-

BELOW: Rear of cockpit can hold little beside top and side curtains except when canvass is in position for moist weather. Wooden floor can be lifted for access to twin six volt batteries and Salisbury hypoid rear axle.





Beneath that long louvered hood lies the jolting TR-3 mill that will tackle 6000 rpm and then some without a sound of complaint. Ample room around the four-barrel makes tuning a pleasure.

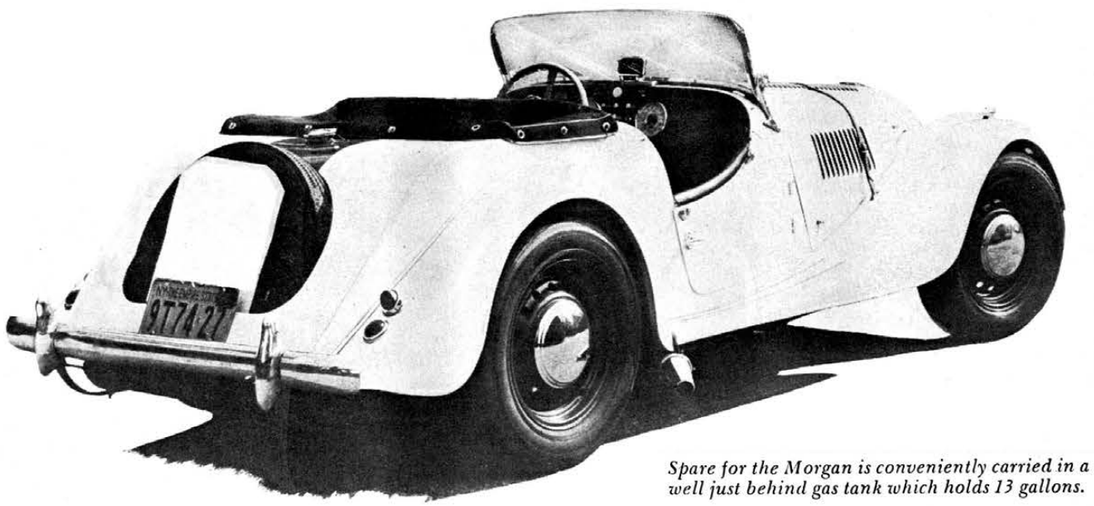


nions at the backs of the underslung rear leaf springs. Armstrong instead of Girling shocks are now used all around, with tubulars at the front to control the short travel of the compact sliding pillar suspension. In 1955 these Mogs started coming through with front brake drums a quarter of an inch wider than the old 1.5 inches, to try to bring the stopping power into line with the increased speed provided by the hot TR2 engine. Brakes are still by far the weakest point of the car in racing, however, and the modern competition seldom gets ahead until they go.

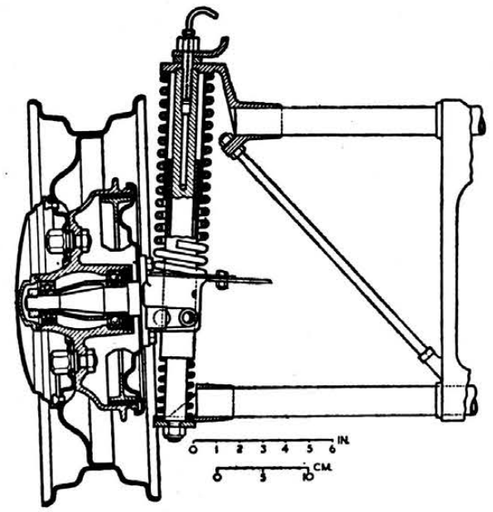
It's odd, but the above criticism is a strong tribute to the Plus Four, since by production sports car standards the brakes are quite good. Pedal feel is firm and progressive, and pulls the car down smoothly and in a straight line. Our ten-stop test showed a lessening of power after four or five stops, but not to a dangerous amount, and full recovery was rapid. In all other important respects the TR3 Morgan is a snorting, fire-breathing road machine, ready and willing to take far greater risks than you will have the nerve to. Marketing a car of such capabilities at a base price of $2655 requires a few sacrifices here and there, and Morgans have shown great integrity and courage by letting the axe fall on the driver and passenger. This is rare in a day when Genuine Leather and polished walnut are frequent cover-ups for skimping under the skin.

Forthright in all respects, the Morgan at once informs you that it has definite ideas about seating and wheel position. A very positive and deliberate latch opens the door from the rear, and hinges placed well forward make the most of the available space. The floor is recessed very deeply between the Z-shaped frame rails, and in spite of the lowness of the car the seating position is almost chair-like. This complicates getting in, but the toughest job is getting out with the top and side curtains up.

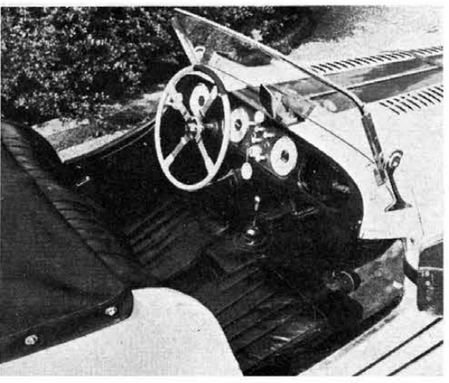
Simple pneumatic cushions over angled plywood boards comprise the seat cushions proper, while the single-piece seat back is shaped and padded over a similar base. Nothing is adjustable, and the most that can be said for this is that it contributes a lot to the strength of the coachbuilt



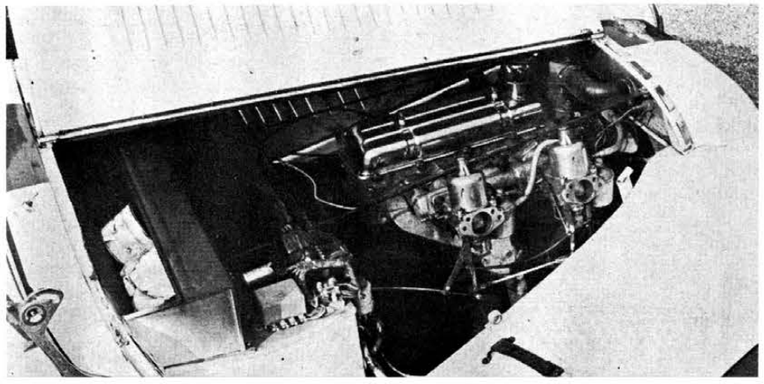
Spare for the Morgan is conveniently carried in a well just behind gas tank which holds 13 gallons.



Front suspension consists of coil springs, vertically sliding spindles. Kingpins are carried between outer ends of upper and tubular cross-bars.

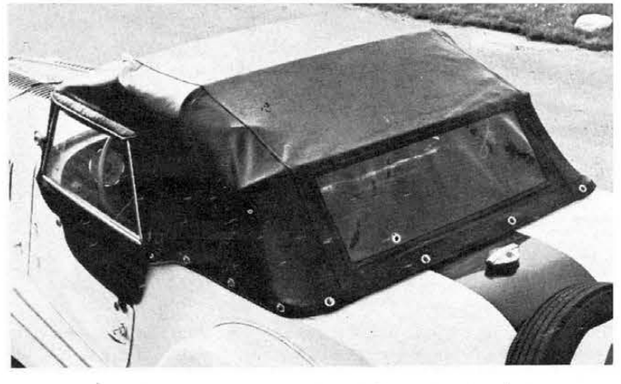


Cockpit arrangement. Seating attitude is bolt upright on pneumatic cushions. Panel is complete, and readable.



TR-3 engine is equipped with two big bore SU carbs, and enlarged ports for better breathing at high revs. Good torque in the low ranges gives sharp acceleration in all gears.

Stiff springing keeps Morgan clinging fast, and flat, through tight bends. This factor coupled with the car's excellent acceleration, makes it a tough customer on short courses.



Side curtains and top are positioned by Dot and twist fasteners. All, except the crossbows can be removed for competition running. Note size of rear window for good rear view.

body. A big Brooklands wheel sits near-vertically in the driver's lap and close to his chest, and has the precise shape and feel that marks that pattern. The seating position is upright and alert, with most of the spinal load carried by the pneumatic cushion. This is not ideal but somehow avoids becoming unbearable during long stints at the wheel. You simply get used to it.

Sideways positioning is not too good, and we appreciated the seat belts on this car. The fixed legroom is naturally close for a six-footer, and elbow room is at a minimum with the curtains up but fine when the padded door cutaways are free. Big, well-spaced pedals mean positive control but no room for the left foot, which usually rests flat on the floor. The handbrake is a good quick-release type, on the passenger side of the wide gearbox housing.

Instruments are big and readable, both by day and night, and rally purposes are well served by a trip recording speedometer on the navigator's side. There is no map light, though, and only one open compartment for loose objects. Pull-out switches at the center control the cowl-mounted wipers and other accessories, while the non-cancelling directional signal switch is at the left.

Ideal for competition in that it can be removed entirely, the heavy-weight top snaps down over a simple tube framework with sturdy Dot and twist-type fasteners. The rear window is big, minimizing the rear quarter blind spots, and at speed the only top fault is a tendency to lift up and out above the side curtains. The latter are clear, stiff, and unusual in that they bolt in place from the outside, which promotes corrosion but eliminates protruding elbow-knockers in the narrow cockpit. Except for the one defect above the draft sealing is very good, and even in the absence of a heater on this car we were warmed on chill evenings by heat from the engine and center-mounted gearbox, which, however, may not be quite so welcome in the summer.

(Continued on page 56)

SPECIFICATIONS

POWER UNIT:

Type	four cylinder, in line
Valve arrangement	Overhead, in line
Bore & Stroke (Engl. & Met.)	3.27 x 3.62 in. (83 x 92 mm)
Stroke/Bore Ratio	1.11 to 1
Displacement (Engl. & Met.)	121.5 cu: in (1991 cc)
Compression Ratio	8.5 to 1
Carburetion by	Two 1¾ in. SU sidedraft
Max. bhp @ rpm	100 bhp @ 5000 rpm
Max. Torque @ rpm	118 lb. ft. @ 3000 rpm
Idle speed	900 rpm.

TOP SPEED:

Two-way average	100 mph
Fastest one-way run	100 mph

ACCELERATION:

From zero to	Seconds
30 mph	3.6
40 mph	5.8
50 mph	8.0
60 mph	11.2
70 mph	14.9
80 mph	20.5
90 mph	30.4
Standing 1/4 mile	18.1
Speed at end of quarter	76 mph

SPEED RANGES IN GEARS:

I	0-36
II	2-58
III	5-82
IV	12-100

SPEEDOMETER CORRECTION:

Indicated	Actual
30	32
40	42
50	51
60	61
70	70
80	79
90	89
100	99

FUEL CONSUMPTION:

Hard driving	22 mpg.

BRAKING EFFICIENCY (10 successive emergency stops from 60 mph, just short of locking wheels)

1st stop	65
2nd	65
3rd	65
4th	60
5th	58
6th	55
7th	60
8th	52
9th	55
10th	55

DRIVE TRAIN:

Transmission ratios Rev	3.44
I	3.44
II	1.98
III	1.40
IV	1.00
Final drive ratio (test car)	3.75
Other available final drive ratio	4.10
Axle torque taken by	rear leaf springs

CHASSIS:

Wheelbase	96.0 in.
Front Tread	47.0 in.
Rear Tread	47.0 in.
Suspension, front	Independent, coil and sliding pillar
Suspension, rear	Solid axle, leaf springs, underslung frame
Shock absorbers	Armstrong tubular front, lever-type rear
Steering type	Cam and sector
Steering wheel turns L to L	2
Turning diameter	33 ft.
Brake type	Girling hydraulic, 2 LS front
Brake lining area	121 sq. in.
Wheel studs	four
Tire size	5.25 x 16 (5.50 x 16 on test car)

GENERAL:

Length	155.0 in.
Width	56.0 in.
Height (top up)	52.5 in.
Weight, test car	1940 lbs.
Weight distribution, F/R	48/52
Weight distribution, F/R with driver	47/53
Fuel capacity—U. S. gallons	13.2

RATING FACTORS:

Bhp per cu. in.	0.823
Bhp. per sq. in. piston area	2.99
Torque (lb-ft) per cu. in.	0.976
Pounds per bhp—test car	19.4
Piston speed @ 60 mph (std.)	1750 ft/min.
Piston speed @ max bhp	3010 ft/min.
Brake lining area per ton (test car)	125 sq. in.

deserves a special breaker, a Magspark, or a full magneto. A wide range of plugs is available from several manufacturers, and the standard 8/1 compression is Champion N8B. A point to watch in the combustion chamber is that portion of head threading that is not covered by a fully-inserted plug. It's a possible hot-spot source, and should be custom-trimmed away.

Cooling

Since they had their own private Le Mans disaster in 1952, Jaguars improved the design of their water pump, which is now efficient at very high speeds. Nevertheless, a reduction in the present drive ration of 1 to 9.9 might be necessary for faster crank rotation. The pump output feeds into a duct cast high on the exhaust side of the block, and vertical vents from this carry "cool" water across the head joint and directly to the exhaust valve seats and guides. This is a top feature, but can be improved as was done on a production D head specially factory tuned for Lou Brero. It has small sheet metal baffles in those vents that send the water directly to the seats without pre-heating from the exhaust port surface.

Pumped water passes straight across the intake valves. The cylinder bores the head to the four outlet holes, via are cooled by thermosyphon circulation only, which keeps their temperature level relatively high and reduces the amount of heat rejection to the cooling water.

The Jaguar 2.4 engine actually made its first public appearance in 1954, when the factory put two prototype engines in D-Types to try to take advantage of the handicapping in the Tourist Trophy. The cars weren't successful, but their speeds were very close to those of the 3.5 liter cars, since they were topped by the same modified C heads and twin-choke Webers. In stark theory, the 2.4 should have the same output as its big brother if the curve of bmep to piston speed could be held at the same level. This has been the objective of the preceding modifications, and the factory, not overlooking the fact that the present Grand Prix limit is 2.5 liters, have done a little development work on their own.

They've fitted it with the top-secret works D-Type head, which has intake and exhaust valves of two and 1 11/16 inches diameter respectively, more steeply inclined in a non-hemispherical pent-roof chamber with provisions for twin ignition. Special slipper pistons are matched to this chamber and their high crowns are deeply bevelled for valve clearance, while the compression ratio remains at the factory limit of 9/1. The intake ports are huge and die-straight, and the whole valve train from cams on down has been overdesigned to allow very high loadings with moderate ramp angles.

With the above head, plus the Lucas fuel injection that has made the big D the hottest thing from Sebring to Silverstone, this production block has been delivering a reliable 270 horsepower at 6000 rpm, which the experimental department regards as the steady operating limit. This is *on gas*, of course, and is approaching both GP outputs and two horsepower per cubic inch. They have a space-frame single-seater to carry it, but the chances are that Lyons will guide his firm away fro mthe rigors of Grand Prix competition. The engine is certainly suitable for the private GP car builder, though, the only drawback being the high weight of 529 pounds. There's an aluminum 2.4 block kicking around the Jag shops, but it's unfortunately not getting much attention. That poundage is put to good use, in a sturdy crankcase and beam-like shaft, and the 2.4 should set new records for output and unbreakability. A final thought in passing, too, is the new 151 cubic inch limit due to go into operation in USAC Championship events, including Indianapolis. Poor man's Miller anyone? *Ludvigsen*

Morgan

(Continued from page 19)

MG owners know what the behind seat trunk room is like and know that it can hold a surprising amount when the top is up. Two twist catches allow the wooden floor to be lifted for quick access to the twin six-volt batteries and the Salisbury hypoid rear axle.

You may have gathered by now that the creature comforts are on the slim side, though starkly honest, and the ride of the Plus Four has the same raw attitude. It tackles big bumps with a leaping, bounding motion which yet avoids the discomfort of true pitching. Our car was fitted with Michelin X tires, which can be run effectively at very low pressures and were thus of great help in lessening the effect of small ripples on the stiff Morgan suspension. The frame is unusually stiff for a classic suspension layout, but small vibrations still give the body a hard time and search out all potential rattle sources. Generally the ride is hard but reassuring in that its response is always consistent.

To the enthusiastic driver, though, it's all more than worthwhile when he wrings the Plus Four out through every variety of bend and finds it clinging tight, flat and fast. There is very little roll and no unwelcome dip at either end, thanks to the stiff springing. This also led us to expect, in combination with a slightly rearward weight bias, an oversteer on corners, but in fact the Morgan understeers very powerfully at most speeds. This is accounted for by the front suspension geometry, which is such that the wheels lean out with the car on corners, and also by the fact that the front end is much stiffer than the rear and thus assumes more of the overturning couple in spite of a low front roll center.

Steering

Steer characteristics is a function of *relative* front-rear cornering powers, and on an *overall* basis the Morgan ranks as one of the stickingest cars we have tested. Steering is not ideal, with two inches of play at the rim and a strong caster action that verges on heaviness, but it is fast and free from excessive road reaction. Understeer plus heaviness means that the Morgan will go wherever you have the strength to point it. The rear end just follows along and never tries to get out of hand, though bumpy surfaces can catch it off balance. We tried tire pressures from 23 to 30 pounds, and the only penalty of the lower figure was a slight amount of tire howl. Wheel response is instantaneous and predictable, and the close-up driving position is well matched to the requirements of the job. At higher speeds there is just enough surplus power available to allow honest drifting, which rounds out the Plus Four's range and confirms it as tops in handling.

Stiff rear leaf springs have further benefits when used with a Hotchkiss drive, as demonstrated by the TR3 Morgan, which bats off from a standing start without a trace of axle hop, windup or judder. Fither a chirp or momentary wheelspin, according to taste, and away you go. Clutch pedal travel is short, and the engagement is smooth yet solid, remaining that way through all our tests. The gearbox setup is one of the Morgan's unusual features, in that the clutch housing and transmission are separated by some nineteen inches of cast tube and splined clutch shaft. The box thus rests at the forward edge of the seats and that short handy lever goes right down into the works without the aid of remote controls. Since the gear layout and casing are substantially the same as those used in the Jaguar, the unit is

(Continued on page 59)

Morgan

(Continued from page 56)

more than strong enough and has good ratios.

Easy control is provided by the direct lever, and the travel is so short that at first you are not sure of being in gear. Second gear synchromesh can easily be faulted, but the top two gears are better. Competition security is provided by a block for the lefthand reverse that can only be overcome by lifting the lever.

Engines

Few engines have so quickly established themselves in stock competition as the Triumph TR series, and the latest TR3 version has undergone enlargements in port and carburetor size to make full use of the high revs it can reach. The engine in this "Sebring" car was smooth and solid up to the 6000 rpm that we were permitted, and it felt ready to tackle more. Very good torque in the low ranges gave that "wall-climbing" feeling no matter what gear you were in. Acceleration through the gears as recorded is very quick, though the low-speed times were marred slightly by the bigger-than-normal tires fitted for long distance competition. The use of a straight pipe also prevents judgement of noise, but the standard Morgan has the pleasantly sharp sound of the early TR2 Triumphs. This machine had a delightful shriek over 5000 revs, appreciation of which, however, was not widespread. We love it, and it matched the car's personality perfectly.

Out on the road the Morgan is well within its limits at 75 or 80 and tracks very well with a light hand on the wheel, while wind noise is moderate for a body of this shape. Controlled by a firewall dimmer switch, the headlights are as usual adequate up to around 65 mph. When on a trip you must remember to press the foot-operated engine oil supply to the front suspension every fifty miles or so, and only eleven other greasing points require attention.

Engine accessibility recalls one of the admitted glories of a bygone age. Everything's handy and a cinch to work on. That long, louvered hood is best viewed from the driver's seat, though, where we guarantee it will give the meekest of chauffeurs an anticipatory thrill. It's no ruse, for the Morgan knows its purpose in life and has been at it a lot longer than most of these upstarts. Just tell it you're the boss, and you'll have made the sincerest of friends. K.E.L.