

Lister's Latest

By ALBERT DOUGLAS

"Its small frontal area and power-output of over 170 bhp is a speed recipe."

THERE is no doubt that currently more small-quantity sports and competition cars are built in the British Isles than in any other country in the world, with the possible exception of the United States. Their birthplaces vary from backyard sheds to quite impressive

small factories, but the Lister works in the age-old University city of Cambridge must be the most unusual of them all.

Driving force behind the Lister sports racing car is burly Brian Lister, whose Grandfather founded the family engineering business over sixty-five years ago. It started on the very spot where now stands the machine shop. Then it was Grandpa Lister's family engineering business with Brian's father in control, making agricultural machinery, hoppers, steel and bronze fittings for churches, ornamental gates and so on. Lister cars are built side by side with these unusual companions, and what is more, they are built with the same painstaking attention to detail, finish and to high engineering standards.

Brian Lister has not unnaturally been an engineer for most of his life, and a motor racing enthusiast for a good part of it. In 1954 he decided that he should put some of the engineering business to use making a product that would carry the Lister name into a different field, and at the same time enable him to become involved in a sport which has fascinated him for many years.

His first car to the pattern which the current cars follow, appeared in competition for the first time in 1954. It was powered by a highly-tuned version of the ubiquitous MG TC engine and was highly successful. This was followed by a 2-liter Bristol-engined car which enjoyed phenomenal success, one of them the winning of the 2-liter class in the 1954 International Sports Car Race at Silverstone in front of many revered Continental marques reputed to have cost ten times as much money.

Lister was fortunate in not only having a well-designed car to go racing with, but also in having the driving services of his friend, brilliant Archie Scott-Brown. Archie is partly disabled, but anyone who has seen him drive (and win) will know that his reaction, speed skill are superior

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The 2-litre Maserati engine fits snugly into the Lister frame. Radiator is angled to conform with the sloping hood lines. Note light front suspension.

RIGHT: Exhaust system is neatly tucked into body side. Two slots at rear expel air from brakes and final drive unit. BELOW: Front view of Lister-Maserati shows large ports below windscreen which are ducted to cool rear brakes and final drive.



to most. In addition to Archie as driver, Lister also has the services of Don Moore, a man who knows how to wrest hairy horses out of engines.

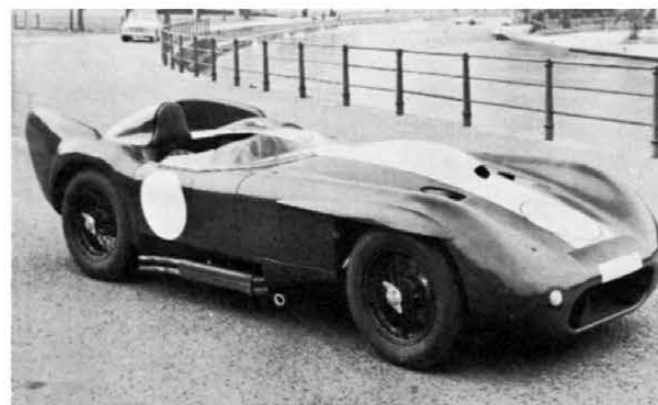
In 1955, the Bristol-engined works car only was raced, again with Archie at the wheel and again a formidable list of success was notched up including an outright win of the British Empire Trophy Race, and wins at Goodwood, Castle Combe, Brands Hatch, Shetterton and other British

circuits. The MG-engined car was put into temporary retirement — as we shall see.

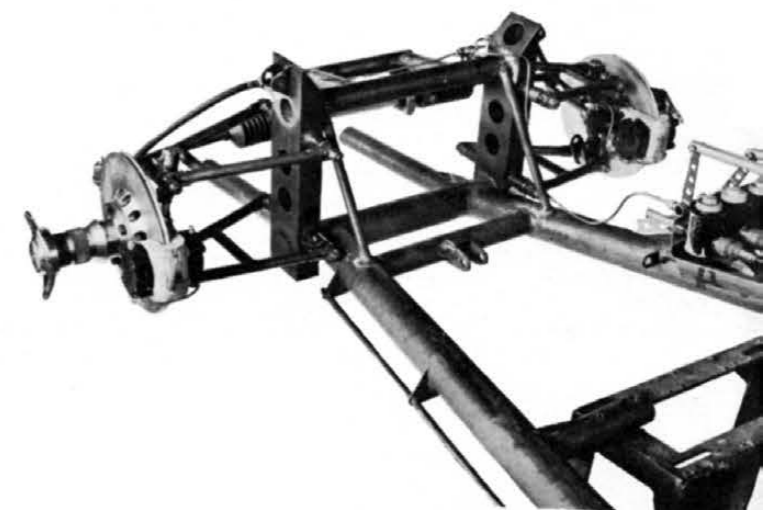
The impressive successes that the Lister was enjoying was prompting a considerable number of seasoned racing drivers to enquire whether replicas could be obtained. Lister was only too pleased to consider manufacture, he had had that in mind from the very commencement of his racing activities, but he had a problem.

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Equal length wishbones make up the front suspension. Coil spring/damper units are not fitted here. Main tubular frame members have welded stiffeners. Rack-and-pinion gear is ahead of top crossmember.



Production Listers in 1955 had streamlined bodies with stabilizing fins. Most models were fitted with 2-liter Bristol engines.



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In the British Isles there are thousands of young men who want to get into motor racing — only one thing stops them — money. The cost of a sports/racing car is high in any country, but in Great Britain it is made even more difficult by a post-war commodity known as Purchase Tax. This tax is levied on most goods, in varying amounts, but in the case of cars 60 percent is currently added to the manufacturer's catalogue price.

Following the lead of Derek Buckler, another well-known builder of competition cars, Lister decided to market his cars in "do-it-yourself" form for home consumption at any rate. By supplying a kit of component parts in this manner, the buyer avoids payment of Purchase Tax, providing of course that he assembles the car himself.

This proved to be a good move, many cars being purchased and raced by British drivers. Lister obtained the services of an aerodynamicist who de-

signed a wind-cheating body with converging tail fins for the "production" cars, but he continued to enter the works Lister-Bristol with the "1951" body. Tail fins were considered rather fashionable in 1955 and Lister admits to adopting them to be considered up-to-date. He himself designed the bodywork on the original cars.

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For 1956 the finned body has been dropped and an entirely new shape has been devised — once again the originator of the car. Functional and rakish-looking it is the result of data gained with the original MG and Bristol-engined cars, and has a notably low frontal area. So low is this frontal area that it is less than that of the better-known 1100cc sports/racing cars of last year — and there were some very small ones.

So keen was Brian Lister on reducing the frontal area to the absolute minimum that he has abandoned his

faithful Bristol engine which must have been the most powerful one in the country. Reason for this apparently odd move was that the 2-liter Bristol engine is an exceptionally tall engine due mainly to its downdraft inlet ports and consequent high-mounted carburetors.

In its place he chose a 2-litre Maserati six-cylinder unit with bore and stroke of 72mm by 80mm respectively. This unit is fed by three double-choke horizontal Weber carburetors which are side-mounted and result in a very low engine. Quite apart from the low carb mounting, the engine is a shallow design anyway, measuring only 22 inches in height without carburetors, one inch less than the 1100cc Coventry-Climax.

Of course the Italian engine cost Lister a considerable amount of money — much more than the Bristol, and he hopes that the outlay will be justified, but of this there should be little doubt. The Maserati has not only decreased the frontal area of the car, it has raised the power-output considerably. Maserati claims 173 bhp and Don Moore has been working on it since it came out of its crate last year, so it can be safely assessed as having gained a few more horses.

The frame of the new car is basically that of the old MG-engined car. Delightfully simple yet extremely robust and rigid, it is, like all Lister chassis a "two-tube" type. This means that the main frame longitudinal members are arranged as two parallel tubes. Material is mild steel of three inches diameter and 16 gauge thickness. Three cross-members of the same dimensions and material bridge the frame, and are welded in position.

Frame construction methods employed on the Lister are interesting and point to the fine engineering standards to which the cars are made. The chassis tube-ends about to be welded are first carefully machined to the correct radius and *then* welded. There is no question of a roughly finished tube being welded, with reliance being placed on the molten weld

filling up the gaps. Consequently the strength/weight ratio of this chassis is very high.

Interested bystanders have often asked Lister why he does not change to the now fashionable multi-tube "space-frame." His answer is that final roadholding and handling are the criterion of good design, and as yet none of his clients have any complaints in that direction. His works cars have been driven by Archie Scott-Brown, Stirling Moss, Ken Wharton and other extremely fast and successful drivers, and they have all had nothing but praise for the car.

Front suspension is independent by equal length tubular wishbones and coil spring hydraulic damper units. The damper units are attached at an angle to steel box-section upright members which are strengthened transversely by the front tubular cross-members. Rear suspension is on the popular De Dion principle with coil spring/damper units again supplying the suspension medium. The very light De Dion tube is located by two parallel radius arms per side and by a bronze block sliding in a vertical guide. Girling disc-brakes 10 inches in diameter are mounted inboard, close up to the Salisbury final-drive unit which is a stressed member supporting the rear spring/damper units. The drive is transmitted by two short half-shafts with Hardy-Spicer needle-roller universal joints, and there is a variety of ratios available for the final-drive.

Front brakes are also Girling 10 inch discs, but mounted outboard. Steering is by MG rack and pinion and two-piece steering column with steel universal joint. Brake operation is through two hydraulic master cylinders, clutch operation being arranged through a third cylinder.

Knock-off wire wheels are fitted, and once again the Lister machine shop proves its versatility by machining the hubs, including the splines, for these desirable fittings.

The radiator and oil-cooler are fitted to the body nose-piece which is of fully-stressed construction, and is divided into three separate air-intakes. The center one feeds the radiator and cooler, and outer ones direct air to the front brakes. Nose piece and body panels are of 20 gauge aluminum-alloy sheet.

It is obvious that air entries and exhausts have been the subject of much study on the latest Lister. Besides the ones already mentioned there are two noticeable intakes in the scuttle of the new body. These are connected to 4 inch flexible pipes which duct air to final-drive and rear brakes, and carburetors respectively. One pipe bends



to the left of the driver under the dashboard and is connected to an aluminum channel secured to the top of the propeller-shaft tunnel whence it runs the length of the tunnel to supply an air-stream. The other pipe bends to the right of the driver then goes forward through to bulkhead to connect to a carburetor air-box. Two

slots in the tail of the body eject the warmed air.

Height of the complete car is a mere 27 inches to top of headrest with driver aboard, and the dry weight is 1175 lbs. With its small frontal area and power-output of over 170 bhp this is a speed recipe.

Replicas of the new car are being

built for several drivers, some to have 2-liter six-cylinder Bristol and others four-cylinder Alta engines of the same capacity. In Great Britain, intending purchasers must supply their own engine and gearbox if they are to receive the Purchase Tax conditions, but of course complete cars are supplied if required. #

Arnolt-Bristol

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sengers under the hardest cornering. Leg-room is unusually ample. The seats have five stages of positively-locked adjustment. My height is 5 ft. 10 ins., and with the driver's seat in the next-to-longest notch I was barely able to touch the front floorboard with either foot. In the competition body there are no interior panels to the car's doors. But there is a metal strip about 1½ inches deep along the bottom inside of each door. This adds to the doors' rigidity and also makes a useful parcel-storage area in each door. There's no partition between the passenger compartment and the luggage space at the rear. Thus this space is accessible both from behind the seats and through the rear deck lid.

The A-B's complement of instruments is very complete. There are a big speedometer, a tachometer of equal size, and gauges for oil and water temperature, oil pressure, ammeter and fuel supply. The tach includes a clock and the speedometer a trip odometer. Warning lights are used to indicate high beam of headlights (Italian "warning" style), two-gallon fuel reserve, direction indicator and battery discharge. Controls include hand throttle and automatic mixture control for starting. The pedals are nicely dimensioned and spaced for feet of average size and the hand-brake lever is ideally placed between the seats. The shift lever is long and on the springy side. If you insist on the last word in refinement you can get a special remote shift linkage from Arnolt.

The 96-in. wheelbase chassis is based on a rigid, light, box-section frame with front suspension by a single transverse leaf and upper wishbones damped by steeply inclined, double acting tubular shocks. The rear axle is solid, with its differential housing offset to the right. Suspension is by longitudinal torsion bars, and the axle is positively located by a triangular stabilizing bracket that anchors final drive housing to frame. There are four shock absorbers at the rear and fabric slings to prevent excessive axle travel during rebound.

Steering is by rack-and-pinion that is dead-positive and impeccable. It appears to be completely non-reversible — that is, although the steering wheel directs the road wheels very sensitively, there is no playback from road wheels to steering wheel. The system responds as quickly as the most demanding driver could want. A wheel movement of just an inch or two is enough to execute most changes of direction, and gentle road curves need only a fraction of an inch. The steering has what I consider an ideal amount of feel — it's slightly heavy even at high speeds. Because of this you can set the wheel on the straightaway or in a constant-radius turn, take your hands off and enjoy the rare experience of having your car "remember" your command long after you gave it.

The A-B is one of the fastest-cornering cars I've ever handled, and this includes many quality road machines capable of far greater top speed. Its fore-and-aft weight distribution is very close to being equal and is slightly tail-heavy. Its tread is wide, its wheelbase short, and its suspension geometry is very stable. Under heavy side loading the rear wheels slide outward just the right amount to permit fast and effortless cornering. At high cornering speeds in big-radius bends the car drifts ever so slightly. Its natural cornering stance is flat and rock-steady and it stresses its tires hardly at all. It tracks true and perfectly at almost any speed. Once you learn not to use too much tiller, you can steer it with something very close to a centaur-like sense of oneness with the mount — especially when you gauge the wheel-setting for any curve precisely in advance, set the wheel with a single motion, and let the car do the rest.

The Bristol gearbox is a near approach to perfection. Its bottom cog has obviously been chosen for racing. It's low in terms of numerical ratio and therefore makes the car slow in getting away from the line. There's a good second lost between letting the clutch out and meaningful forward acceleration. But if it had a higher numerical ratio the engine would peak sooner. You only start once in a race, but there will probably be many times when you can use a broadly useful low-gear-range.

The A-B's first is good up to 40 mph.

First has no synchromesh, but you can downshift to it with no clash or noise by using elementary Model A Ford double-clutch technique. The other gears are synchronized and can be changed with a delicious degree of silence and certainty if you will make the change "slowly" — taking about one-tenth of a second to pass from gear to gear, while never lifting your foot from the throttle. A similar pause insures silent downshifts. You can make them more rapidly, with less stress on the mechanism, by double-clutching and blipping the throttle with the clutch out.

The brakes are terrific. I pulled a wheel to inspect one of the brake drums and was totally unimpressed by the sight of the simplest sort of non-finned, non-ventilated drum. Yet these brakes are all you could ask for. During our ten-stop fade test they lost not a bit of their massive stopping power. These are brakes to race with — which means they're the kind of brakes you don't mind entrusting with your life.

So let's summarize. In terms of performance, the Arnolt-Bristol is a thoroughbred racing car fit to be stabled with Ferraris and Mercedes. Its acceleration is shattering and any point on the acceleration curve can be reached in a matter of instants. You can get tremendous speed in the space of a few watch-ticks, then downshift and brake and be creeping along in Second split-minutes after you were indicating 110 mph. The engine's power is nothing short of a revelation. It forces you to take a second look at all the scholarly arguments in favor of the short-stroked engine. In terms of hand-work and fine finish on mechanical components, there are few machines in the world that can compete with the Arnolt-Bristol. It's a goer and a winner, a full fledged racing machine that can blow off others far out of its displacement class and worlds apart from its price class. It's a car the enthusiasts ought to be fighting to buy.

I'm thoroughly convinced that you'll find no car with more performance per dollar than you can get in the A-B. It's a Golden Age-type sports car, the sort of combination of fierce racing car and obedient road machine that survives here and there only in the high price-brackets.

G B