AUTOSPORT

BRITAIN'S MOTOR SPORTING WEEKLY

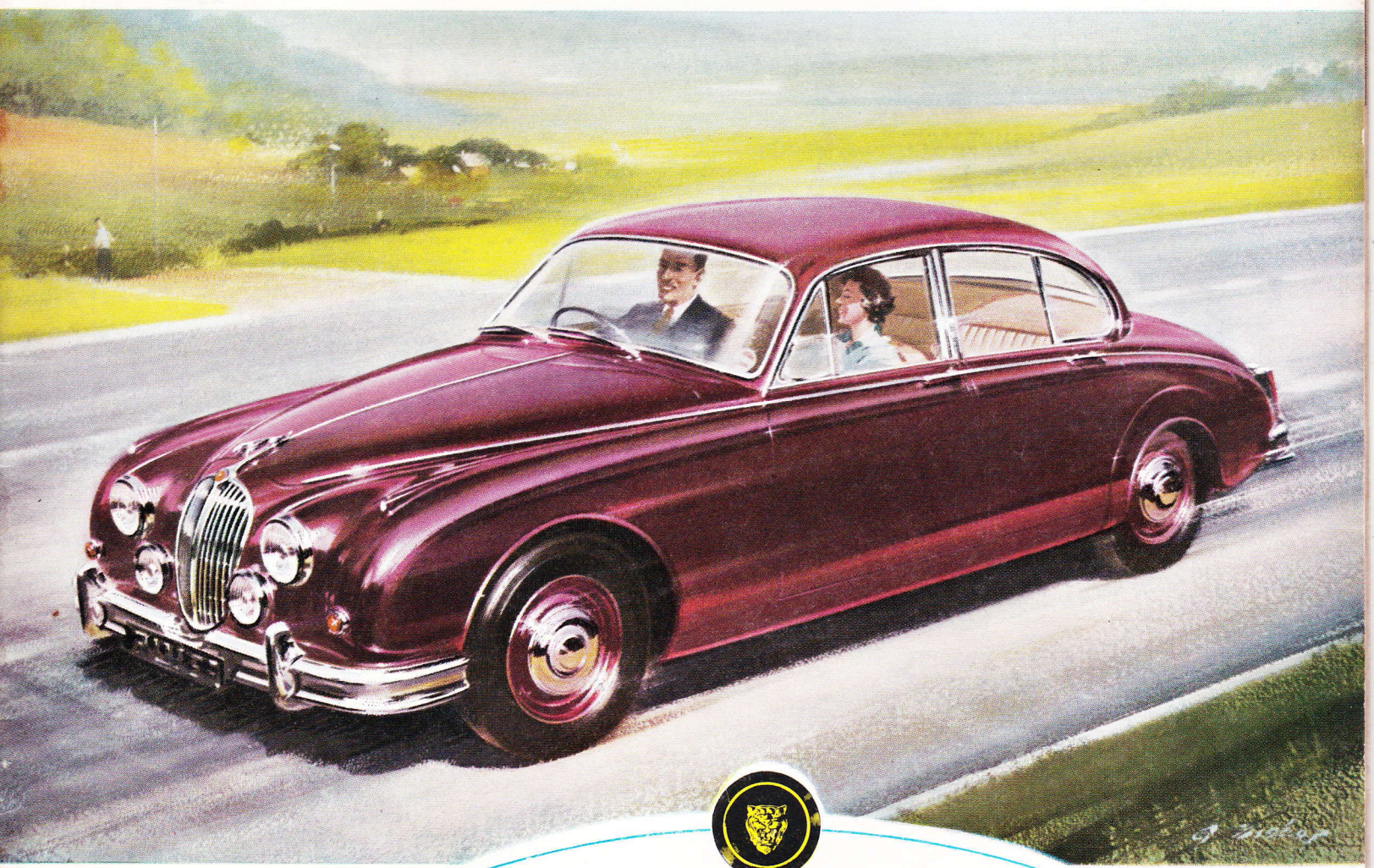
DECEMBER 18, 1959

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EVERY FRIDAY

Vol. 19 No. 25

Registered at the G.P.O. as a Newspaper



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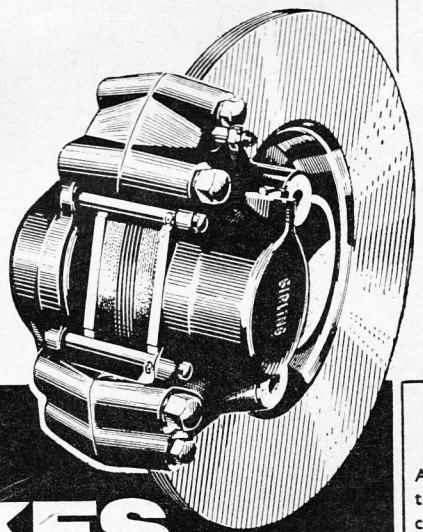


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2nd COOPER M. Trintignant

4th COOPER J. Brabham

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48 FIRSTS IN MAJOR INTERNATIONAL EVENTS 1959

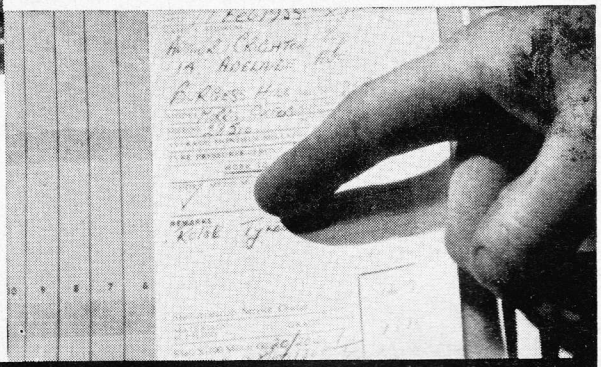
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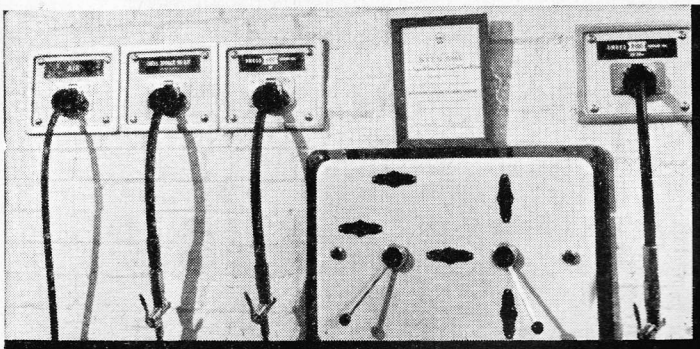


YOUR CAR HOLDS NO SECRETS FOR SHELL

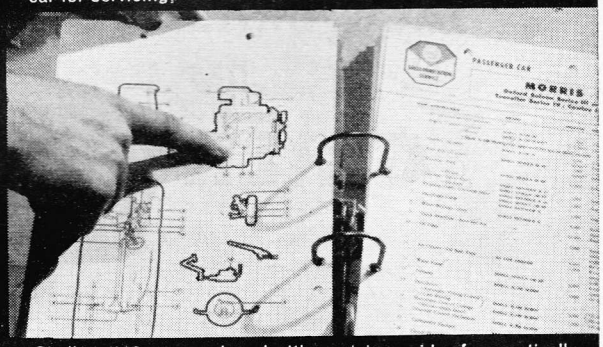
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AUTOSPORT

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Registered at the G.P.O. as a Newspaper

Vol. 19 No. 25 **December 18, 1959**

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EDITORIAL

BRABHAM IS CHAMPION OF THE WORLD

THE Grand Prix racing season for 1959 is over, and from it has emerged a new World Champion in the unassuming Australian Jack Brabham. The eyes of the world were on Sebring last week-end to see which of the three contenders for the title would emerge victorious. Brabham, though because of his great sportsmanship and modesty he would never admit it, is a thoroughly worthy champion and his reward has come after what must have been an extremely trying season. At the end of the deciding United States Grand Prix the title almost eluded him, for when his fuel tank ran dry he was faced with a long distance over which he must push his car. When he collapsed exhausted at the end of the race he was unaware of Bruce McLaren's victory which had prevented Maurice Trintignant or Tony Brooks from beating his Cooper to the chequered flag. Not only was it a great day for Jack Brabham, either: it was an occasion of enormous success and prestige for Cooper-Climax, and John Cooper, whose cars had already clearly won the Formula 1 and Formula 2 Constructors' Championships, was there to see the American Grand Prix and the World Drivers' Championship go to his drivers and his machines. To Stirling Moss must go all our sympathy in the extremely bad luck that overtook him once more. After being runner-up for so long he has this year lost even that small consolation, and such disappointment must be hard to bear. It is to be hoped that the remarkable run of ill-fortune that has dogged him throughout the season will at least be kinder to one of the world's greatest drivers next year. Tony Brooks, too, must have been more than a little disappointed, and it might well be that his first-lap spin cost him the title. As it was, the incident and a subsequent pit stop left him almost a lap in arrears in the early part of the race, and he spent the remainder of the event making up his lost ground. To Rodger Ward goes our admiration: his was one of the most courageous and sporting efforts of the day and clutch failure at half-distance ended his run with the Offenhauser-engined midget. The Indianapolis winner never gave up trying, and it is to be hoped that appreciation of his very fine efforts will encourage others from his form of racing to try their fortunes in the Grand Prix field.

THE TRIALS CHAMPIONSHIP

ONCE again there is a new trials champion and this time it is Charles Pollard. A comparatively new name in trials, he has, in fact, achieved the remarkable distinction of winning the R.A.C. trials championship at his first attempt and after only two seasons in this branch of the sport. On Saturday he drove extremely well, of course, as he has done throughout the past season, and his car's immaculate turn-out has always been remarkable. The Championship itself was an extremely well-run event, with well-planned sections of an interesting nature and each presenting different problems. That the event resulted in a tie over such a testing course speaks volumes for the skill of Pollard and Peter Highwood, the runner-up. Both drivers remained almost level on marks from an early stage in the trial.

PIT and PADDOCK

THE fine performance put up by Studebaker Larks during the curtain-raising compact car race at Sebring may break the so-called "Detroit agreement" which keeps American motor manufacturers out of competition. The cars were entered by an official Studebaker dealer and many prominent General Motors executives had come from Detroit to watch the event. Coast-to-coast television coverage of the compact car race resulted in a great deal of favourable publicity which may convince the manufacturers that competitive motoring may be a good thing after all!

BILL FRANCE, director of America's Daytona Raceway, has put up a prize of $10,000 for the first three miles a minute lap. This prize may well be won at the Raceway's next meeting on 31st January.

STANDARD-TRIUMPH ENTRIES IN MONTE CARLO RALLY

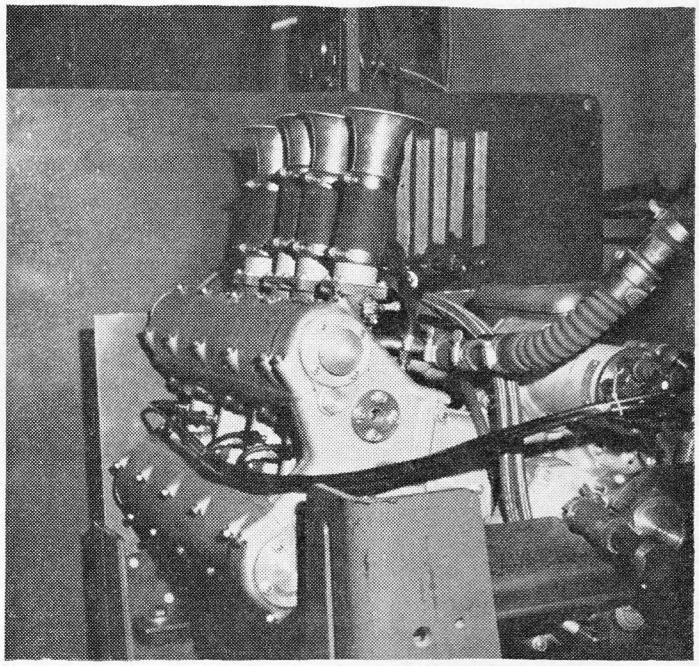
DRIVERS of four different nationalities make up the crews for the five Triumph Herald coupés and the two Triumph TR3s entered by the Standard-Triumph Group in the 1960 Monte Carlo Rally. The crews are:—

TR3A, M. Becquart/J. Blanchet (Lisbon); TR3A, J. Thuner/B. Cornu (Paris); Herald, Mlle. A. Soisbault/Mme. R. Wagner (Paris); Herald, R. Slotemaker/R. Crellin (The Hague); Herald, C. Corbishley/P. Roberts (Glasgow); Herald, I. Lewis/H. Nash (Glasgow); Herald, K. Ballisat/S. Turner (Glasgow).

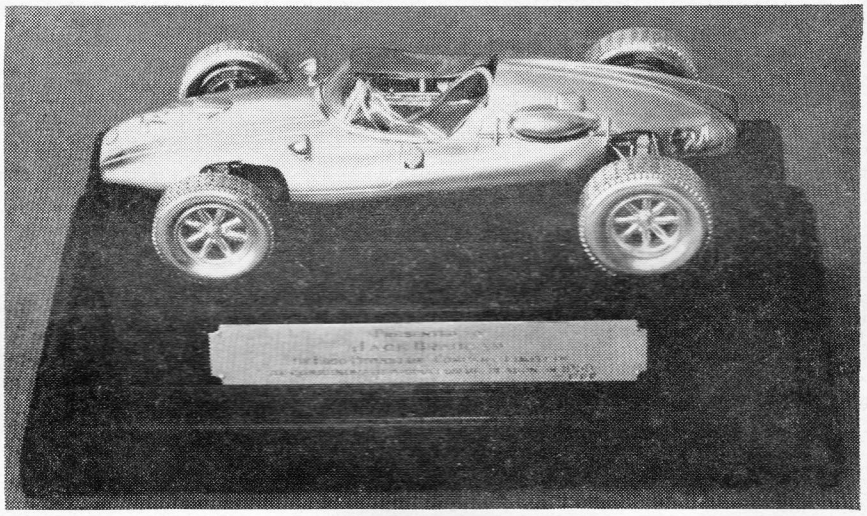
Seven other Standard-Triumph cars are entered privately.

★

EXCITING: The new all-alloy Scarab Grand Prix engine with desmodromic valves and Hilborn Travers fuel injection.

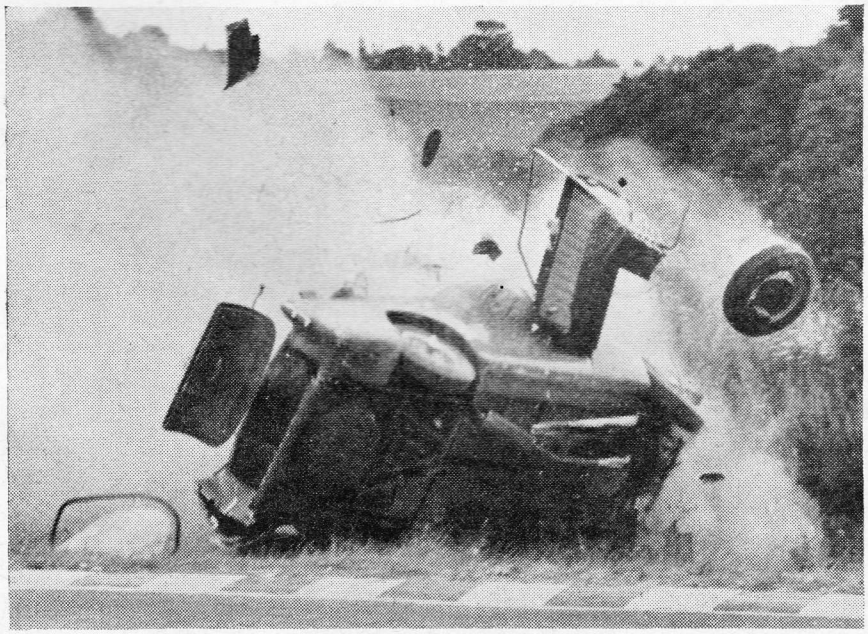


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SILVER model of a G.P. Cooper (right) was presented by the Esso Petroleum Company to Jack Brabham.

PEERLESS PRANG: (Below) This photograph of Albert Gay's crash at Brands Hatch won a prize for Victor Blackman of the Daily Express *in the Encyclopædia Britannica's annual competition.*



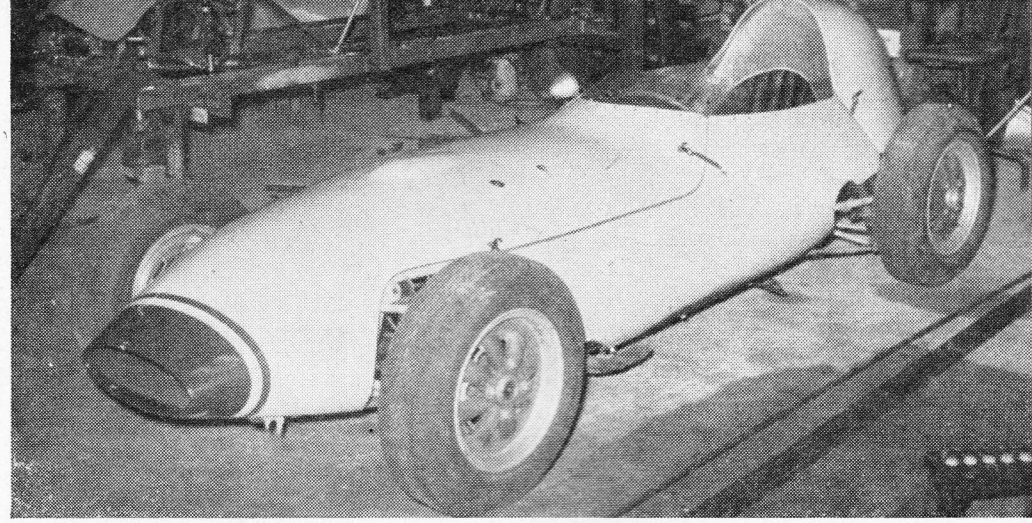
THE Trials Championship Trophy and B.T.R.D.A. awards were presented by Mrs. Hazel Chapman at the Association's extremely enjoyable and successful annual dinner and dance at the St. Anne's Hotel, Buxton, on Saturday. The Trials Gold Star was won by Tony Alldred, with Frank Lewis as runner-up. Winner of the Silver Star rally competition was K. C. Walker from D. C. Astle, and the Ladies' Silver Garter award went to Mrs. Pauline Mayman. M. J. Hawley won the Flather Star driving test competition and A. W. Clift the award for standard production car trials.

Final World Championship Standing

1.	Jack Brabham	31
2.	Tony Brooks	27
3.	Stirling Moss	25½
4.	Phil Hill	20
5.	Maurice Trintignant	19
6.	Bruce McLaren	16½
7.	Dan Gurney	13
8.	Joakim Bonnier	10
	Masten Gregory	10
10.	Rodger Ward	8

Manufacturers' World Championship

1.	Cooper	53 points
2.	Ferrari	38 points
3.	B.R.M.	19 points
4.	Lotus	1 point

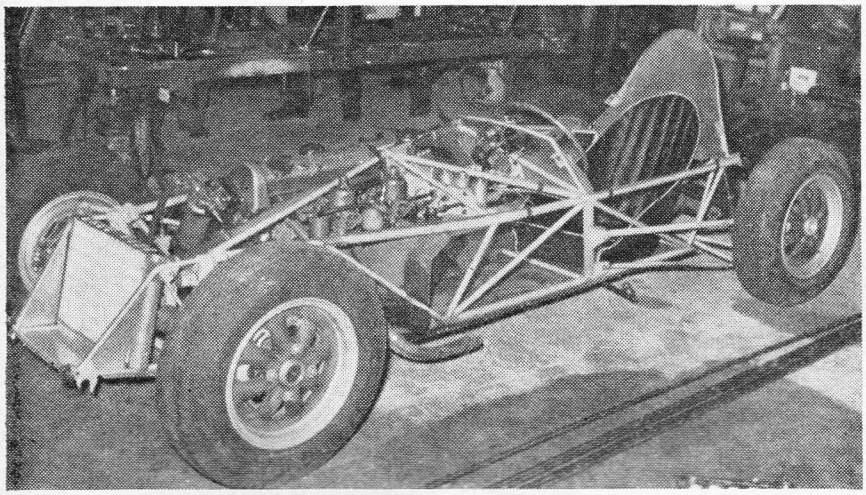


SLEEK, PURPOSEFUL BODY (right) clothes the space frame (below) and is in four parts, secured in such a way that rapid removal is possible. The general effect is most pleasing, giving the car an appearance of greater length than it has.

AFTER a phenomenal run of successes with his 1,100 c.c. Lola sports cars, Eric Broadley is now entering the single-seater arena. The first Lola racing car is a Formula Junior machine, and it is intended that it shall be powered with the new oversquare Ford engine, though any other eligible unit could be used. Don't be alarmed at the Coventry Climax engine in the photographs, since this was only fitted for preliminary tests before the Ford unit was ready.

The Formula Junior Lola

Eric Broadley's First Racing Car



The space frame is constructed of 1 in. and ¾ in. mild steel tubes, bronze welded together. The front suspension employs the same wishbones and stub axles as the existing two-seater, but the track is narrower at 3 ft. 9 ins. The helical springs, telescopic dampers, and rack and pinion steering gear, are also similar to those of the sports car.

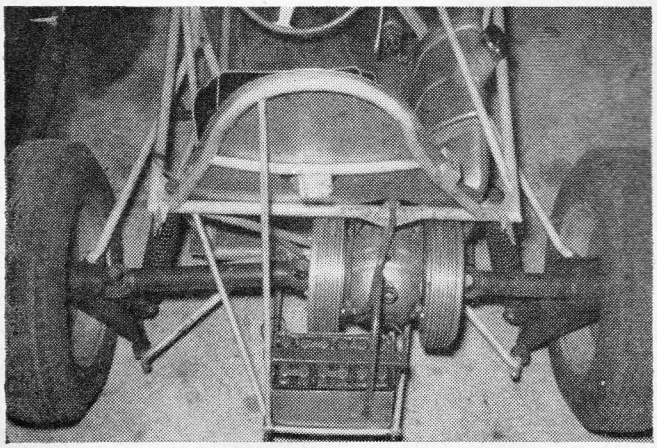
The rear suspension is on the same principle as that of the previous machines, but differs in detail. Once again it is a wishbone system, of which the articulated half-shaft is a stressed member. There are long tubular trailing links, and the lower wishbone also has a slight angle of trail. As the transmission is offset to the right, an ingenious method is adopted in accommodating a right side half-shaft of adequate length. The rear hub on that side is of very large diameter, and is carried on a pair of opposed taper roller races. The half-shaft passes right through the hub, which actually contains the outer universal joint. On the left side, the normal hub and half-shaft construction is followed; the rear track is ½ in. more than the front.

The engine is offset to the right of the car, and the transmission passes on that side of the driver's seat which is some 3 ins. to the left of centre. The chassis-mounted hypoid unit is as before, but this also is offset, and the Lockheed drum-type brakes are of 9 ins. instead of 10 ins. diameter. Smaller wheels are fitted too, and 5.25-13 ins. tyres are at present in use, though a smaller section may be tried in front.

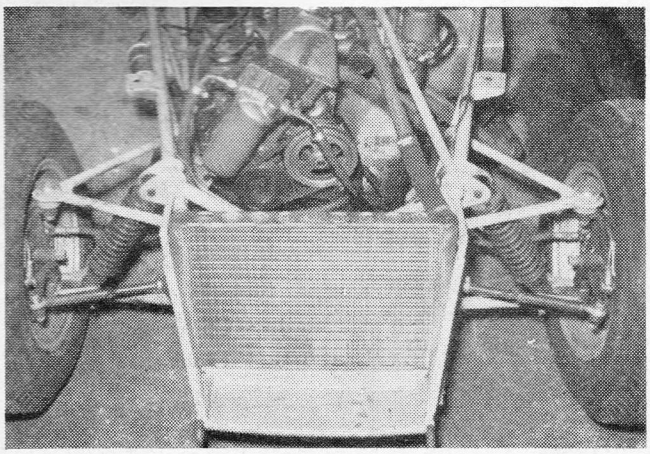
The tuned Ford engine will be mated to a B.M.C. gearbox with Lola close-ratio gears. A 7¼ ins. Borg and Beck clutch will be bolted to a cut-down Ford flywheel. The gear lever will come on the driver's right, and it should be possible to keep the Weber twin-choke carburetters and ramming pipes inside the bonnet. The Gallay radiator is at the nose of the car, and the small header tank is behind the engine. The fuel tank is on the right of the propeller shaft, but a tail tank will be used if there are long distance races. The battery is behind the hypoid unit.

Unlike the cigar-shaped Juniors that we have seen, the Lola has a body of the maximum permitted width.

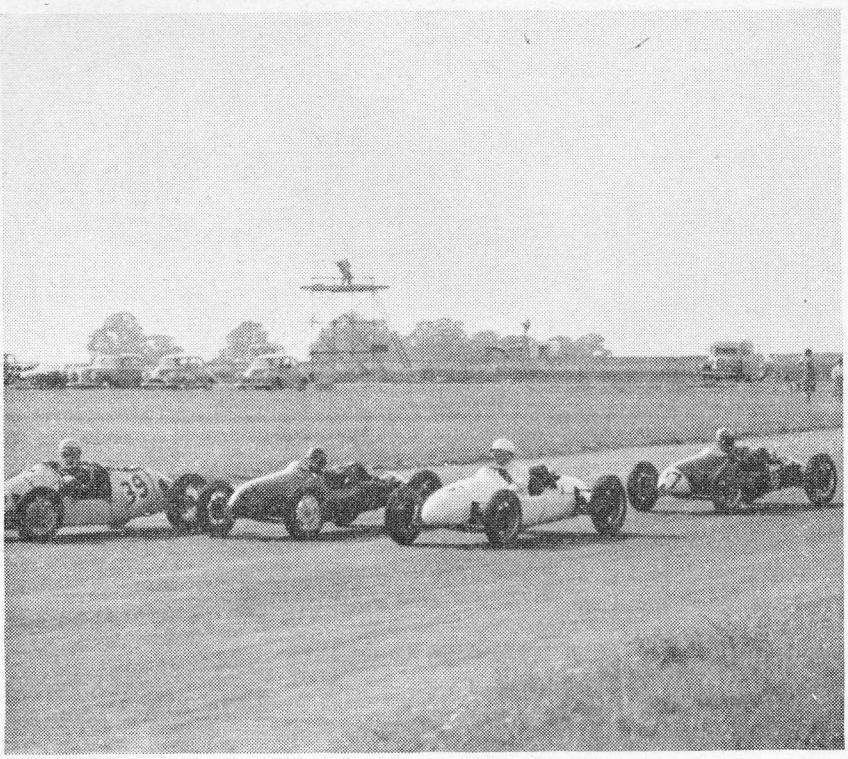
(*Continued on page* 810)



REAR SUSPENSION is on the same principles as that of the sports cars but differs in detail, and an ingenious method is used to accommodate an offside half-shaft of adequate length.



FRONT SUSPENSION employs the same wishbones and stub axles as the existing two-seater but the track is narrower at 3 ft. 9 ins. Helical springs, telescopic dampers and steering gear are similar to the sports car units.



ONE-CYLINDER power units are still used in 500 c.c. racing today, but as a production car engine they would be unacceptable.

TECHNICAL AND OTHERWISE

How many cylinders do you need?

BY JOHN BOLSTER

I BET you don't know how many valves your radio has! In the past, everybody talked about his "three-valver" or his "seven-valve superhet", but such electronic discussion has long gone out of fashion. Yet the number of cylinders in an internal combustion engine has always been a topic of conversation, and in more than 60 years of motoring nobody has ever got tired of counting the things.

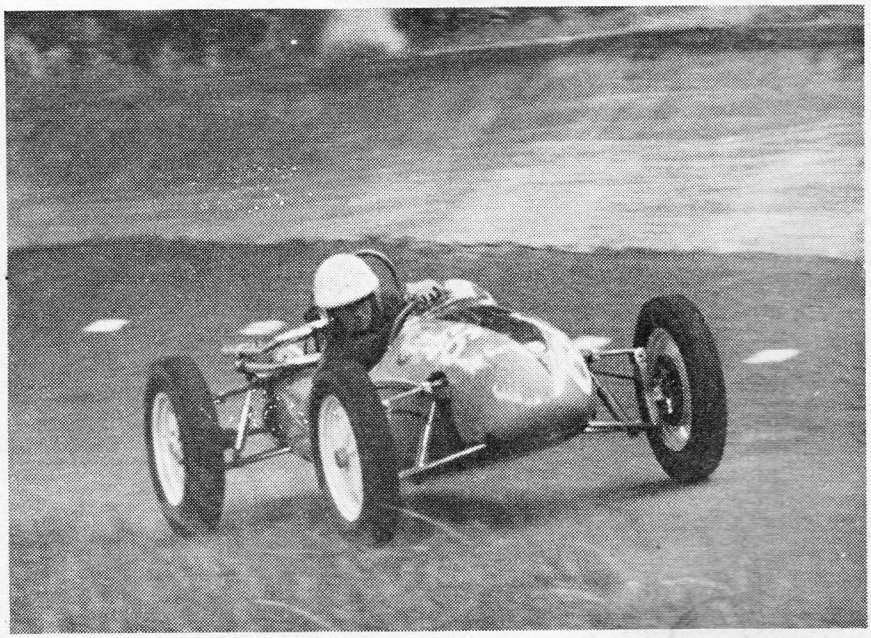
After all this time one still sees "Six" or "Eight" on the back of a car, along with all the other chromium-plated nonsense, such as "Super" and "Automatic". It implies that you paid a bit more for your car, that you habitually drink "champers", and that your wife has a mink coat. I have never been tempted to write "Four" on the back of my Mini, and only an inverted snob would inscribe "One" on the tail of his Bond. However, there are some more technical reasons underlying the choice of "X" cylinders for any particular type of car, as I shall here attempt to show.

In the beginning cars had one or two cylinders, and they were far from being quiet and flexible, as we prove every November on the Brighton Run. The four-cylinder engine then became all but universal, and even some of the earliest ones were a great advance. Curiously enough, the eight-cylinder engine preceded the six-, and C.G.V., Ader, Dufaux, Darracq, Porthos and others tried that number of cylinders in straight and vee formation soon after the turn of the century. Spyker and Napier quickly followed with the "six", while quite a few three-cylinder cars were sold by Panhard, Vauxhall, Rolls and Duryea.

Thus, although the "four" was the standard engine, you could have almost any other number to choice. *En passant*, it is odd that the five-cylinder power unit, now so beloved by heavy transport operators, was not favoured. Anyway, it soon emerged that the "four" couldn't be beaten as a practical, hard-working unit, but that the "six" had a flexibility that was allied with perfect balance. Of course, when engines were bolted rigidly to the chassis, balance was of vital importance, but the connoisseurs of the Edwardian era also demanded such low speed flexibility as no 1959 car can give.

It is a curious thing that nowadays we pad our cars until we can hardly hear the mechanism, but by and large the modern car is regrettably noisy to the bystander. In the early days, a really good car had to sound silent to the general public, and an expensive machine was expected to travel at walking speed on top gear while threading the crowded market place or whispering up the drive of a stately home. For such purposes, the overlapping power impulses of the six-cylinder were indispensable, and it became recognized that for sheer luxury one must support an extra pair of mouths.

After the Kaiser War, there was motoring for the million, and once again the two-cylinder car made an appearance. Their numbers were legion, but Rover, G.N., B.S.A., A.B.C. and countless others come to mind. They were all totally lacking in refinement, and the four-cylinder Austin Seven cooked their goose. The public may think they want speed, economy, or good looks, but really they will always buy the car that gives the smoothest and most silent travelling. Before the big slump of 1929, the motor papers were suggesting that six- or eight-cylinder engines would become universal, except for tradesmen's vans.



TWO-CYLINDER racing cars hold a virtual monopoly in hill-climbing. Will "twins" become popular among touring cars?

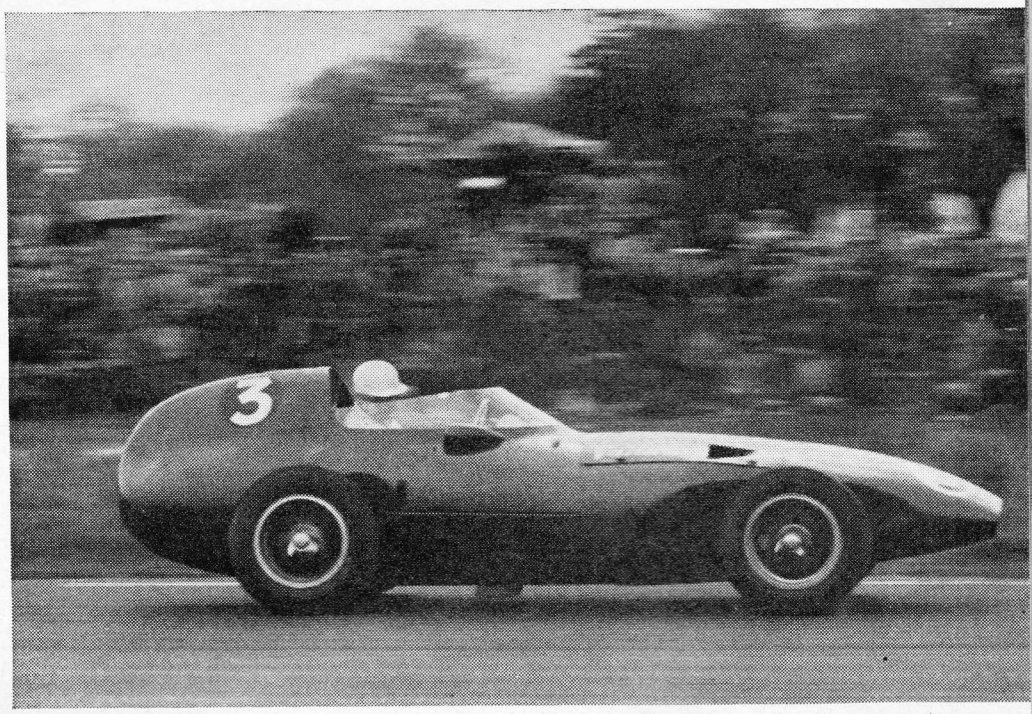
THE FOUR-CYLINDER engine has gained tremendous popularity in the industry today and in racing the Vanwall was almost unbeatable last year.

In the poverty stricken early 1930s, we were well and truly back among the four-cylinders. Luckily, the Chrysler "floating power" patents could be shared at a price and Citroën soon proved that a flexibly mounted "four" could approach the "six" of bygone days. It is curious that when prosperity returned, almost every manufacturer went mad and added a straight-eight to his range. I don't suppose an eight-cylinder Hillman or Wolseley, for example, has survived, and I see no reason why it should. Anyway, cheap straight-eights abounded, and luxury cars like the Rolls-Royce and the Hispano-Suiza had 12 cylinders, while the Cadillac and the Marmon had 16. After all, with petrol at 6*d*. a gallon in the States and just over 1*s*. in England, what were a few cylinders among friends?

The very large car contained the seeds of its own destruction, for on ordinary roads it was unwieldy, slow and tiring to drive. After the Hitler War, the Rolls had six cylinders and the Cadillac eight. The price of petrol rose and rose, and nobody missed the "12s" and 16s". Compression ratios went up and engines gave much more power per litre. A new generation had no idea how smooth and quiet were the cars of 1914, and the modern type of car was accepted which would not run properly at less than 20 m.p.h. on top gear. The motorist today has to row himself along with his gear lever in a manner which his father would have considered intolerable. Even the bigger engines have high compression ratio and no real flexibility, but the automatic gearbox has masked this melancholy fact.

Nevertheless, a point has been reached where the public are beginning to demand quieter and more flexible cars. From racing, we know that the best all-round engines, which combine high power output, low weight, good torque, and freedom from destructive vibration, usually have individual cylinders of about 350 c.c. capacity. In the same way, the everyday production engine of $1\frac{1}{2}$ to $2\frac{1}{2}$ litres needs more than the four cylinders it so often has. One knows of several "eights" in the offing, including a prototype of only $1\frac{1}{2}$ litres, and though the straight-eight does not fit in with the modern short bonnet, the V8 is the most compact engine of all. We can expect to see the medium-sized cars of all nationalities with more than four cylinders, but there is another side to the question.

If the 350 c.c. cylinder is ideal, as I have postulated, the four-cylinder car of 600 c.c. to 1,000 c.c. has more "pots" than it needs. From the point of view of performance, I think that this is so. The 980 c.c. Auto Union has three cylinders, and is notably smooth and silent, though as it is a two-stroke it is a rather special case. Both Austin and Ford have had three-cylinder prototypes in the past, but there is no four-stroke of this type in current production. Let us, however, consider the two-cylinder engine.

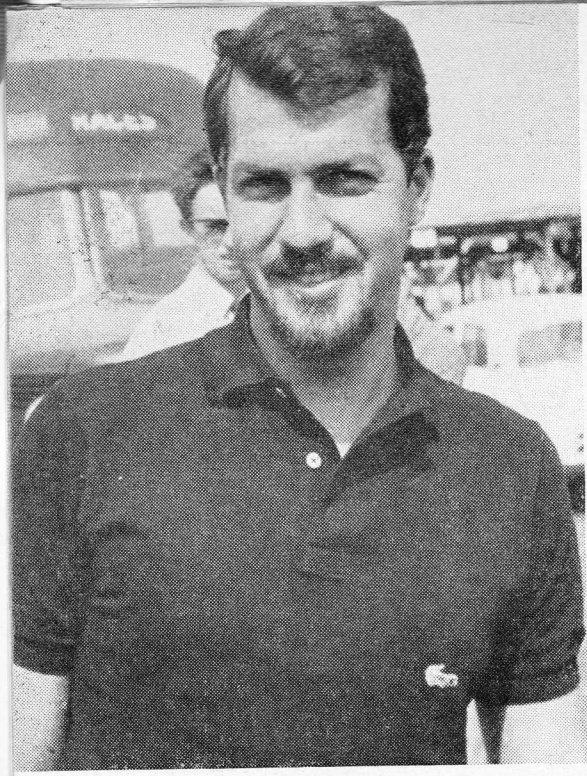


Excluding competition models, by far the fastest small-engined saloon is a "twin". This is the Panhard Tigre, and it has an enormous body that can be used as a six-seater. Yet I recently timed one at Montlhéry, and it lapped consistently at over 85 m.p.h. with remarkable ease and silence. The Panhard has a capacity of only 850 c.c., and the average 850 c.c. "four" has its work cut out to lap at 70 m.p.h. The Panhard engine is a flat-twin, and it is so well balanced that it never seems to be working hard. It is not flexible at the lowest speeds, but it accelerates well and is very responsive in the middle revolution range. Unfortunately, the flat-twin engine is expensive to make, and the vertical twin does not seem to be as smooth or as powerful.

Well, there it is, and I leave it with you. Does the medium-sized cylinder of, say, 350 c.c. have something that the very large or very small "pot" lacks? I would be interested to hear your opinions. By the same token, do readers think that the average production car of today would be better if it were more flexible and more silent? We all enjoy performance, but when one uses a car for 365 days in the year there are other things, you know.



THE SIX, TOO, is used by many manufacturers, notably those of high performance machines.



PROFILE — JOAKIM BONNIER

By Christopher Nixon

ONLY a couple of years or so ago the name Joakim Bonnier meant little or nothing at all to the majority of enthusiasts. He was known as "that Swedish fellow with the beard". Since that time, however, he has progressed from being just a driver of above average ability to the polished and highly competent Grand Prix pilot we now know.

He started his career in 1953 with a 1948 Citroën. In this car he competed in many rallies and trials in Sweden. The Citroën was followed by an old H.R.G. but he had little or no success in this, for most of his competitors were in Porsches.

The next year he went into the motor business and became a distributor for Alfa Romeo. He raced a car of this marque in his first "real" road race, the so-called Swedish G.P. of that year, a sports car race, in which he finished third. He continued racing for the rest of that year and in 1955 went to Italy for the Mille Miglia. Driving an Alfa again, he failed to finish, but he enjoyed himself immensely. Moving north again he went to Finland where he competed in quite a few races. Just for fun he entered the Stockholm G.P. in the new Disco Volante Alfa—and won.

From Finland he moved on to England and Oulton Park, where he won a saloon car race in an Alfa. In the Tourist Trophy he shared the wheel of a 2-litre Maserati with Andre Loens and together they won their class. Then it was back to Sweden where he did some dirt track racing.

At the beginning of 1956 he decided to start motor racing as a profession. So he sold his business and started to earn a living as a racing driver.

He still had the Disco Alfa, which he describes as "a terrific car". In Sweden there is a lot of ice racing and the Alfa was particularly suited to this form of competition. He used it to good effect, winning more races than he can recall, and was finally dubbed "King of Ice"! "Ice racing isn't real racing," says Joe, "but it is great fun. All you need is a car with lots of torque, and the Alfa certainly had that."

His next step was to buy a 1½-litre Maserati. "I thought it would be *the* car, but then Lotus and Cooper came out with their 1,500s and my brilliant idea turned out to be a big mistake." He raced it at Oulton Park, Aintree and Silverstone, but without any noticeable success. However, he did win two saloon car races (at Aintree and Silverstone) in an Alfa.

The Mille Miglia of that year saw Bonnier back in Italy, once again in an Alfa Romeo G.S.V. He enjoyed this event hugely and managed a very creditable 15th place overall, as well as being third in class. He reckons he would have won the class but for one thing: the lights were set with an empty tank. The result was that with a full tank the lights shone up in the air, which didn't help at all. In the end he had to wait for the next car and follow it, and, of course, lost a lot of time in the process.

At Oulton Park the year before, Joe had met Mackay Fraser. In the spring of 1956 they met again and it was at Oulton Park that year that they decided to join forces. They bought an ancient and enormous old bus, big enough to hold three cars, Mac's Ferrari and Joe's Alfa and Maserati. Then they started on their grand tour of Europe. They went to Spa, Sardinia, Nürburgring, Sweden, Italy (for the Supercortemaggiore), Bari and Monza. Was their journey really necessary? Well, necessary or not, it produced some pleasing results, for they gained numerous wins, class wins and placings between them.

At Monza Joe competed in the G.T. race preceding the Grand Prix. After the race he was wandering about the paddock, thinking of not much, when he was hailed by the Maserati team manager, Ugolini. The conversation is, I think, worth recording. It went something like this, with Ugolini starting the proceedings:—

"Bonnier, where the hell have you been?"

"What do you mean, where have I been? I've just finished my race."

"I dare say you have, but you're going to start another in about 40 minutes. You're driving for us in the G.P."

"Don't be silly, I've never even sat in a G.P. car. I haven't the vaguest idea how to drive one."

"I can't help that. Villoresi is sick and you'll have to take his place."

The outcome of this conversation was that a short time later our hero found himself hurtling round Monza in a Formula 1 Maserati. He was, he recalls, "very, very frightened", which could be one of the great understatements of our times.

Eventually the car broke down and he retired. It had been quite an experience.

After that he and Mac went to Avus where he competed in two races with the Veloce and a 1,500 Maserati. With this meeting over they set off for Modena for the Imola G.P. Seventy hours later they arrived after a series of breakdowns *en route*.

Now Fraser had started to drive for Lotus and Joe had the 1,500 Maserati. In the race Joe found that his two most dangerous competitors were Musso and Castellotti, both on Oscas. After a bad start Bonnier fought his way up to third place and with eight laps to go he passed Musso and went after Castellotti, catching him at the rate of 2-3 secs. a lap. Two laps later, however, his race ended with his first really bad accident. "Somebody got in my way and I flipped. I was flung out and hit a telegraph post head on. I was asleep for some time. . . ."

He was picked up, bundled into an ambulance and conducted at high speed to a hospital, where, to the surprise of one and all, nothing could be found wrong with him. Thinking that there



"KING OF ICE": Clutching his winner's bouquet, Joe brings the Disco Alfa in after winning an ice race.



TEAM WORK: Mackay Fraser (Ferrari) leads Joe Bonnier as they approach Lodge Corner during the 1956 British Empire Trophy.

must be a catch to this somewhere, the doctors insisted that he remain for a week for observation. So Joe settled down for a week in bed.

This was not to be, however, for a day or so later a friend came to see him and suggested that he should pack up and go. This seemed to be a good idea, so Joe left, feeling more or less all right. On the way back to Sweden, however, he began to feel worse and worse and as soon as he got home went for an X-ray. This was just as well for it was found that he had broken a vertebrae and several ribs. The result was that he had to wear a cast for six months.

His doctor, who happened to be his brother-in-law, told him that racing was out of the question for at least four months. "O.K.," said Joe, and promptly flew to Rome for the G.P. there. "This was silly, I know," he says, "but I felt that with luck I might get into the Maserati team for the next year, and I knew that if I didn't put up some sort of a show in Rome I wouldn't even be considered."

He competed in three races in Rome, finishing first, fourth and sixth. The next day Ugolini called him and asked him to come to Modena, which he did. There he signed a contract to drive for Maserati in sports car races in 1957. Ugolini also told him that if he hadn't raced in Rome Maserati wouldn't have been interested in him, so it was just as well that he defied his doctor's orders!

From this point on Bonnier began to make a name for himself, and to try to squeeze his exploits over the last three years into these pages would be an impossible task, so we'll leave his career and move on.

He was born in Stockholm on 31st January, 1930. When he was 19 he left school and joined the Navy, eventually receiving his commission. He is still in the service and only recently finished a 30-day course. He is *not* being "called up", however, as some people seem to believe.

His father is a professor at Stockholm University and so it was not surprising that he should want his son to go to a university too. So Joe went to Oxford, where he studied English Literature, and it was at this period that he really got the hang of our language. He has mastered it very successfully, too, speaking easily and fluently, although he will admit that he has changed his Oxford accent for a faintly American one!

From Oxford he went to Paris "where I was supposed to do something in the family firm of publishers". He stayed there a while and then returned to Sweden and started his car business.

A quiet, rather serious-looking man, Bonnier nevertheless impresses with his quick smile and agreeable personality. He loves his fiancée (whom he plans to marry in the spring) and French cooking. He dislikes cats and ladders he has to walk under. He doesn't smoke and drinks "very mildly".

He is very interested in modern art and collects as much as he can. He is a keen squash and golf player and intends to play as much of the latter as he can this year.

As a sideline Joe writes for several Swedish magazines and is in the process of writing two books, one a biography and the other on the art of driving.

Although he has a home in Stockholm he is seldom there, for he actually lives in Caracas, although when he marries he will probably move to Switzerland.

He is proud to number Juan Manuel Fangio among his friends (who wouldn't be) and will tell you how the Old Man used to take him round a circuit before a race and show him cut-off points, lines through corners, and so one.

His immense admiration for the master is shared by Fangio's countrymen. "I once stayed with him in his home in Mar del Plata. If we went to a night club everything stopped, the people all stood up and applauded him to his seat. It was fantastic." I personally cannot think of any British celebrity who is regarded with such affection, can you?

Of the new formula, Bonnier says, "I think it is unfortunate because the existing cars are the safest ever, but I don't mind as long as we get good cars to drive. I think, too, that we shall get more competition. Incidentally, I'm pretty sure that Maserati will resume racing.

"I quite like sports car racing, but it is made dangerous by the inexperienced drivers who are allowed to compete in the big races.

"The World Championship is a good idea I think, but it seems to me that the points system is wrong. I think the winner should get more, say, 10, then six for second and so on. After all, it is much more difficult to win than to come in second."

Talking of winning brings to mind an amusing piece of Bonnier strategy. He was racing his Alfa in a saloon car race at Silverstone in 1956. The regs. stated that there had to be at least three cars in the class, otherwise it would be amalgamated with the next one up. It so happened that there were only three cars in Joe's class, one of which was another Alfa. In practice he proved to be fastest of the three but was very concerned to find that the other Alfa had broken down. This was very serious, for if he didn't start Joe would not get any prize money for his class win. "So I lent him my mechanic and the car was repaired in time for the start of the race. As it happened he hardly completed a lap before it broke again, but I won my class and got my £50 prize money!"

The biggest disappointment of his career was the Targa Florio this year. He was leading the race in the Porsche when it broke down 10 minutes before the end. He considers that it was the best race of his life, though. "I thoroughly enjoyed myself and I felt that I had driven better than ever before. I learnt after the race that I had done one lap at over 100 k.p.h. This, I felt, was quite an achievement, as the only other driver who has done this is Stirling, who did it in the Aston."

Joe's plans for 1960 are not yet finalized but he will probably stay with B.R.M. and Porsche. He is a valuable asset to any team, and has proved himself to be a first class G.P. driver. His progress next year should be well worth watching.

No. 9 of a series © AUTOSPORT 1959.



CLIPPING THE BALES, Bonnier drifts the B.R.M. through one of Casablanca's corners. He hopes to be with B.R.M. again next year.



TRIALS CHAMPION Charles Pollard tackles the tenth hill of the day—one which the entire field failed to climb. Pollard in fact lost two marks here.

Charles Pollard Is Trials Champion

Tie-Decider Resolves Equal Performances by Pollard and P. F. Highwood

THE new trials champion for 1960 is Charles Pollard, after his victory on Saturday in the R.A.C. trials championship organized by the Sheffield and Hallamshire Club. That sentence gives the facts, but it tells only a small part of the story of one of the most exciting —yes, exciting—trials in years. The result was, in fact, a tie between Charles and Peter Highwood, who lost an equal number of marks, but the title goes to Pollard under G.C.R. No. 23, worked on a basis of "most marks lost soonest". This we shall explain in due course.

There were 18 qualifiers for the championship, including Cuth Harrison, winner of last year's competition, Geoff Newman, 1955 winner, and Reg Phillips, who won the title in 1953. Also competing was the reigning Irish champion, W. Chesney, who was handicapped by an unsuitable motor-car in an event totally different to those to which he is accustomed. All credit goes to him for finishing and, in fact, doing comparatively well!

It was difficult to pick a favourite for the championship. Charles Pollard, of course, has an extremely good record but seemed, on paper, to lack experience, for this is only his second trials season and his first championship trial. Peter Highwood, on the other hand, recently found excellent form and had won events on the two previous weekends, while Tony Alldred, winner of this year's B.T.R.D.A. trials gold star, and Frank Lewis, runner-up in this competition, had both been extremely successful.

The site of the trial was a series of hills and hummocks involving lank, wet grass, sticky mud, rocky outcrops and dead fern on a particularly bleak Derbyshire moor. It became at once apparent that course marking was extremely tight, allowing absolutely no margin for error, and many competitors climbed to the top of hills only to lose marks by touching a marker lower down.

BY MARTYN WATKINS
PHOTOGRAPHY BY FRANCIS PENN

The first hill was not, apparently, difficult, with no one losing more than four marks and Mike Lawson, L. Hurt, Ron Kemp, Tony Alldred, Eric Jackson, Peter Highwood, Percy Barden, Charles Pollard and Cuth Harrison recording clean climbs. The second section gave even less trouble and only Chesney lost marks, the rest climbing clean.

The third hill saw only Lawson, Chandler, Newman and Cuth Harrison reaching the top, although Frank Lewis, Peter Highwood, Charles Pollard and David Render lost only one mark each.

Then came hill No. 4, and again only four cars got to the top, these being Hurt, Alldred, Jackson and Newman. The position so far was that Cuth Harrison led, having lost only one mark on the four hills so far climbed; Geoff Newman had lost only two and Tony Alldred three, while Eric Jackson and Michael Lawson had lost four each. Highwood and Pollard had dropped seven and six respectively.

On the fifth hill, however, the situation altered. This was a much more difficult hill, starting on a steep, bumpy grass area, levelling out before a very tight and steep left-hand turn. Here Harrison lost five marks and Newman four, so that their totals now reached six marks lost apiece. Tony Alldred's loss increased to nine, Eric Jackson moving up to third place with a total of seven marks lost. Pollard's loss now stood at nine, and Highwood's 10, while Michael Lawson lost seven more marks to make a total of 11.

On the sixth hill there were 13 cleans, Peter Highwood being among those who lost marks. Hill No. 7, a long section starting with a slight incline on grass and fern which led to a right-hand turn on an adverse camber. Then came a sharp left turn and the course ran up a steep bump, down into a hollow and then up a very steep bank. Highest here was one, reached by Lawson, Ron Faulkner, Jackson, Highwood, Ernie Chandler, Render and Harrison.

On the eighth hill there were five cleans, scored by Alldred, Jackson, Highwood, Newman and Rex Chappell. This section had a level but trickily cambered start in an absolute morass, after which the course curved right and left up a steep, bumpy grass bank. Harrison lost two on this, bringing his total to nine marks lost. Level with him now was Geoff Newman. Alldred's total loss now came to 12, Highwood's to 16 and Pollard's to 14. The leader



SPORTING RUNNER-UP after the tie had been resolved was Peter Highwood. Here he attempts hill No. 15, on which he was one of six drivers who lost only one mark—none were clean.



DEEP FERN on the sixth hill, on which there were 13 clean climbs, is traversed by Tony Alldred. Tony took third place after a brisk fight with Geoff Newman.

now was Eric Jackson, with eight marks lost. Then came Harrison and Newman (9); Alldred (12); Lawson and Pollard (14); Frank Lewis (15); Phillips and Highwood (16) and David Render (17).

On the ninth hill only Alldred, Pollard and Chappell were clean. Lawson and Lewis lost 11, Phillips, Jackson and Highwood one, Newman 10, Render nine and Harrison one.

The next hill again stopped the entire field. Highest up were Highwood, Chandler and Chappell, who lost one mark each; Kemp and Pollard lost two each while Bernard Dees, Reg Phillips and David Render lost three each, and Tony Alldred lost four.

This was now the position, with five hills still to be climbed before lunch: leading were Pollard and Alldred (16). Then came Highwood (18); Jackson (19); Harrison and Phillips (20); Newman (21); Render (29) and Lawson (36), the latter having lost over 20 marks on the last two hills!

Ten of the day's total of 25 hills had been completed—and still no one had taken a secure lead and, in fact, it was anyone's championship.

The 11th hill started in a bog and the course ran level for a few yards to turn sharp left and up a steep, bumpy hillock. Again no one reached the top, but a brilliant climb by Ernie Chandler lost him only one mark. Highwood and Percy Barden were almost as good, and each lost only two marks. Jackson, Pollard, Chappell and Harrison lost five each and Alldred seven.

On hill 12, which started in a bog before turning sharply right to run up a steep hill, allowed only one clean, Geoff Newman being successful. Percy Barden lost two and Highwood, Chappell, Dees and Render were next best with a loss of four marks each.

Farthest up hill 13 was Pollard, losing three marks, while next best were Phillips, Alldred, Jackson, Highwood, Chandler, Barden, Newman, Chappell and Harrison, losing four marks each.

This troublesome hill started on level grass, the course then turning left and up to a steep ridge, then downhill to a hairpin left-hander and on upwards. Difficulties arose for the majority at the hairpin.

The 14th hill was an easy climb, starting in a watersplash and continuing on a gentle gradient. The entire entry was clean here.

The morning's last hill was a long, long one. The course started with a sharp rise and continued along a level, narrow gulley. Then came a tight right turn with awkwardly placed ruts, after which the course ran downhill into a bog, round a hairpin left-hander and finished with a steep, bumpy rise. This failed the entire entry, but Frank Lewis, Bernard Dees, Peter Highwood, Ernie Chandler, Charles Pollard and Rex Chappell lost only one mark each.

The lunch-time positions revealed a tie for first place and a close thing elsewhere. Equal with 30 marks each lost were Pollard and Highwood, while third, only one mark behind, was Newman. Alldred (34), Jackson (36) and Phillips and Harrison (37 each) made up the rest of the leaders.

During lunch Pollard and Ron Faulkner were both busy, the former having completed the last three hills of the morning with a defective differential unit: a spare was sportingly loaned him by Cuth Harrison and was fitted in a very short time. Faulkner had shed a Panhard rod during the morning and worked hard to replace that.

In the afternoon 10 of the morning hills were re-run, with modifications to make the marking even tighter employed in most cases.

Now began the real fight: with only 10 marks separating the first eight, a serious mistake by any one of them could alter the whole situation. But from their consistent performances in the morning it seemed likely that the battle would develop between Pollard and Highwood for top honours.

First blood went to Peter Highwood, with a clean climb on the first hill—one of only two cleans. Pollard lost three marks and Geoff Newman seven to give Highwood a small and very insecure lead. Next came hill No. 3, a long incline on soft mud with an adverse camber to a sharp right-hander and a steep, muddy finish. All but three were clean here, Highwood retaining his lead.

Hill No. 5, which came next, saw no clean climbs. Charles Pollard lost two marks, Highwood two and Newman two, to leave the placings unaltered. Highwood, Newman and Pollard were clean on the next two hills as well and, with only five hills to go, it seemed that Peter might well keep his narrow lead.

However, the next hill—No. 10—changed all that. Reg Phillips and Tony Alldred got clear of the morass at the start and both lost only one mark. Highwood lost 10, Newman nine and Pollard six on this one and the cat was now really among the pigeons. Leader now was Charles Pollard, with a total loss of 41 marks, one point ahead of Peter Highwood. Third now was Tony Alldred (44) and Geoff Newman was down to fourth place with 49 marks lost.

On the next hill, No. 11, however, Highwood drew level again with a loss of four marks against Pollard's five.



CONCENTRATION: Geoff Newman, who won the Championship in 1955, swings his car on to full lock on the 10th hill to negotiate the very tight marking featured in the event.



IN SPITE of the muddy watersplash which marked the start, the 14th hill was an easy section which failed no one. Here Percy Barden tackles it with his climax-engined, i.r.s. car.

Alldred retained third place but was now only two marks ahead of Newman. Four hills remained: the only issue in doubt was which of these four drivers would take the title?

Generally speaking, sporting trials are interesting. They can also be amusing and that they are great fun is undeniable. But their greatest protagonist (and few supporters are more enthusiastic than the writer) could not, as a rule, claim that they are exciting. This, however, was different: a more thrilling contest of any sort will not be seen again for a long time, and excitement grew to fever heat!

On hill No. 12, which came next, Highwood went ahead—by only one point, losing three marks against Pollard's four. Newman, losing five marks, took third place from Alldred, who lost eight. On hill No. 13 Highwood and Pollard were clean, while Tony Alldred took third place back again from Geoff Newman by losing no marks to Newman's loss of nine. Hill No. 14 was not included in the afternoon sections.

With one hill to go, Highwood still led by only one mark from Pollard, and Alldred was not so far ahead of Newman that he could not lose third place. Only Newman could not now win the championship. Eleven marks covered Highwood, Pollard and Alldred, and with a possible maximum loss of 12 on the last hill any of the three could take the title with a clean climb. If both the two leaders lost 12, then Alldred would win, if he lost no marks, by one mark.

Reg Phillips was now on level terms with Alldred, and was first to tackle the last hill. But he almost failed to leave the starting line and lost 12 marks. Tony Alldred lost two, as did Geoff Newman. Charles Pollard lost two marks—and Peter Highwood lost three, bringing his total loss to 52—the same as Pollard!

To decide the tie, the winner was announced to be whoever lost most marks earliest in the trial. The decision went to Charles Pollard whose score card for the first four climbs read: "0-0-1-5" against Peter Highwood's "0-0-1-6". Third place went to Tony Alldred, fourth to Geoff Newman and Reg Phillips and Eric Jackson shared fifth place.

Whatever the result, the 1959 Championship was an extremely fine event: in congratulating Charles Pollard one must not forget Peter Highwood, a most sporting runner-up who hid his disappointment extremely well. In his third championship trial he demonstrated that he is as fine a trials driver as the best. To lose the championship on a tie-decider must have been galling in the extreme to both Peter and his wife and passenger, Dorothy.

Of Charles Pollard it can only be said that he is an extremely worthy champion: his skill, after only two seasons' experience, has taken him to the top. His driving on Saturday was exemplary. It will be a long time before the 1959 Championship is forgotten and apart from the thrills it provided, this was in no small measure due to the first-class organization of the Sheffield and Hallamshire C.C.

Provisional Results

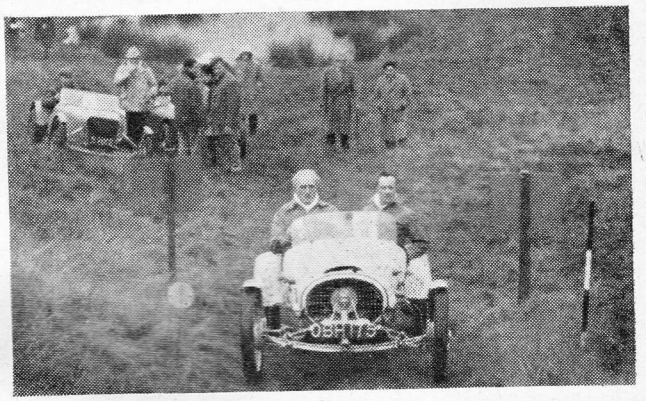
Best Performance and Trials Championship: C. W. Pollard (Cannon), 52 marks lost. **Runner-up:** P. F. Highwood (Canhi), 52 marks lost. **Third place:** A. D. Alldred (J.A.P.-Bassinet), 62 marks lost; 4, G. J. Newman (Cannon), 70; 5, E. Jackson (Cannon) and R. W. Phillips (Fairley), 72; 7, L. Hurt (Ford), 80; 8, T. C. Harrison (Harford), 81; 9, R. Chappell (Cannon), 83; 10, E. J. Chandler (Chandler-VW), 86; 11, M. H. Lawson (M. & L.), 88; 12, R. Kemp (Cannon), 90; 13, P. A. Barden (P.A.B.) and D. D. Render (Cannon), 91; 15, B. H. Dees (Cannon), 93; 16, F. T. Lewis (Cannon), 94; 17, R. W. Faulkner (Special), 106; 18, W. Chesney (Justa), 154.

Best Northern Driver: A. D. Alldred. **Best Midlands Driver:** C. W. Pollard. **Best Southern Driver:** P. F. Highwood.

★

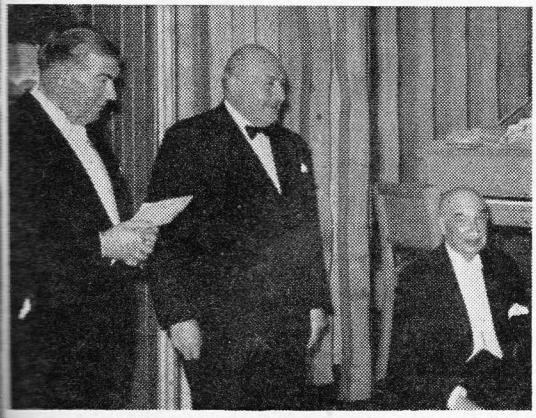
LEAVING the start of the last of the day's hills is Ernie Chandler in his VW-engined special.

★





VISITOR from Ireland was W. Chesney, in his "Justa". He is reigning Irish trials champion.



THE TWO major award winners (right). They are (l.-r.) Esdale Dowling (Wilfred Haughton Trophy) and his wife, and Frank Robinson (Victor Ferguson Memorial Trophy) and Mrs. Robinson. OFFICERS of the Club (above) are (l.-r.) Gordon Weill (Secretary), Commodore C. A. R. Shellington (Chairman) and T. W. Haughton (President).



ULSTER AUTOMOBILE CLUB DINNER

Photography by George Phillips



HAPPY SIX: Chatting together are (l.-r.) Mrs. Ron Watts, Dr. Terry Gardiner, Mrs. James McVeigh, Ron Watts, Mrs. Gardiner and James McVeigh.



SITTING IT OUT are (l.-r.) Mrs. Charles Eyre-Maunsell, Ronnie Adams, Charles Eyre-Maunsell, Mrs. Wilnor Jones, Mrs. Gordon Neill and Dr. Wilnor Jones.



CHEERS! The teetotallers are Mrs. Betty Cordner and Thompson Glass. With glasses in hand are George Alton and Mr. and Mrs. Wilbert Todd.



"WELL DONE, SIR!" Mrs. J. W. Haughton presents the Wilfred Haughton Trophy for the best aggregate performance (closed cars) to Esdale Dowling.



DRAMA AT SEBRING

Jack Brabham (Cooper-Climax) Wins World Championship After Last-lap Breakdown — Victory Goes to Bruce McLaren (Cooper-Climax) — Wonderful Performance by Maurice Trintignant (Cooper-Climax) — Stirling Moss Goes Out With Transmission Troubles

BY GREGOR GRANT
Photography by Ozzie Lyons

IN one of the most dramatic finishes ever witnessed at a motor race, Bruce McLaren (Cooper-Climax) won the first post-war Grand Prix to be held in the U.S.A., by 0.9 sec. from Maurice Trintignant in Rob Walker's Cooper-Climax. The New Zealander averaged 98.87 m.p.h., and the Frenchman set fastest lap with 3 mins. 05 secs., a speed of 101.13 m.p.h. Jack Brabham, who had led from the sixth lap after Stirling Moss had retired with transmission failure, stopped on his last lap with an empty fuel tank, and pushed his car about a mile to the finish, only to collapse on the line with exhaustion.

Tony Brooks (Ferrari) went off-course on the first lap, and became involved in a slight collision with team-mate Taffy von Trips. A subsequent pit-stop put him nearly a lap in arrears, and he spent the rest of the race attempting to make up the deficit. The mantle of Cooper-chaser fell on Cliff Allison (Ferrari), challenged by Innes Ireland (Lotus), who dropped back after stopping at his pit to sort out gear-selector troubles. Allison eventually retired, leaving von Trips to uphold the prestige of Scuderia Ferrari, hoping to force the issue and cause the leading Coopers to be driven rather faster than was planned. However, Maurice Trintignant in the surviving Walker Cooper-Climax upset the applecart by overtaking the German driver on the 24th lap, and setting up a new lap record in 3 mins. 05 secs. (101.13 m.p.h.).

Just as Brabham was about to be flagged winner, the Cooper-Climax came to a standstill, out of fuel. The Australian pluckily pushed his car over the line after a hike of about a mile, and took fourth place. A leak in the fuel system had developed, but team-mate Bruce McLaren was there to prevent Trintignant and Brooks from taking the chequered flag in front of the Cooper.

Although Brabham had failed to ensure a place, the World Drivers' Championship was his. Collapsing completely exhausted in front of the



"YOU DID IT, BOY!" An elated Bruce McLaren brings his Cooper into the pits after his surprise victory (above). Way back under the bridge, Jack Brabham pushes his Cooper to the finish line—and the Championship. "FRANKLY, I WAS AMAZED!" A surprised Bruce McLaren, seen here with Alec Ulman, receives the plaudits of the crowd.



TEN MINUTES TO GO. The cars are lined up on the grid shortly before the off, and a laughing John Cooper has a word with an official.

pits, the Australian had a tremendous ovation from the crowd. Von Trips had his engine disintegrate three laps from the end, and also rolled his car over the line. In his case he merely waited on the finish mark till the flag had dropped.

The Sebring circuit was hard on motor cars and, out of the 18 starters, only seven machines were running at the end. Probably the most courageous and sporting effort was that of Rodger Ward, who unhappily went out with clutch failure at half-distance in Bob Wilkes's Offy-engined midget. The Indianapolis winner, although obviously outpaced by his more powerful rivals, never gave up trying, and his little car was extremely popular with the spectators.

* * *

TRULY Sebring had the eyes of the motor-sporting world upon it, eagerly anticipating the battle featuring Moss, Brooks and Brabham for the right to be hailed Champion of the World. Missing were the Reventlow Scarabs which were not quite ready for racing. Even so, Lance and his associates were not prepared to make their F1 début without the incentive of starting money, even for the glory of having all-American G.P. cars on the starting grid.

Brabham, Moss and McLaren had new-type cylinder heads on their Coventry-Climax engines, giving an approximate power output of 245 b.h.p. Stirling Moss's car had completely revised rear suspension, utilizing helical springs in place of the familiar transverse spring layout. This had been thought out entirely by Moss, who had also obtained the springs from some unnamed source.

Ferraris had three all-independently sprung cars with 4-o.h.c. engines for Brooks, Allison and von Trips, whilst Phil Hill's was a blue-painted machine with the 2-o.h.c. power unit in a short chassis with de Dion rear. This engine was about 20 b.h.p. down on the four-cam jobs, but had better torque. The Tec-Mec had a front-mounted Maserati engine in a Colotti-designed frame. De Tomaso's Cooper-Osca was more or less experimental, and was fitted with a 2-o.h.c. engine. Jim Rathmann was down to handle the Tec-Mec, but did not appear; the red car was taken over by Fritz d'Orey.

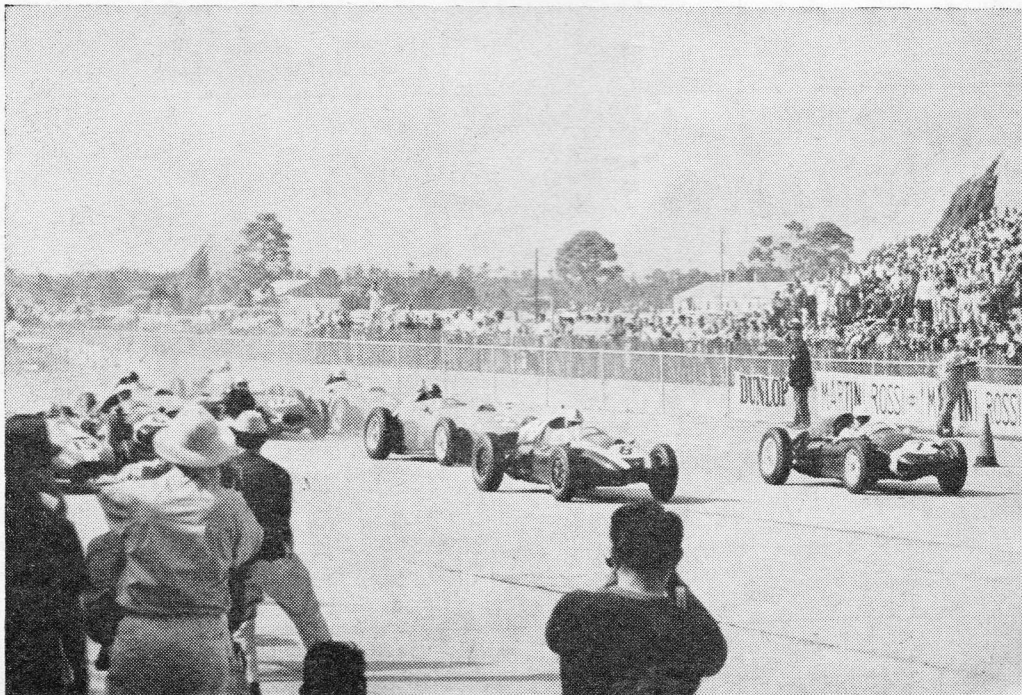
Bob Said's Connaught had the "tooth-paste tube" body on the unraced space-frame, supposedly entered by Connaught Engineering, although Paul Emery was in charge. The car never appeared to go properly, and did most of its practising on less than its four cylinders. Rodger Ward's beautifully turned-out midget had a 2-o.h.c. Meyer-Drake four-cylinder engine of 1.7 litres, modified to run on Avgas. A two-speed gearbox was constructed from Ford Model A bits; there was a quick-change two-speed Halibrand diff., Halibrand disc brakes developed from the Messier type used on Gordini. Both Ward and his sponsor Bob Wilkes realized that they had no chance of beating the F1 cars, but the popular Rodger just wanted to be in such an historic event.

Not long after the cars began the training, the lap record went completely for a Burton. Moss's existing record of 3 mins. 20 secs. in the DBR1 Aston Martin (93.6 m.p.h.) was beaten by no fewer than 13 drivers. Spectators gasped their astonishment when Stirling Moss returned 3 mins. dead, a speed of 104 m.p.h. He made racing look so ridiculously easy, and was some 5 secs. quicker than anyone else. Tony Brooks tried all four Ferraris, including the blue "twin-cam". The Italian cars looked nothing like so steady as either the Coopers or the Lotuses. Brabham did a 3 mins. 05 secs., and also did some landscape gardening, giving the nearside of the body a non-standard shape. Stirling's new suspension layout seemed to work well. The Ferrari boys tried ever so hard to get down to Moss's times, and Brooks was credited with a 3 mins. 05 secs. in Taffy von Trips's car.

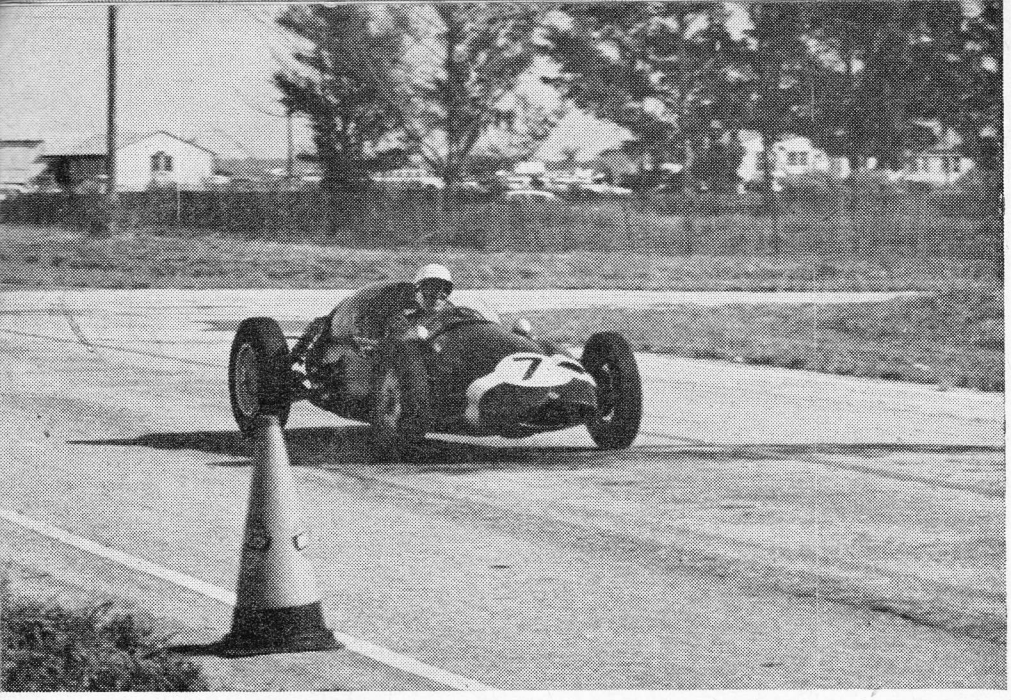
The unfortunate Bob Said trundled round in the peculiar-looking Connaught, banging and scuffling so much that announcer Art Peck mentioned drily that Bobby was frying ham and eggs. Droll humour was much in evidence over the P.A., and after Stirling had gone round at 104 m.p.h., the remark was: "That boy sure does some pretty low flying!"

A high wind cut down Friday's training times, but despite this Moss recorded 3 mins. 1.5 secs. Brabham had gearbox difficulties, and also had a suspect head-gasket, which meant some burning of the midnight oil by John Cooper, Tim Wall and the mechanics. Ward, whose engine had been blown up without completing a lap on Thursday, was content to trundle round. Rathmann decided not to drive the Tec-Mec, which was practised by Fritz d'Orey. Before his troubles, Brabham did a fine 3 mins. 3 secs. Brooks recorded 3 mins. 05.9 secs., Trintignant, 3 mins. 06 secs., and Harry Schell popped up with an unexpected 3 mins. 05.2 secs., in his 2.2-litre car. However, the timekeepers couldn't have believed the evidence of their watches, for he was announced as having done 3 mins. 11.2 secs. Innes Ireland took his Lotus round smartly in 3 mins. 08.2 secs. George Constantine was in trouble with the Mike Taylor 2-litre Cooper-Climax, with suspected leaking gasket. In the end, all had cracked the existing lap record with the exception of Said (Connaught), de Tomaso (Cooper-Osca) and Constantine.

There was plenty of excitement when Schell found himself relegated to row four. He protested vociferously that he

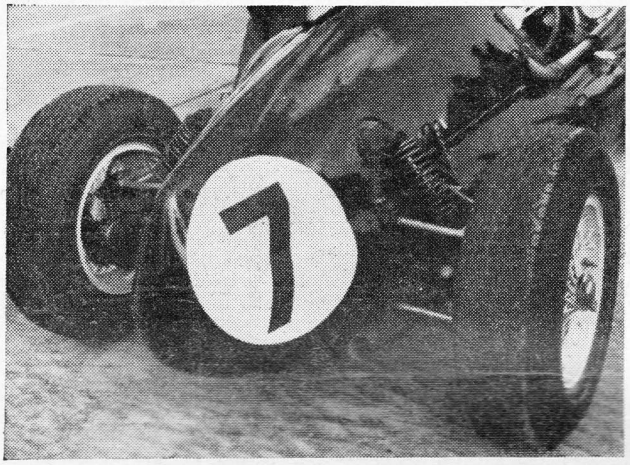


"THEY'RE AWAY!" The flag is down and some 4,500 h.p. is unleashed. Moss and Brabham move into an immediate lead.



STARTING GRID

Moss (Cooper-C.) 3 m. 00 s.	Brabham (Cooper-C.) 3 m. 03 s.	Schell (Cooper-C.) 3 m. 05.2 s.
Brooks (Ferrari) 3 m. 05.9 s.	Trintignant (Cooper-C.) 3 m. 06 s.	
Von Trips (Ferrari) 3 m. 06.2 s.	Allison (Ferrari) 3 m. 06.2 s.	P. Hill (Ferrari) 3 m. 07.2 s.
Ireland (Lotus) 3 m. 08.2 s.	McLaren (Cooper-C.) 3 m. 08.6 s.	
Salvadori (Cooper-M.) 3 m. 12 s.	Stacey (Lotus) 3 m. 13.8 s.	Said (Connaught) 3 m. 27.3 s.
de Tomaso (Cooper-Osca) 3 m. 28 s.	Constantine (Cooper-C.) 3 m. 30.6 s.	
Blanchard (Porsche RSK) 3 m. 32.7 s.	d'Orey (Tec-Mec) 3 m. 33.4 s.	Cade (Maserati) 3 m. 39 s.
	Ward (Kurtis-Kraft) 3 m. 43.8 s.	



★

"WELL, THERE'S ALWAYS NEXT YEAR." Poor Stirling (above) was once again robbed of victory by mechanical troubles. In practice he broke his own sports car lap record by 20 secs. MOSS MODS. (left). The Walker Cooper had this coil spring suspension which Stirling himself designed.

★

had done a 3 mins. 05.2 secs, and he was going to get in his rightful place on the front row. After much bickering, the timekeepers admitted their error. Harry pushed his car jubilantly alongside Brabham's, and Brooks's was moved back. This was more than he had accomplished with B.R.M. The fun then started again, and as the girls of the Sebring band and the majorettes tried to get into line, they were swept aside by an angry bunch of gesticulating Italians, with Tavoni almost doing his nut. Arguments raged to and fro, with Alec Ulman, Bill Smith and Reggie Smith doing their best to restore order. It looked exactly like a free-fight in a Glasgow dockside pub—and even noisier. Then the majorettes started up the band and the girls stamped their shapely legs. As if by magic the jostling and shoving ceased, although Tavoni and Co. shuffled off with black looks for Harry Schell, and both Moss and Brabham were trying unsuccessfully to keep their faces straight.

With two minutes to go, engines were started and an excited crowd settled to watch the spectacle of Grand Prix racing, not seen in these United States since the Mercs. and Auto Unions went to the crazy Roosevelt Raceway before the war. Rodger Ward looked lonely sitting by himself on the back of the grid, but completely happy. Photographers pushed each other out of the way to get a closer view, and as James Melton raised the flag, the crowd tensed as if sensing that this might well be the race of the century. Down went the flag, and the field surged forwards, with Bob Said almost in the second row by the time the others had moved.

As they streamed towards the second bend and Tower Turn, Moss and Brabham were battling for the lead. Stacey's gears went funny, and his Lotus became mixed up with Said's Connaught. Both Brooks and von Trips misjudged a turn, took to the infield behind the Dunlop rubber markers, and gently collided with each other. Von Trips carried on with a bashed-in Ferrari nosepiece, but Brooks had difficulty in restarting. Moss came through to start his second lap about a couple of seconds ahead of Brabham, with McLaren, Hill, Ireland, Trintignant and Salvadori in close company, tailed by Harry Schell whose clutch was slipping badly. Into the pits came Stacey and Brooks, just as Blanchard's Porsche went through in last position. Ward's Midget lay just behind the squat Tec-Mec, de Tomaso's Cooper-Osca and Constantine's Cooper-Climax.

Mike Costin worked on Stacey's gear selector mechanism, and Brooks restarted after a quick look-see, nearly a lap in arrears. Moss was drawing away from the others, and Innes Ireland fairly whistled past Phil Hill's blue Ferrari, which was also taken by von Trips. It was a pity indeed that Brooks was not up there to challenge his rivals, and with Stirl already turning under 3 mins. 09 secs., he would have a hard job to get to grips with Moss, Brabham and Co.

Rob Walker had estimated that Moss would probably make a couple of seconds per lap, and that was exactly what he was doing. However, Brabham and McLaren looked pretty confident, and the way the young New Zealander was shadowing his great friend reminded one of how Moss used to keep in the wheel-tracks of Juan



COOPERS DOMINANT. Jack Brabham leads Bruce McLaren through an Ess bend early on in the race.

Manuel Fangio in the Mercedes-Benz days. Stacey at last got away again, but seemed to be rather short of ratios. Bob Said appeared, almost dead beat, having pushed the Connaught to the pits after a spin-out on the North Runway. The nose of the high-tailed car was badly battered, and it had to be marked up as having been retired.

Allison, Ireland and Hill were running neck-and-neck, tailed by the imperturbable Trintignant, Salvadori and von Trips. Constantine's engine was spluttering badly, whilst Schell was battling with a rapidly disappearing clutch. Anyway the gallant Rodger Ward was not tail-end-Charley, for the little midget had drawn well away from Blanchard's Porsche, which was not exactly hanging about for a sports job. Stacey called in again, but this time there was nothing which could be done to make the Lotus mobile. With four laps gone, Moss had increased his advantage over Brabham to 8 secs., and was getting down to 2 mins. 7.5 secs. Innes Ireland was breathing down Cliff Allison's exhaust pipe, but neither could shake off Maurice Trintignant who was getting away from Phil Hill, whose Ferrari appeared to have Hopalong Cassidy tendencies. Constantine called in at his pit, where his mechanics diagnosed a blown head gasket and stripped top bolts.

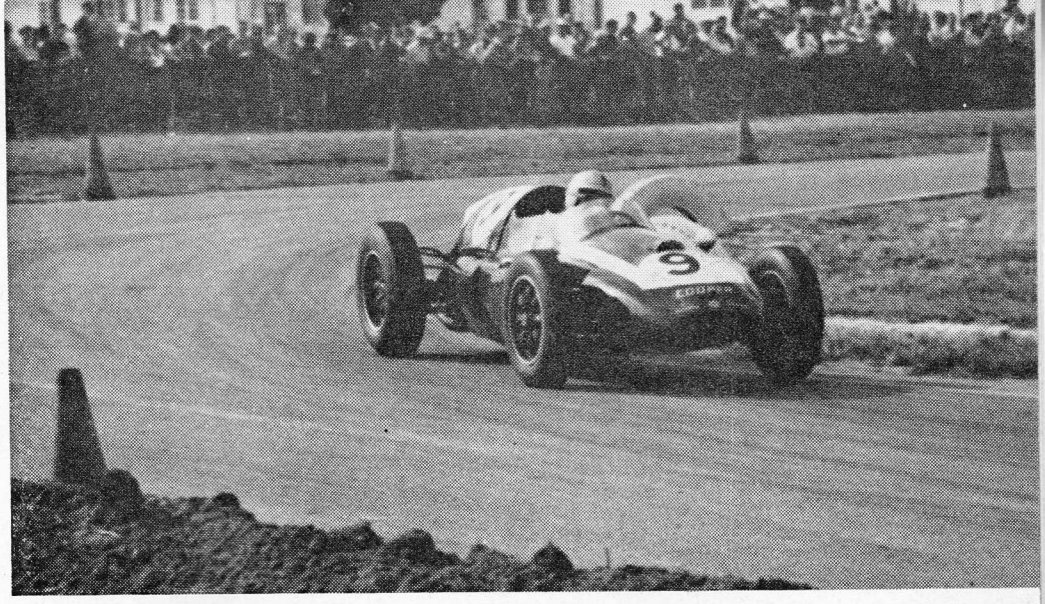
Moss completed his fifth lap, almost to Walker's calculations, for he was 9.8 secs. in front of Brabham. Harry Schell stopped to see if his clutch could be repaired, but the damage had already been done. Back in the pack, Tony Brooks was tearing round in a desperate attempt to regain those lost minutes and seconds, but Allison was the main hope of Ferrari.

Then there was a gasp from the crowd. Brabham and McLaren came through on their own, with no sign of Moss. Surely this couldn't be, no one deserved such dreadful luck. It looked as though his Championship hopes were blasted for 1959 at any rate. Allison, Ireland, Trintignant, von Trips, Hill, Salvadori, D'Orey, de Tomaso, Ward, Blanchard—still no sign of Stirling. Then it was confirmed—Moss had retired with suspected broken drop gears in the transmission. John Cooper displayed a board MOSS OUT to Brabham, which the Australian gravely acknowledged.

Schell, who had got going again, toured round for a lap or two, then finally called it a day just as de Tomaso pulled in with his white Cooper-Osca. Brabham and McLaren hared round, with Allison in full pursuit in an attempt to force the pace, and maybe upset the plans of the Cooper team. Innes Ireland was merely determined to go motor racing, and was rapidly coming up on Cliff and his Ferrari. Still Trint sat there, calm, untroubled and driving with extreme polish. Von Trips and Hill followed, but Roy Salvadori was gradually dropping back. Rodger Ward still circulated, outclassed certainly, but downhearted—never. As the fast boys went through, the Indy winner drew well in, to give them all the room they wanted.

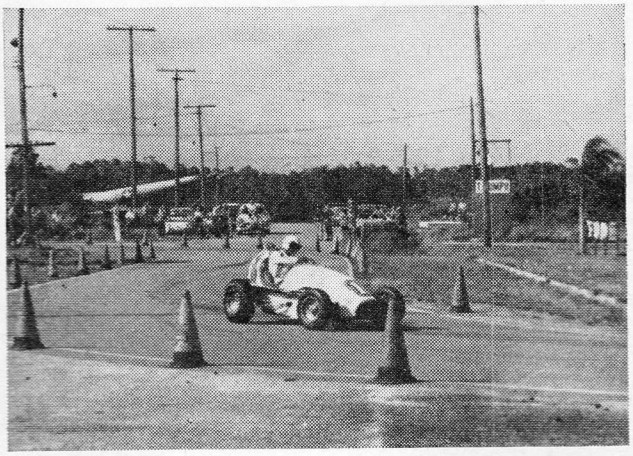
After eight laps Brooks was 81.5 secs. behind Brabham, and Allison was definitely gaining, as was Innes Ireland, of course, who was looking for every opportunity to take the red car. Phil Hill drew into the pits with clutch bothers, mechanics tinkered with the car, but one could sense that it was only a matter of time before it would be pushed away.

Next time round and Allison came past alone behind Brabham and McLaren. His Lotus escort had disappeared from the fray, but came into the pits to have its gearbox attended to. The race was certainly taking its toll. Schell and de Tomaso were tooling round with obviously crippled cars, whilst the Tec-Mec was quietly removed after spewing oil on the concrete. Von Trips finally had a stab at taking Trintignant, and the Frenchman nonchalantly waved him through. After 11 laps, Allison was within 13 secs. of the Cooper pair, and Brooks was cutting



NO LUCK FOR TONY. Tony Brooks was involved in a shunt early on and could only finish third.

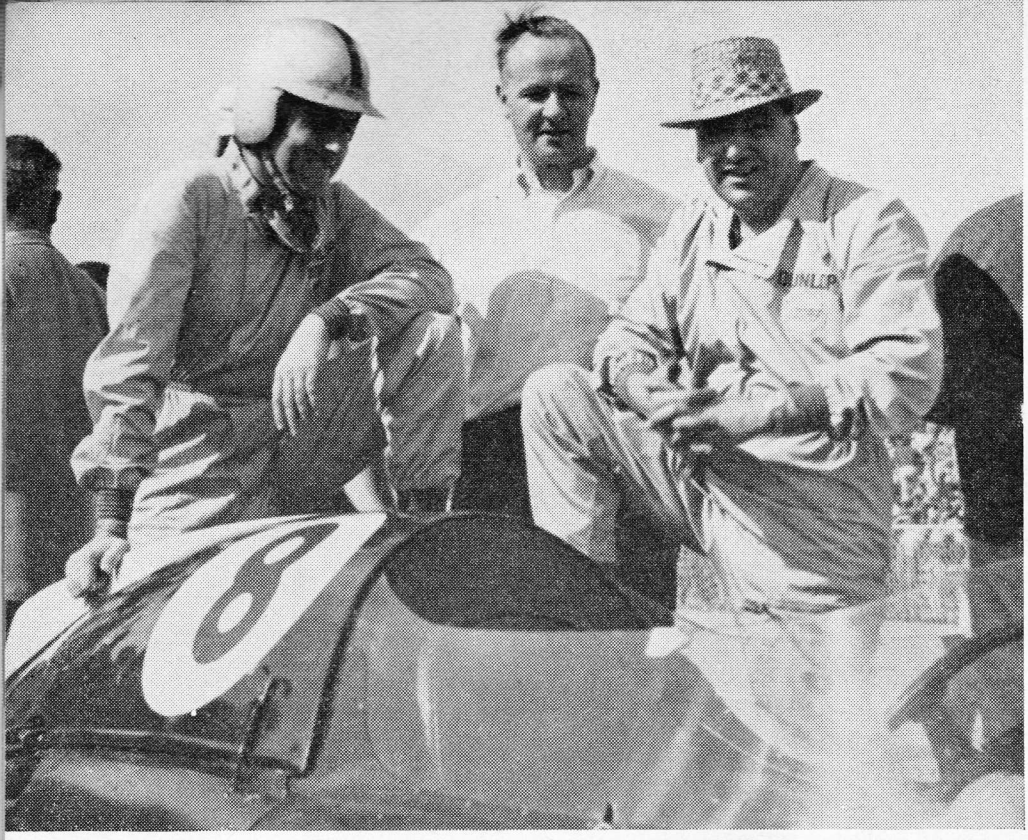
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ON HIS WAY TO VICTORY (above). Bruce McLaren swings the Cooper through a left-hander. Bruce must surely be the youngest man ever to win a Grande Épreuve. *He finished sixth in the World Championship. LITTLE 'UN (right). Rodger Ward hustles the little midget through the Esses. Note the missile in the background!*

★





down the gap a second or so a lap. Ireland rejoined the race, but the Lotus seemed to have become a single-speeder, which did not exactly make for fast lappery.

Down came the distance separating Allison from the two leaders, and Brooks was also doing his stuff in the way of carving off seconds. It was now up to Cliff Allison, who could quite easily set the cat amongst the pigeons by disturbing Cooper race domination. Brabham and McLaren weren't obviously worried, for John had been keeping them down. Yet, when the lead shrank to 7 secs. on the 16th lap, then it was time to do something about it. The boys received the nod from "the boss", and immediately started a slight spurt, taking back around two seconds a lap from Allison. McLaren was putting up a brilliant exhibition, inspired by Brabham. The pair never put a wheel wrong, nor looked likely to do so. Allison went faster and faster, but the contest was more or less over when he slid into a straw bale, making his Ferrari the twin of von Trips's.

Allison's gallant effort was over. Into the pits he came, went out again, stopped once more and then became a spectator. Another gallant effort ended when Rodger Ward went out with clutch trouble, having covered 21 laps. He was loudly cheered for a sporting try, as was Stirling Moss who appeared after having walked back to the pits. Salvadori retired after 25 laps with transmission failure.

The race was now virtually over, and when Trintignant overtook von Trips it was Cooper-Climax 1-2-3, with the Frenchman 25 secs. behind Brabham, and Brooks a long 77 secs. in arrears. People began to leave the circuit, but afterwards must have kicked themselves. This motor race had an astonishing ending, which could hardly have been dreamed up by the most imaginative of screen writers.

Trintignant began to close up on the leaders at a very high rate of knots, leaving von Trips 'way behind. With everyone crowding the finish area to welcome the Champion of the World, von Trips's engine more or less exploded, and he pushed the crippled machine towards the finish. Trintignant was travelling at a tremendous speed, closing up on Brabham and McLaren in a highly disconcerting manner. A highly delighted Rob Walker's eyes nearly popped out of his head, when it was announced that Trint had brought the lap record down to 3 mins. 5 secs. (101.13 m.p.h.). Brabham and McLaren realized that something was going on, but refused to be rattled. One lap to go, and everyone was set to welcome the new Champion of the World, when suddenly the whole picture changed. With von Trips waiting to push his oil-dripping Ferrari over the line, McLaren came through on his own, with Trintignant closing up in spite of a broken wishbone. Poor Brabham had run out of fuel, and was reported to be pushing his car to the finish—it was Monte Carlo all over again, only this time certain victory had been snatched from the Australian.

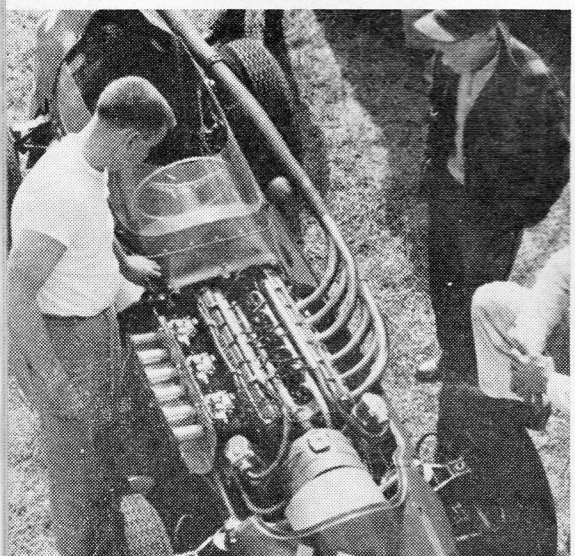
Over the line went Bruce McLaren, to win the Grand Prix of the U.S.A., with the remarkable Trintignant just 0.9 sec. behind. Round they went to complete their safety lap, and all eyes were on the finishing straight. Tony Brooks roared through to take third place, not high enough to affect Brabham's already won Championship. Innes Ireland finished. Then a blue-clad figure was seen, pushing his Cooper-Climax. Whilst hordes of folk crowded round, Brabham collapsed—completely exhausted. It was some time before he recovered sufficiently to congratulate Bruce McLaren on his wonderful victory. The wear on Bruce's Dunlops was 3 mm.

In addition to the G.P. there was a Formula Junior race won by Walt Hansgen in Briggs Cunningham's Stanguellini, and a two hours' event for compact cars, also won by Hansgen—this time in Briggs's 3.4 Jaguar. Runner-up was a Studebaker Lark, the performance of which astonished everyone. More of this in another issue.

Results

1, Bruce McLaren (Cooper), 42 laps; 2, Maurice Trintignant (Cooper), 42 laps; 3, Tony Brooks (Ferrari), 42 laps; 4, Jack Brabham (Cooper), 42 laps; 5, Wolfgang von Trips (Ferrari), 39 laps; 6, Innes Ireland (Lotus), 39 laps; 7, Harry Blanchard (Porsche), 38 laps.

CONFIDENT (above). Jack Brabham, John Gordon-Bennet and John Cooper are all smiles before the race. Perhaps they were already sure of the outcome of the Championship. THE TEC-MEC (below, left) proved a disappointment, retiring after seven laps. ONE LAP TO GO. Jack and Bruce complete their 41st lap. The next time Jack's car crossed the line he was pushing it!





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SPER-LASH! A competitor (left) goes hurtling into the water in a Champ. WINNER of the individual award was W.O.II Asbury, here receiving his trophy from Lt.-Col. Crosby. Goff Imhof looks on.

THE ARMY ROUGH RIDING CHAMPIONSHIP

Photography by George Phillips



"IS IT THE RUSSIANS, MUM?" Two Champs fight a watery battle on the return run through the lake.



"HUP!" Cpl. Grasson, concentrating hard, guns his motorcycle up a muddy, leafy slope. He won this class.



"COME ON, SARGE!" Sgt. Crutchley of the Royal Signals eases his Land Rover down a dip, whilst a "marshal" prepares to reveal his marker board.



GENTLY DOES IT. Sgt. Pickworth takes his 3-tonner down a steep drop. He won this class. Believe it or not, nobody turned anything over!

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Grand Prix of America, Sebring, December 12th
1st Bruce McLaren—Cooper-Climax
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COMPARATIVE PERFORMANCE

SPEED	MINI		FORD 105E	
	Standard	Modified	Standard	Modified
0-60 m.p.h.	32.6 secs.	21.2 secs.	35 secs.	27 secs.
20-60 m.p.h. 3rd gear	—	—	19 secs.	14.6 secs.
40-60 m.p.h. top	20 secs.	16 secs.	24.2 secs.	20 secs.

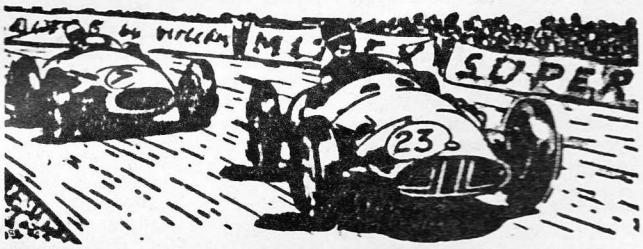
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Nr. FARNINGHAM, KENT

BOXING DAY
12.30 p.m.
(Practice 9 a.m.)

Club News

By MICHAEL DURNIN

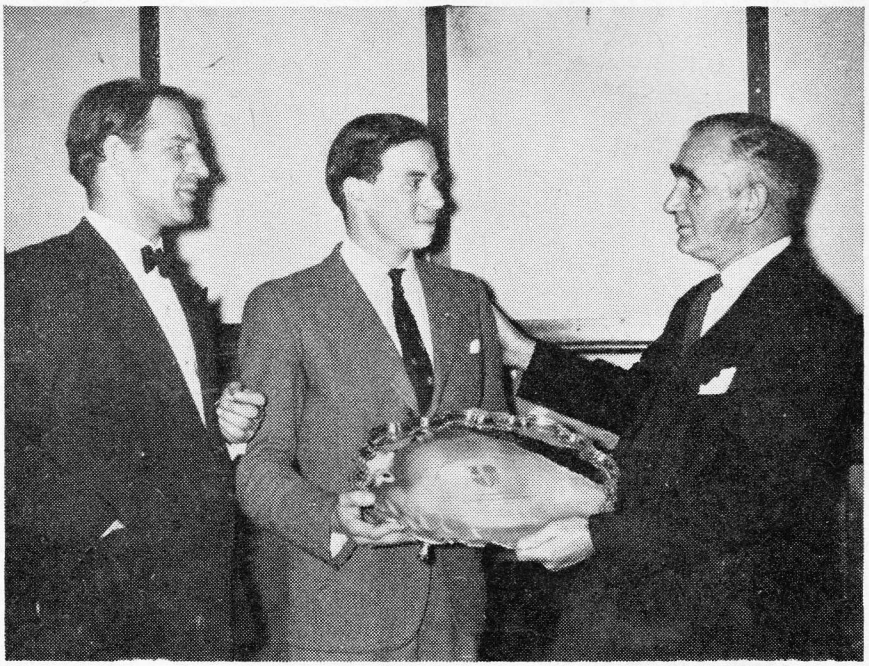
THE **South Wales A.C.'s** 12th Welsh Rally, a national British event, is scheduled for 8th-9th January. The rally, with starting points at Cardiff, Gloucester and Shrewsbury, is a qualifying event for the R.A.C. Rally Championship and the B.T.R.D.A. Gold Star. Regs. are available from W. L. Howell, 141 Llanedeyrn Road, Cyncoed, Cardiff, who must have all entries by 28th December. . . . **Kentish Border C.C.** Christmas party will be held at the Bickley Arms Hotel, Old Station Hill, Chislehurst, on 18th December from 8 p.m.—midnight. Tickets (5*s*.) available from all committee members. . . . **Dursley M.C. and L.C.C.** driving test meeting will be held at Babdown Aerodrome, near Calcot, at 10.30 a.m. on 27th December. Regs. for this closed event from A. Mellerup, Hillberry Lodge, Dursley, Glos. . . . **B.A.R.C (N.W. Centre)** "Festive Frolics" driving test meeting will take place in the No. 1 Car Park, New Brighton (adjacent to swimming pool), at 12.30 p.m. on 26th December. All member clubs of the Association of North-Western C.C. are invited to this event. Regs. are available from G. F. Irving, 27 Stanley Street, Liverpool 1, who must have all entries by 23rd December. . . . **East Surrey M.C.** Moonbeam Rally, a half-night closed event, takes place on 16th-17th January. Regs. from J. A. T. Ball, 130 Nightingale Road, Carshalton, Surrey. . . . Another closed to club event, the **Romford Enthusiasts C.C.** Christmas Rally, takes place on 27th December. Regs. for this 75-miler from C. A. Pelling, 40 Squirrels Heath Road, Harold Wood, Essex. . . . **V.S.C.C.** Measham Trophy rally takes place on 2nd January. The closing date for entries has been extended from 16th December to 21st December. Invited clubs are: Shenstone and D.C.C., S.U.N.B.A.C., B.O.C., N.S.C.C., Wolverhampton and South Staffs C.C., Herefordshire M.C., North Staffs C.C., S.W.A.C., M.M.E.C. and Charnwood C.C. Entries should be sent to C. R. Southall, 33 Alderbrook Road, Solihull, Warwickshire.

Lola—*continued*

The body is in four parts, the largest single unit being the nose duct, bonnet top and driving screen. The bonnet sides are separate panels, and the tail is the fourth piece. All these sections are secured in such a way that very rapid removal is possible. The general effect is most pleasing, the car having a low and purposeful look to which the small-diameter wheels contribute, and it looks much longer than it is, with a wheelbase of only 6 ft. 10 ins. There is a minimum weight clause in the regulations, equivalent to some 7 cwt. 18 lb., and it will be no trouble to keep the Lola down to this.

Formula Junior is going to provide us with many new cars and some most exciting racing. If the Lola is as successful as the sports version, it should gain more than its share of the laurels.

JOHN V. BOLSTER.



PETER HUGHES Memorial Trophy, a solid silver salver, is presented to Jim Clark of the Border Reivers by Mr. Alastair Ford for being Scotland's No. 1 racing driver of the season. Adding congratulations is Innes Ireland, chief guest at the annual dinner of Berwick Motor Club, where the presentation was made.

FALKIRK and D.M.C. YULETIDE RALLY

THE annual Yuletide Rally of the Falkirk and District Motor Club, although probably one of the last rally events of the year, is fast becoming known by discerning competitors as a most testing event, despite simple navigation and tests which, nevertheless, ensure that neither driver nor navigator get any respite.

This half-day event, which this year was an invitation event, was again in the capable hands of Jimmy Yuill and Alistair Ross. Again as usual, the 27 competitors started with two tests in Falkirk Ice Rink car park, and found that each test had to be completed within a set time, this being ample for all sizes of car, although the width of the garage in one was adjusted to three inches greater than the car width. The second included parking the nearside as close to the kerb as possible. Despite the simplicity Sandy Morrison, "Top Gear" Rally Champion, smacked a pylon with his M.G. TF, while brother Logan (M.G.A) and Alistair Brown (3.4 Jaguar) also incurred penalties.

Came the route sheets to cover the 50-mile run, all within a radius of 10 miles from the start, and it was found that every one of the five sections was indicated by straightforward route directions at fairly low average speeds. However, complacency was abruptly shattered, within one mile of the start, when entrants were required to follow the one-way street system in Falkirk. This was eventually sorted out with everyone but Bob Hamilton, the eventual winner, losing marks.

As all sections were regularity, a secret time check after two and a half miles found many wanting after the previous panic in Falkirk. Dudley Merer (Sunbeam Alpine) repaired to the start, to commence his rally again, and Bill Syer of Dunfermline lost his award by phoning the finish for directions to the next control.

After the second section, a special section of 2.2 miles was embarked upon which lost everyone marks except Ian James (Sunbeam). Five map references, followed by route directions, led the entry past three code words to be noted, and it was found that Sandy Morrison missed one near Greenhill Farm.

The next section included a secret check and found D. C. Black (Dauphine), George Stewart (Land-Rover) and Sandy Morrison (M.G. TF) among others, who were not watching their timepieces. The control on this section caught A. M. Brown (Jaguar) very late, in company with J. D. Campbell (Austin) and Hugh Rutherford (Wolseley). W. F. Jack (Vauxhall) passed this control several times as it was obscured by a parked omnibus. David James (Triumph TR2) met a non-competitor wanting the same piece of road, and his rally ended there.

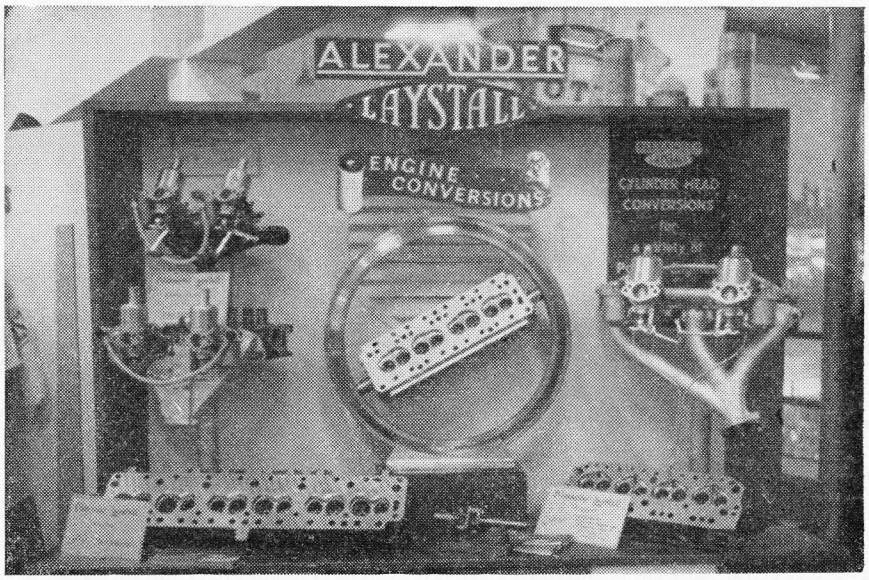
The final section included two code words, the finding of which was made impossible, at least for later cars, as one was demolished while the other became almost unrecognizable, so were deleted from the final reckoning. This section covered the maze of short twisting roads around Bonnybridge, under the Forth and Clyde canal to an even more confusing maze near Larbert. George Stewart (Land-Rover), Ian Morrison (Morris 1000), E. D. Denholm in a pre-war Austin 7 tourer (with no tenths on the speedo), and Jim Morrison (Austin A105) were late on this one, with others, in clocking in at the finish at Powfoulis Hotel, Airth.

W. K. H.

Results

1, R. Hamilton/A. Evangelisti (Jaguar XK 120), 48 marks lost; 2, W. L. Morrison/G. Jeffrey (M.G.A), 237; 3, R. Callander/G. Sharp (Ford), 251.

SOME of the Alexander range of tuning equipment, applicable to many British and Continental production engines.



THE CAMSHAFT QUESTION

BY TED MARTIN

THIS article is the work of Ted Martin, late of M.G.s and currently development engineer to Michael Christie. As he makes perfectly clear, he is in the special camshaft industry professionally, and is, therefore, an interested party. Nevertheless, this is a contribution of high technical merit that covers new ground.

Perhaps one might make two comments. In the first place there are certain engines which have such small carburetters and/or induction systems that no form of tuning, camshafts included, can make any difference until a bigger breathing "mouth" is provided. Secondly, the camshaft of commerce is often inaccurately made or incorrectly mated with its driving sprocket. Thus, an astonishingly large number of standard cars are condemned to give an inferior performance because their valve timing and lift differs from what the designer intended. J.V.B.

THE announcement of an extensive range of modified camshafts marketed by Alexander Engineering poses a question for everyone interested in faster cars. It is the same question arising from the availability of any conversion equipment, and amounts to: "Is there anything in it? If so, what, and is it worth it?"

Admitting that the writer, who designed these camshafts, is prone to over-enthusiasm on a pet subject, he is, nevertheless, in a good position to explain what there is to get enthusiastic about, and hopes, in so doing, to answer the important part of the question impartially.

In America the writer found that the first piece of equipment sought by the man about to "soup" his "mill" was a camshaft more suited to the requirements. The provision of such camshafts has developed into a business which dwarfs our entire conversion industry, and Ed. Iskenderian, and many others, have devised cam profiles producing quite staggering performances from normal production engines. Iskenderian, himself a "souper" of considerable repute, came to the conclusion some years ago that, given a structurally sound engine, he could make it basically suitable for the whole range of motoring activities simply by swapping camshafts. Multi-carburation and compression and exhaust changes then follow to make full use of the modified valve timing and lift. He developed this thinking to such good effect that the "hot cam" is now the primary American conversion component.

In this country, as we all know, the additional carburetter has come to occupy a similar position, and it was reasonable to wonder who was right, and then to delve into cam profiles to find the answer.

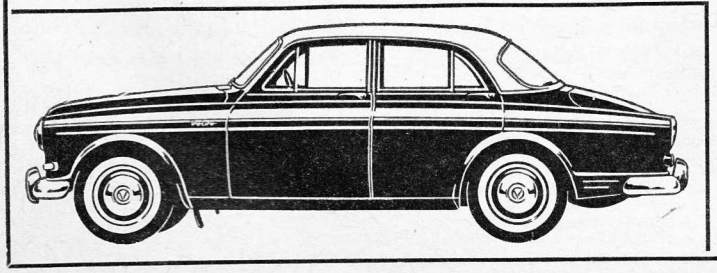
The job of conversion development creates a mental yardstick for the assessment of any conversion feature called "Cost per Added Horsepower". It is not an infallible standard, since horsepower is by no means all that one aims for, but it is a realistic guide, and on that basis the Americans seem to be on the right track in making the special camshaft the first stage of conversion. The typical result of adding a second similar carburetter to a production engine is a horsepower increase of 14 per cent. A new inlet manifold is required and the throttle and choke mechanism need modification. That added to the cost of the extra carburetter comes to some £20. A camshaft which provides about the same horsepower increase, plus higher valve crash r.p.m., costs only £7, while the fitting costs are the same within a pound or so. A special camshaft is thus by far the cheapest form of first stage conversion, and since only a substitution of parts is involved, there is nothing additional on the engine to leak or adjust, and only in the unlikely event of very careful measurement, does anyone realise that the engine is not in absolutely standard form. One can readily visualize circumstances where this would be an advantage. The car does, however, have a higher maximum speed and greatly improved acceleration.

Where the camshaft scores resoundingly is at the second stage of tuning. For example, one might as a first stage have fitted an Alexander Conversion to an A35 at a cost of some £40. To go further at a later date would entail disposal of the entire conversion in order to fit the Stage 2 arrangement having a big valve modified head, larger carbs., flat top pistons, and flexible inlet manifold at a further cost of about £60. Instead, the addition of the polydyne Road Racing Camshaft to the existing Stage 1 conversion would only entail an outlay of £9 plus fitting, and give very nearly as good results.

Completing the picture, one might already have a Stage 2 conversion and still require more steam. By any other method this would run into a great deal of money, but for £9, plus fitting, the Road Racing cam supplies something like 12 more horsepower and over 7,000

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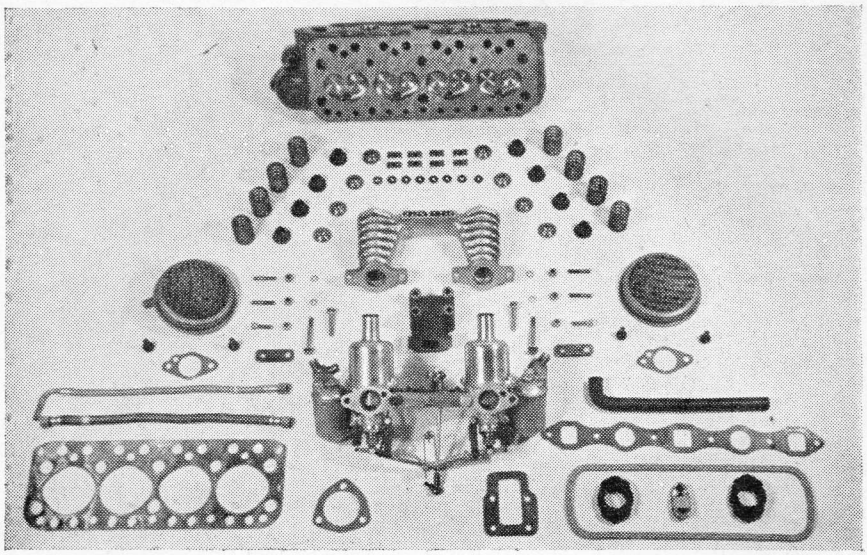
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STAGE ONE Alexander conversion kit for B.M.C. "A"-type engines. The question of employing a special camshaft for improving on the performance of "stage one tuning" is fully discussed in the text.

r.p.m. The engine then enters the racing category and durability should be anticipated on those terms.

Having thus eulogized the special camshaft, at the expense of the conventional conversion, one must look to the other side of the penny to complete the picture.

The popular conversion kit usually incorporates a high compression head to improve Thermal Efficiency, and twin carburetters, tuned inlet manifold, and modified porting to improve Volumetric Efficiency. The special camshaft, on the other hand, only materially improves Volumetric Efficiency.

The result of improved Thermal Efficiency is increased torque, usually throughout the operating speed range, giving better top gear pulling power, and reduced fuel consumption.

The result of improved Volumetric Efficiency is more complete filling of the cylinders at medium and high r.p.m., and, therefore, an ability to produce more power at higher r.p.m. Since horsepower is the product of torque multiplied by r.p.m., and torque is roughly proportional to the degree of cylinder filling, it follows that higher Volumetric Efficiency is synonymous with higher horsepower output.

Thus the conventional conversion enables more mixture to get into the cylinders to produce more horsepower, at the cost of more fuel consumed, but it offsets this with a means of getting more intrinsic power out of that extra fuel used. The practical result is that one can actually go faster with the conventional conversion without getting any less miles per gallon.

With the camshaft one does not get more out of the fuel, and consequently one always uses more fuel when taking advantage of the higher speeds made possible by the cam. However, speed for speed, the special cam is no less economical than the standard cam, and invariably no carburetter mixture adjustment is necessary as the result of installing either the Super Sports or Road Racing shaft. This is significant evidence that an engine does not become wildly uneconomical when doctored with a good special cam, and there are indeed instances where such engines equipped with certain types of carburetters profit slightly from weaker mixture settings.

It appears from the foregoing that improvements at the camshaft only pay off at high r.p.m. and high speeds. That the most obvious benefits become apparent only at the top end is true, but the degree to which a gain is evident at lower speeds depends upon the cam design that is displaced, and the general intention behind the engine design.

Production engines usually fall into one of three categories. There are the top gear lugging variety, usually found with three speed gearboxes, which are extremely responsive to a sports type of cam right through the speed range. There are the middle class engines which satisfy the majority and combine fair top gear pulling power with quite brisk performance at high r.p.m. in the gears. These are natural subjects for the converters providing they embody a good structural safety margin, and respond equally well to both sports and racing cams, and even, in certain instances, such as the B.M.C. "A" Series, to whole hog sprint cams. Finally, there are the sports engines which are already converted when sold and usually feature a "warmish" cam design at birth. These respond only to top-end cams as a rule, and usually at some expense to the low speed pulling power they may possess. The sports type of cam can do quite a lot for such engines right through the speed range, but a road-racing type can do a lot more and in a manner in keeping with the original character of the engine. Such engines when so modified definitely, however, enter the category of racing engines and live and die rather quickly.

A good general guide to special cam selection is, therefore, sports cams for the overall improvement of woolly and moderate machines, and road racing cams for high r.p.m. improvement of moderate to lively conveyances. For actual racing and competition use of a serious nature one cannot generalize. A special cam could, strictly speaking, be designed for every engine for every circuit, but since this is not yet necessary, a truer reflection of the current situation would be a special cam for each engine design for each competition category. Since one cannot afford the time or money to evolve such a vast range of cam designs for the few people likely to require them, one can only offer to deal with any such special requirements on a direct request, fortified, of course, with a little financial leverage.

A further, rather gloomy, but, to those afflicted, very valuable, aspect of special cam designs, is the opportunity of curing that fatal engine disease, the dropped valve. The technical explanation for broken valves, soft valve springs, worn tappets and broken rockers is straightforward but tedious to read and absorb. Basically there are two main reasons. Too rapid acceleration of the valve, dictated by the cam, for the rest of the valve gear, or valve gear that is flexible in a manner not considered in the cam design employed. Both can be accommodated by suitable cam profiles to the extent that structural failures are avoided, and higher r.p.m. is made available into the bargain.

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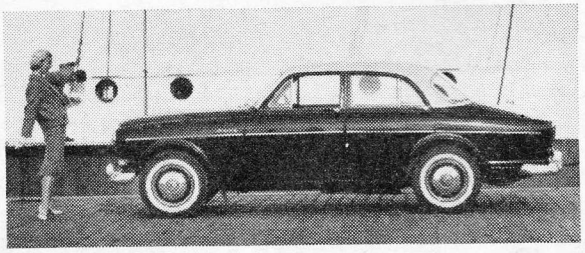
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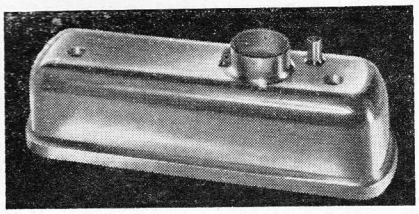


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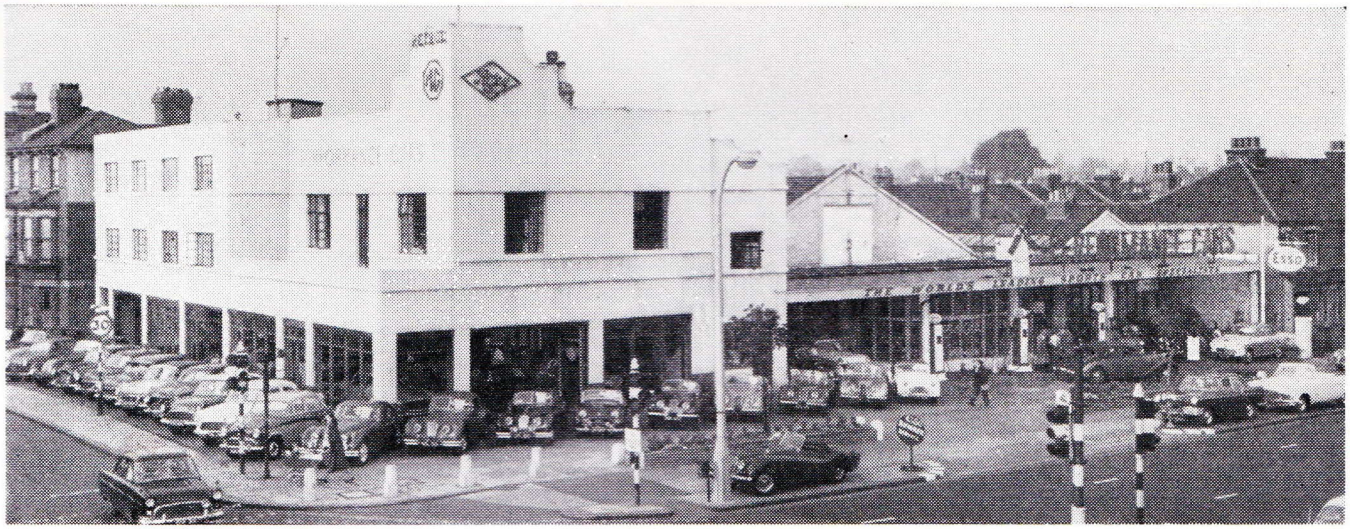
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1960 Model **A40** de luxe, duotone, 181m., HI..... £670
1958 **A55** de luxe, duo green, HI £675
1957 Sept. **METRO** f/h, duo white/yellow, RH2... £585
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1955 **A90 WESTMINSTER,** H2 ..... £445
1952 **A40 SPORTS,** really superb, blue, H..... £385
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1949 **PRINCESS,** beautiful example, maroon, HR £395

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1959 **SPRITE,** blue specimen, extras, I..... £625
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1957 **BN4,** ice blue, 6 port, TBPWORH..... £845
1957 **Dec. BN4,** duo blue/ivory, PFBRH..... £845
1957 **BN4,** duo ivory and black, OWPQ..... £825
1957 **BN4,** duo black/ivory, QHR..... £815
1957 **BN4,** duo green/ivory, HPFQW..... £795
1955 **BNI,** white showpiece, OWHR..... £625
1955 **BNI,** red showpiece, HOWQX..... £585
1955 **BNI,** red, must be seen, HOWQX..... £575
1954 **BNI,** red, above average, HROWO..... £575
1954 **BNI,** white/red hardtop, HOPQWI..... £545

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1927 **BENTLEY** 3 litre V.D.P. Tourer..... £500
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1938 **BSA** 2 seater, fine black example £155
1950 **DAIMLER HOOPER TOURING** saloon, 30,000 miles, (ex Royalty) magnificent example, RHI..... £1,585
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FORD

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1958 Nov. **ZEPHYR** saloon, primrose, HPI..... £725
1957 **CONSUL Mk. II,** duo white/red, HI..... £645
1957 **CONSUL Mk. II** saloon, green, H £625
1956 Nov. **ZEPHYR Mk. II** saloon, ivory, PH... £595
1956 **CONSUL Mk. II,** duo black/white, HI .. £595
1956 **CONSUL Mk. II** saloon, exceptional, H2. £545
1956 **THAMES ESTATE,** blue, HI..... £365
1955 **CONSUL** saloon, blue, ORHXM..... £475
1955 **CONSUL** saloon, superb in green £455
1955 **CONSUL** Conv., beautiful example, RH... £455
1955 **ZEPHYR** Conv., duo grey/red, H..... ... £425
1955 **ANGLIA,** unmarked throughout, black, I £345
1954 **ZEPHYR,** fine black example, H..... ..... £375
1954 **ZEPHYR,** above average, black, HPI..... £365

1954 **HEALEY ABBOTT** Convertible, red..... £545
1951 **HEALEY TICKFORD** Conv., exceptional £395
1951 **HEALEY ABBOTT TOURER,** fine ex .. £295
1950 **HEALEY SILVERSTONE,** blue, very fast £495

JAGUAR

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1956 **XK140** s/e drophead, maroon, RHOWP2 .. £665
1955 **XK140** f/h., maroon showpiece, HP..... £765
1955 **Mk. VII "M"** type, beautiful example, OH .. £545
1954 **XK120** d/h, superb specimen, beige..... £645
1954 **XK120** fixed head, pale blue, RHEPX..... £575
1954 **Mk. VII,** black showpiece, 8 to 1 comp £465
1952 **XK120 ROADSTER,** suede green, RHPE... £445
1951 **XK120,** 33,000 m., white, I..... ..... £495
1951 **XK120 ROADSTER,** duo grey/black, RHQ £415
1949 **Mk. V** 3½ saloon, duotone grey, RH..... £295
1939 **S.S.100,** red, original..... £295
1937 2½ **S.S.100,** green, tidy..... £145

1955 **JENSEN 541,** beautiful example, RHX..... £925
1950 **JOWETT JUPITER** Special, black, fast... £275
1954 **KIEFT/Climax Stage II,** green..... £445
1950 **LAGONDA 2.6** d/h, black/blue, RHP..... £445
1955 Sept. **LOTUS Mk. IX 1100** Climax de Dion £545
1955 **LOTUS Mk. VI,** Climax 1100 engine..... £495

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MINOR 1000 2 door, black/red..... £590
MGA Twin Cam, 2 seater, iris blue..... £1,707
M.G. Mk. III, island green/beige..... £1,012
MGA 1600, chariot red..... £943
RILEY 4/68, red/crimson..... £1,078
RILEY 1.5, red/biscuit..... £815
WOLSELEY 15/60 duo blue/smoke grey £953

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1955 Oct. **MINOR** Conv., new engine £445
1955 **MINOR** de luxe saloon, black/red, H..... £445
1954 **MINOR** 4 door, spotless, I..... £425

M.G.

1959 **MGA** Twin Cam f/h, red, 1,271m., RHXI... £1,165
1959 **MGA 1600,** 2,000 m., blue, DXI £895
1959 **MGA ROADSTER,** white, 6,000 miles, QI £845
1958 **MGA ROADSTER,** kingfisher blue, RHPI £765
1957 Dec. **MGA,** green, HI..... £725
1957 **MAGNETTE VARITONE,** duo green, HP £765
1957 Oct. **MGA** f/h, spotless green, HB2..... £715

1957 **MGA ROADSTER,** red, BFHPQX2..... £675
1956 **MAGNETTE,** red snowpiece, RH2..... £645
1955 **TF 1500,** sparkling ivory specimen H2..... £575
1955 **TF 1500,** red, very fast, XQ..... £565
1954 Sept. **MAGNETTE,** pastel blue, RH2..... £565
1954 **TF,** enthusiast maintained, red, PQ..... £495
1953 **TD Mk. II,** quite unmarked, green..... £475
1953 **TD,** exceptional throughout, black £465
1953 **TD,** pale green, above average, XPQ..... £435
1951 Oct. **TD,** 1959 engine, green £425
1949 Oct. **TC,** good throughout, black..... £335
1949 **TC,** good condition throughout, ABP..... £295
1949 **TC,** white, average condition..... £275
1948 **TC,** well maintained, green, H £315
1947 **TC,** excellent car throughout, black..... £275
1947 **TC,** black, enthusiast maintained £265
1946 **TC,** really beautiful, black/red, BP..... £295
1940 **TA,** very tidy in red..... £225
1939 **TA TICKFORD,** blue, must be seen..... £275
1939 **TA,** black, 16 in. rears, RH £195
1939 **TA TICKFORD,** red, tidy..... £175
1938 **TA,** enthusiast maintained, black/red..... £165
1937 **TA,** really excellent in black, PB..... £195
1935 **NA MAGNETTE** Tourer, green, tidy..... £75

1958 **PEERLESS G.T.,** blue, Webasto roof, de Dion, discs, heater, overdrive, "X" tyres, spots, etc..... £995

RILEY

1955 **PATHFINDER,** lovely grey example, H... £575
1954 1½ **R.M.E.** saloon, beautiful black, H..... £575
1951 2½ saloon, black, rebored, FRHP..... £345
1949 1½ litre, well maintained, black/red, H2..... £325

1956 **ROLLS-ROYCE SILVER CLOUD,** 37,000 m..... £3,950
1938 **ROLLS-ROYCE 25/30** Thruppo/d saloon £625
1953 **STANDARD VANGUARD PH II,** black /red, H..... £345

1955 **SWALLOW DORETTI,** red, HTQPX..... £595
1951 **SUNBEAM TALBOT 90** Conv., black, H £345
1951 **SUNBEAM TALBOT 90** saloon, bronze £315
1934 **TALBOT 105** supercharged 2/4 seater, superb performance, must be seen..... £245

TRIUMPH

1960 Model **HERALD** saloon, green, 48 miles... £755
1959 Oct. **HERALD** Coupe, 1700 m., HI..... £755
1958 Dec. **TR3A,** white/red, DHPXI..... £865
1958 **TR3A** hardtop, blue, HOWXDI..... £845
1957 **TR3,** blue/grey, disc brakes, X2..... £745
1956 **TR3,** green, must be seen, HP..... £665
1956 **TR2,** green, 9 to 1 comp., HQ..... £575
1955 **TR2** hardtop, duo yellow/black, XPR2..... £595
1955 **TR2,** really beautiful in white, HRP..... £545
1955 **TR2,** green/white hardtop, XHPI..... £545
1954 **TR2,** red, must be seen, OTRHPQX..... £535
1954 **TR2,** very exceptional, black, H..... £495
1949 **2000 ROADSTER,** satin bronze/red..... £345
1949 **2000 ROADSTER,** green, tidy..... £235
1947 **1800 ROADSTER,** dark blue specimen, H... £295
1947 **1800 ROADSTER,** grey..... £215

1958 **TURNER,** very fast/economical, grey, RQX2 £535

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