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The Way of Things

A Well-Merited Honour.

WHEN the land speed record was once more raised further from possible attacks by other countries, with the amazing speed of 246.08 m.p.h., the whole country was in praise of the man who had achieved this feat. We now have the pleasure of joining in congratulating Sir Malcolm Campbell on his great effort, and especially on the honour that His Majesty has conferred on him in recognition of the very real service he has rendered to England.

It is doubly gratifying to feel that the real origin of this honour has not been lost sight of, and that a definite success of this sort, attained after continual striving, by personal skill, and at a risk which is as unknown as the conditions under which the success is achieved, is rewarded still by the honour of knighthood.

It is due to the perseverance and keenness of men like Sir Malcolm that the sport of motor racing has been raised to the level of a national institution, and while retaining the romance of all great adventure, has the additional value of increasing the prestige of Britain and of British trade throughout the world.

In such a record, success depends on the wholehearted co-operation of everyone connected with the design and construction of the car, and it is impossible to detail the many aspects where credit is due. However, in offering our congratulations to Sir Malcolm Campbell we must not forget the part played by Mr. Fred Railton, the designer of the car. Nor must we forget the generosity of Miss Marion Carstairs, who, without any public announcement or fuss of any kind, gave financial aid without which the attempt could not have been made.

The "Bluebird's" sensational performance at Daytona has been a leading topic of discussion throughout the civilised world, and England is proud of her and her driver.

Meanwhile, things augur well for the future in regard to our high-speed records and reputation in those other elements—the water and the air. "Miss England II" and Don are ready, and in spite of official shillyshallying and the resultant pother, when the Schneider Contest is held, six months from now, we shall be there. With confidence, therefore, we can hope to show the world once again that for all the wailings of our tame pessimists, we are still the swiftest country in the world. Not that we can afford to rest on our laurels; our friendly rivals are extremely busy. But the position which we hold to-day should encourage us in further efforts, and should finally remove that inferiority complex, which together with a stoical complacency is said to be jeopardising our position as a leader amongst nations.

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CAMBRIDGE AT BRANCHES PARK.

Varsity Club's Successful Speed Trials.



[*Motor Sport Photograph.*]

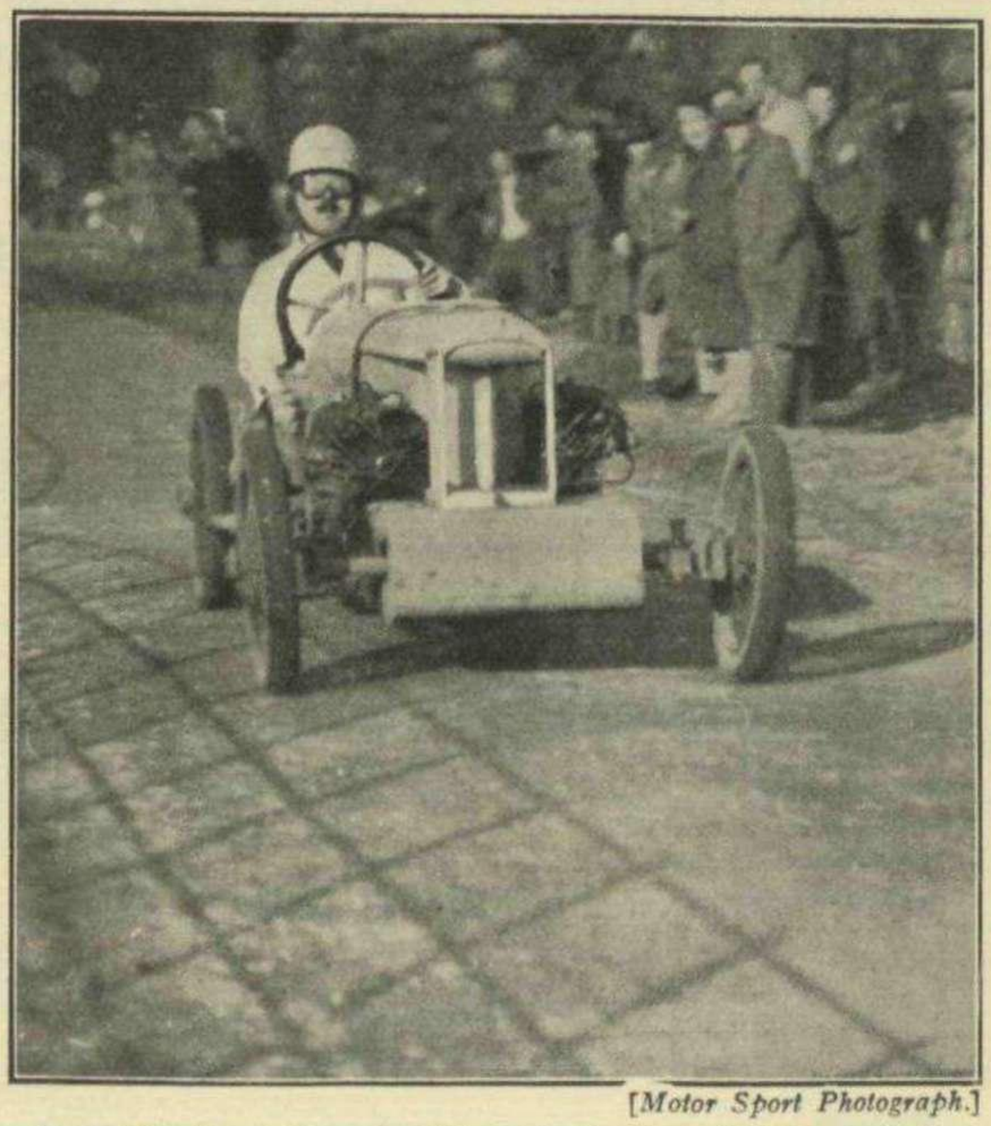
Winner of the unlimited class: A. N. Spottiswoode and his Bugatti (21.2 *secs.*).

SPRINT events on the road are such a rarity in these days that it was a real treat to get up to an affair like the Cambridge Auto Club's speed trials at Branches Park on February 21st last. Combined with the usual cheerful atmosphere so characteristic of a varsity event was the presence of some really good motor cars. Old members of the club being able to compete, the interest of the event was increased, and it was evident that the said old members had been doing a little quiet borrowing of motors for the event. "Ginger" Llewellyn had acquired Davenport's V-twin Frazer-Nash for the occasion, and proceeded to clean up the car events with great gusto—great stuff this car!

It would have been a happy thought on the part of the organisers to scatter a few signs round the vicinity to guide lost motorists to the scene of action. However, everyone seemed to get there eventually, and start the furious disrobing of the motor that one always hopes is going to knock off a few fifths of a second. The competitors' enclosure was well laid out with plenty of room for everyone, and was soon littered with temporarily discarded wings, windscreens and spare wheels.

There were, of course, some pukka racing cars which arrived in fighting trim, such as R. G. Nash's single-seater Frazer-Nash, "The Terror," which has now been finished off with a very neat body, and looked very attractive. Spottiswoode's Bugatti, which has done so well at Shelsley and elsewhere, was another business-like turnout.

The entertainment was opened by the motorcycle contingent, which contained several riders with Isle of Man experience, who put up very polished and snappy performances. Mavrogodato is still faithful to Scotts, while Muir, Sikes and Cockerell upheld Velocettes. The Velocettes were really excellent, being well tuned and well ridden. Cockerell's was somewhat oversize and made fastest time of all vehicles with 19.5 secs., while Muir annexed the 350 c.c. class. "Mavro's" Scott was perfectly tuned and screamed up the course without a miss to the tune that only a Scott can produce. In fact, the general trend of events showed that motorcycling is still going strong at Cambridge while the car element of the club does not seem to be so strong, with one or two exceptions. Robinson's old Brescia Bugatti was good, however, and won the Reilly Cup for the fastest time by an undergraduate's own car. Here is someone who can both tune and drive, so good luck to him when he gets a new motor.

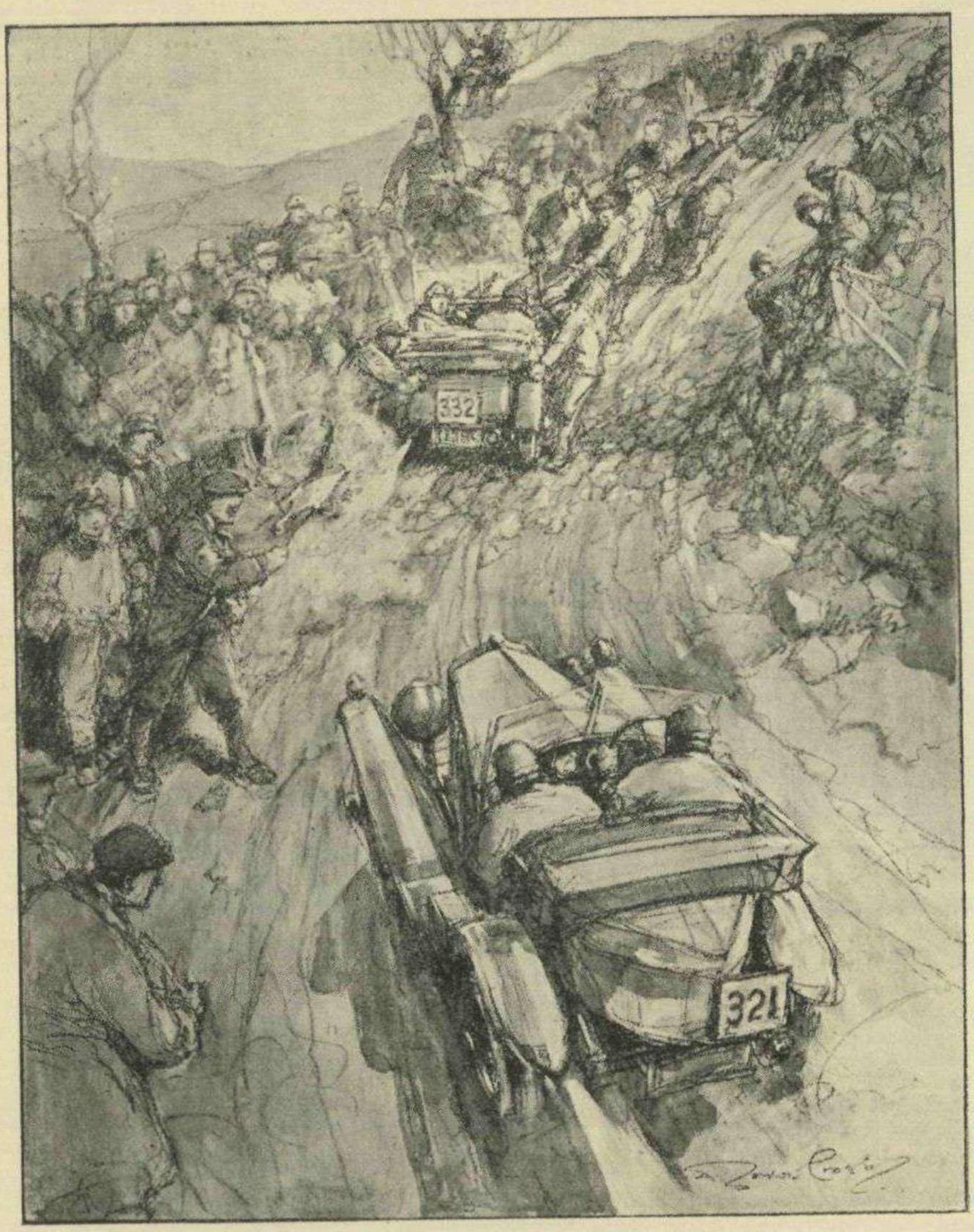


[*Motor Sport Photograph.*]

A. S. Llewellyn (*Davenport-Special*) *who clocked* 20.4 *seconds for the course.*

As 3 or 4 runs each were allowed, there was fair opportunity for drivers to rectify defects and get the best out of their vehicles. Llewellyn had a bit of bother with the clutch pedal on his first run, and a new one had to be constructed of tubing at short notice, but when he got going he went to some purpose, and recorded 20.4 secs for the 550 yards course. This was fastest time of the day and a very good show indeed.

Nash, on the "Terror" also had a little preliminary trouble but eventually he got away satisfactorily. His acceleration was colossal, but towards the end of



Beggar's Roost takes its Toll!
London-Land's End Trial, Easter, 1925. Mr. Gordon Crosby's drawing shows . . . . in the hands of the towing squad, while E. Hillary (Frazer-Nash) dashes up at speed.
(Reproduced by courtzsy of "The Autocar").

"The makers have wisely made no attempt to compete in price with mass-production machines, preferring to appeal to the immensely enthusiastic body of drivers who want a car that is FAST, SPORTING IN APPEARANCE, has FIERCE ACCELERATION, RESPONDS TO TUNING, and can CLIMB ANYTHING and GO ANYWHERE. This ideal the Frazer-Nash admirably fulfils."
The Autocar, July 18th, 1930.

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CAMBRIDGE AT BRANCHES PARK—continued.



[*Motor Sport photographs*]

A trio of triers. Top, W. S. Braidwood (Frazer-Nash) — 22.7 seconds; centre, M. F. L. Falkner (Super-charged Midget) —24.0 seconds—winner of the 850 c.c. class; bottom—T. B. Wood (Riley) in the 1100 c.c. class.

the run it caught fire and he coasted over the finish to lose fastest time by 1/10th of a second. Fortunately, the car was little damaged, but his new paintwork was rather spoilt.

Conan-Doyle ran the famous Frazer-Nash, the "Slug," in to third place in the 1500 c.c. class. The car went very well, and if he had only kept his foot down would have gone a great deal better. We rather failed to see the point of the number "9" permanently emblazoned on the tail; judging by his performance this was the last thing he required. The same equipage brought "Chitty I," but although this seemed a good joke at first, the time wasted in playing with it, coupled with the disappointing performance put up on it, soon failed to amuse.

The hangers-on of this particular crowd would also do well to remember that when someone has been good enough to lend their grounds for such an event, a little common politeness to the regular inhabitants is about the least that can be expected in return.

Spottiswoode's Bugatti was well tuned as ever and beautifully driven, putting up 3rd fastest time of the day, while praise is due to Twist for his fine performance in the 1100 c.c. class on an Amilcar, his gear changing being particularly snappy.

The 850 c.c. was notable for Falkner's M.G. Midget with a blower. He put up 24 secs., an excellent time for 850 c.c. Charles Brackenbury appeared about half way through the proceedings on his 2,300 c.c Bug., and having refreshed himself at leisure proceeded to get a second in the unlimited class.

This class was, however, carefully segregated from the rather fierce "1500's" which, owing to the Frazer-Nash contingent were liable to upset the calculations of the larger class. Hopkins put up a good show on a very normal 3-seater Nash, his getaway being distinctly the right idea.

A very neat looking "4½" Invicta was entered by Kehoe, but as its driver appeared to regard the event either as a concours d'elegance or a running-in track, the car never had a chance to show its paces. After all, this car can do more than 10 m.p.h. in low before changing up!

The whole event was a thoroughly enjoyable affair, and the weather really assisted things for once. The Cambridge club are to be congratulated on their efforts to keep alive one of the most sporting type of motor events, and one which amateurs can afford to take part in. The heartiest thanks of everyone present is due to Mrs. Tonge, the owner of Branches Park, by whose kindness in lending the drive the event was made possible.

[*Motor Sport photograph*]

A good car and driver. The old Brescia "Bug." with J. A. Robinson at the wheel did some good motoring. He won the Reilly Cup for fastest time with an undergraduate's own car.

SOME RESULTS.

850 c.c. CLASS. CARS.
1st, M. F. L. Falkner, M.G. Midget, 24.0 secs.
2nd, G. G. L. Willis, B.C. Austin, 26.4 secs.
3rd, G. R. Hartwell, 747 Austin, 28.3 secs.

1100 c.c. CLASS. 1st, B. P. Twist, Amilcar, 22.8 secs.

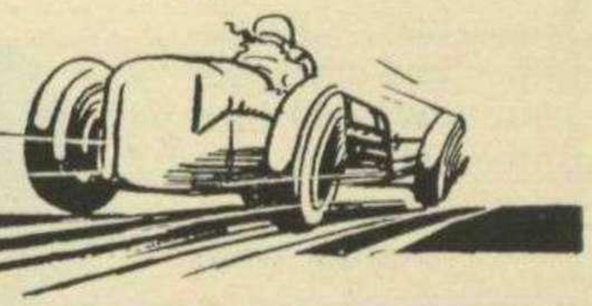
1500 c.c. CLASS.
A. S. Llewellyn, Frazer-Nash, 20.4 secs.
R. G. J. Nash, Frazer-Nash, 20.5 secs.
A. Conan-Doyle, Frazer-Nash, 22.3 secs.

UNLIMITED c.c. CLASS.
A. N. Spottiswoode, Bugatti (1996 c.c.), 21.2 secs.
C. Brackenbury, Bugatti (2300 c.c.), 22.7 secs.
J. Allan Arnold, Bugatti (1996 c.c.), 23.2 secs.

ALL-COMERS CLASS.
A. S. Llewellyn, Frazer-Nash, 20.4 secs.
R. G. J. Nash, Frazer-Nash, 20.5 secs.
A. N. Spottiswoode, Bugatti, 21.2 secs.

Rumblings

BOANERGES



LAST month I suggested that this season would see not a little competition in the 750 c.c. class, but few people can have expected that the scrap would have commenced as soon as it has. However, although we have got to wait awhile before we can see these remarkable little motors in direct competition in a race, we have not had to wait long to see various records being distributed among them at really amazing speeds.

On the 6th of last month Capt. Malcolm Campbell, following his wonderful feat with "Bluebird," took out the supercharged Austin and put the class H International record for the kilometre up to 94.03 m.p.h. It is very doubtful if sand is really suitable surface for a small car, as even "Bluebird" slowed considerably on striking the heavier patches, while the drag is bound to have an appreciable effect on a 750 c.c. machine. The whole performance must have opened the eyes of some of our American friends as to capabilities of the "½-pint auto" as they dub it. It seems likely that this speed will be considerably raised when the car is run on a more suitable surface.

The sand had hardly settled down after this record had been established than news came of George Eyston's further efforts on the M.G. Midget at Montlhèry. Now that this is supercharged, the Austin will have a competitor on equal terms, and Eyston gave a demonstration of the M.G.'s possibilities by setting up new records for 5 and 10 miles and 5 and 10 kilometres. The highest speed was 97.07 m.p.h. for 5 kilometres, the 10 miles being covered at 96.91 m.p.h.

Not satisfied with this performance he went out again on the 16th of last month and raised the figures to over 100 m.p.h., and is, therefore, the first man to reach this figure in a 750 c.c. car.

The actual speeds, subject to confirmation, were as follows:—5 kilometres, 103.13 m.p.h.; 5 miles, 102.76 m.p.h.; 10 kilometres, 102.43 m.p.h.; 10 miles, 101.87 m.p.h. The performance is the more remarkable in that, it is stated, the air pressure on the petrol feed caused leaks, so that the driver was forced to use the hand pump continually. Mr. Eyston amongst other necessary things, used "Castrol", and the car is the property of Mr. J. A. Palmes of Jarvis & Sons, Wimbledon, the well known specialists in M.G. cars.

In the case of these remarkable speeds it is invidious to try and compare one make with the other, as they are both so amazingly good. The really interesting thing is going to be watching what happens to the cars in the larger classes. They will certainly have to look out or they will be getting beaten on sheer speed by their smaller rivals!

The 750 c.c. class in the Double-Twelve looks like being even more of a dog-fight than was expected at first. No less than 4 teams of M.G. Midgets are expected (all the new 750 c.c. model, in addition to private entries including Randall's syndicate who won the team prize last year). Austins will be represented by an official team under A. C. R. Waite, and that will not be all, I gather, by any means. The Double-Twelve is not what one might call a complicated sort of event, being rather "round-and-round," but its great value as a test of cars is being more than ever recognised, and this year's event should be the best yet, and worth every effort to get down and see it.

The larger classes should also be full of interest in this and the later events, as Maserati will be represented in force by a team entered by Mr. M. C. Morris. This entry has been subject to the usual rumours and excitements attaching to the possibility of such an interesting and formidable *marque*, but E. M. Fronteras tells me that details have now been settled between Mr. Morris, of R.A.G. Carburettors and Signor Maserati, and that the team will consist of Cav. Campari, G. Ramponi, E. M. Fronteras, and G. E. T. Eyston. This team must be one of the most formidable connected with any make and should brighten up this year's racing considerably.

Lord Howe will be driving a Mercédès in the Double-Twelve, while a 1½-litre "Merc" is likely to appear at Shelsley in the hands of Von Stuck, who at present holds the record on an Austro Daimler. The name of Mercédès is not usually associated with anything as small as 1½-litre, but they are as good at this type as the big stuff, and we ought to see some lively competition in this class if they appear. There is a very snappy 1½-litre Mercédès at present down at Thompson and Taylor's Brooklands workshops, which is the property of Lady Dorothy Paget, and it is to be hoped that this will also appear to swell this class.

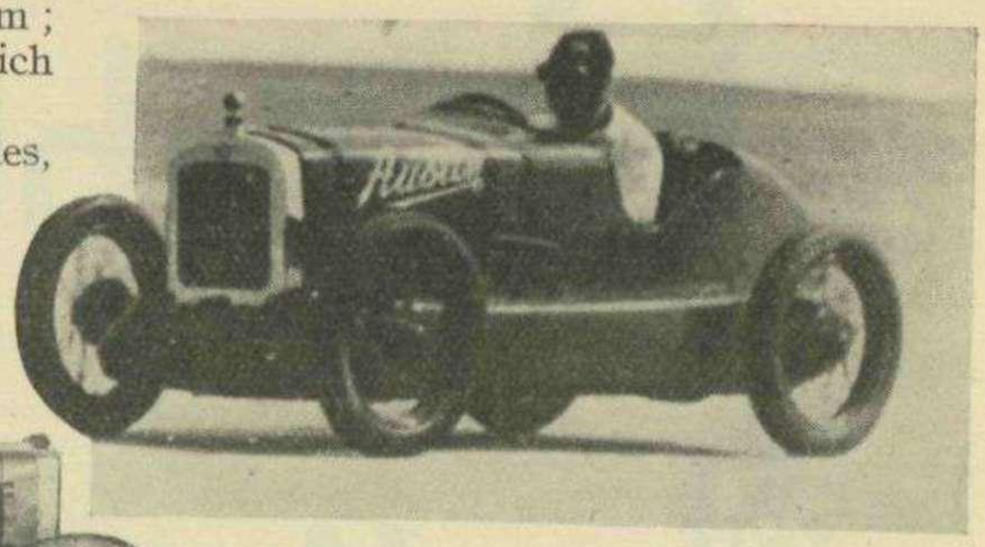
Life in the Old Dogs yet.

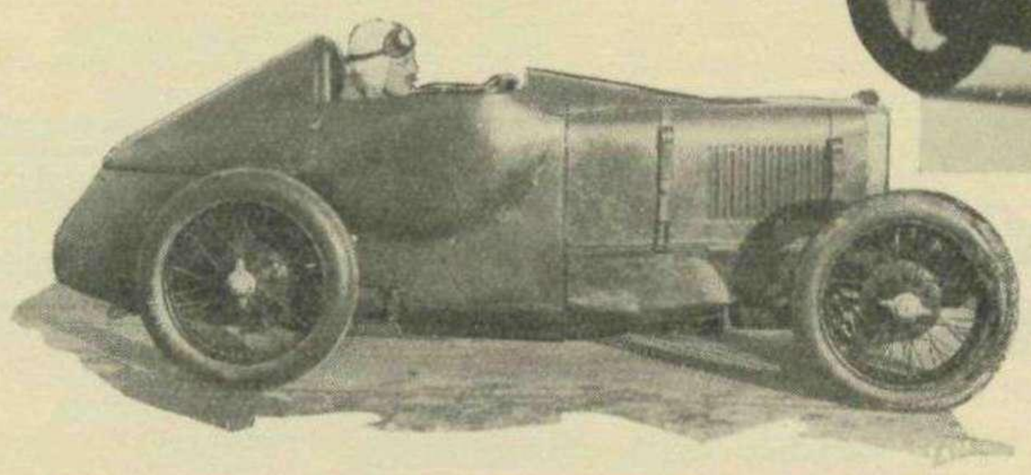
With motorcycle trials held in numbers every week-end it is only

RUMBLINGS—continued

natural that the general public should have lost interest in them ; but there was no lack of interest in the " Old Crocks " trial which took place recently.

Described as the " Pioneer run to Brighton for motor-cycles, tricycles and quadricycles of historic interest," the event attracted an entry of 60, of whom, despite the vagaries of old-age mounts, 57 actually started. The start was at Tattenham Corner, of " Derby " fame, and the finish at the Aquarium, Brighton. The machines were divided into three classes, according to age, and bonus marks were awarded to the more antique.





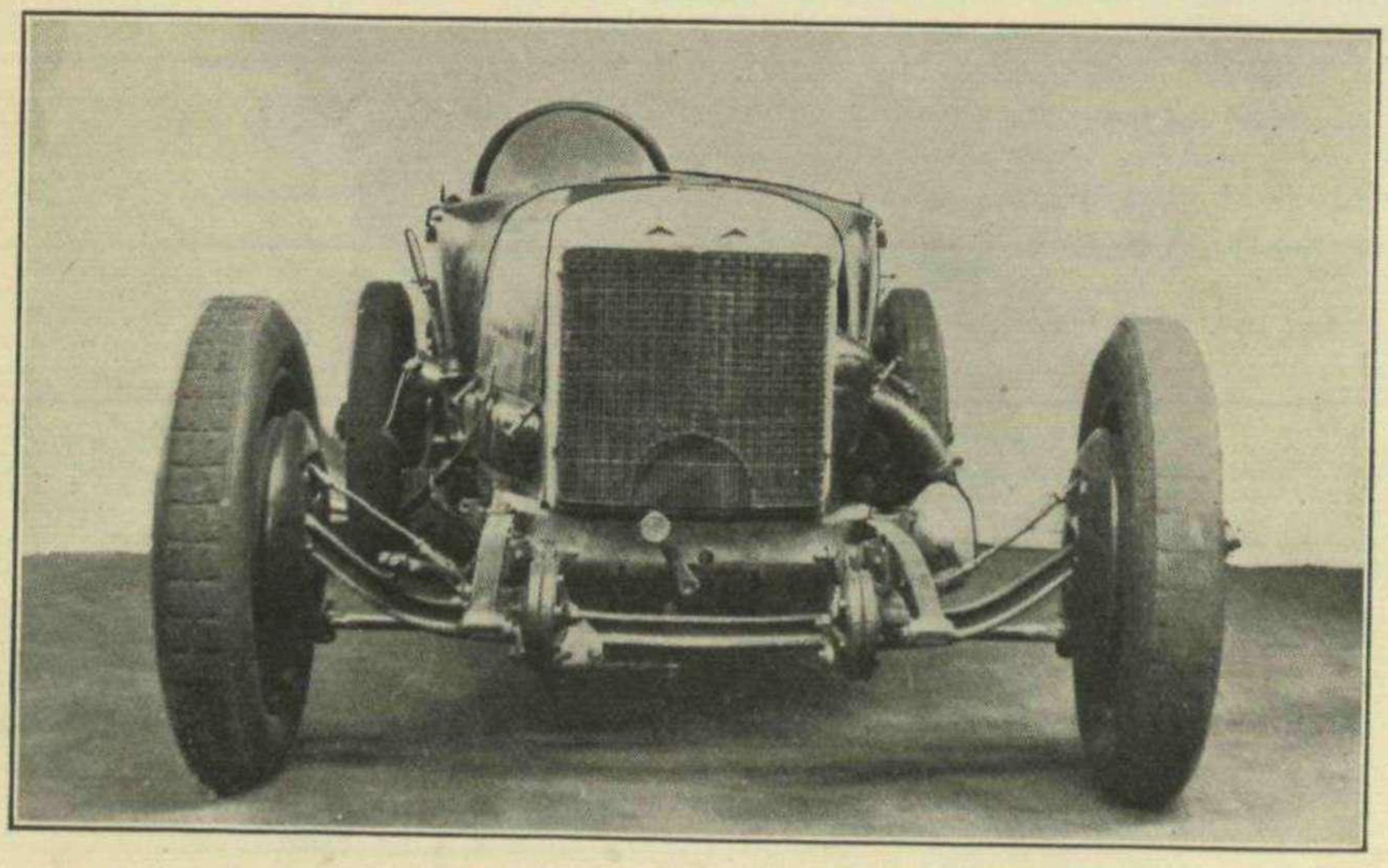
Far from home—but still upholding British motoring prestige ; two snaps taken in France and the U.S.A. Eyston's 750 c.c. M.G. at Montlhery, and (above) Campbell showing the Americans " how " with his " ½ pint auto."

A curious feature of the trial was the number of defunct makes represented. The 57 starting machines were composed of 31 different makes, and of these only 13 are on the market today. The majority of those still manufactured were British.

There was no award for best performance of the day, the better competitors being given plaques and the less successful certificates. All the machines were 17 years old at least, and some were over 30. Yet of the 57 starters, 49 reached Brighton and were thus eligible for award. Only seven of them failed to secure the coveted plaques.

Although over a dozen foreign machines competed, most of the premier awards went to British machines. Triumphs led the field with nine starters, all of whom finished, securing eight plaques and a certificate. In point of numbers the next most popular make was the Belgian F.N., with an entry of five ; three gained plaques but two fell by the wayside. Then the entries slumped to three each for Chater-Lea, Kerry and Minerva, each of these makes securing two plaques. De Dion, Douglas, Humber, James, Matchless, Rex and Rover were represented by two machines each, and the remainder were individual entries, mostly bearing names unknown to a post-War generation of motorists and motor cyclists.

I was talking to one of the old school about these aged crocks, and he waxed quite sentimental about the old days. Those were the times, he said, when every hill was an adventure,—jockeying your single-geared belt-drive one-lunger up gradients which meant much wangling of spark and air controls. Now it is all so very cut and dried.



The 1½-litre Mercedes, to which " Boanerges " refers. It is being reconditioned in preparation for the coming season by Messrs. Thompson and Taylor. Lady Dorothy Paget is the owner.

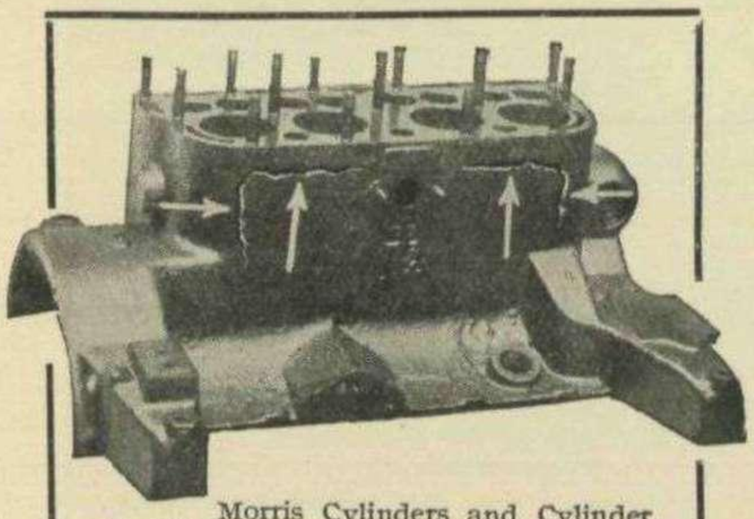
Brooklands This Month.

A programme of eight races has been arranged for the Brooklands Open Meeting on Saturday, March 14th. The first event is at 2 p.m. and there will be three Long and three Short handicaps. Two races wi'l run over the " Mountain " course.

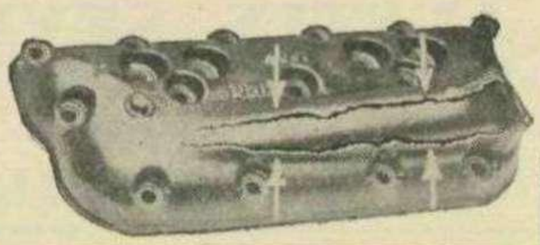
The entry fee for the " Mountain " Speed Handicap has been reduced from 5 guineas to 2 guineas. Drivers in all the big International races this season must be experienced, and it is probable that many people will take advantage of this special concession at the Brooklands Spring Meeting in order to qualify for the British Double-Twelve, this being the first race in which this new regulation takes effect.

As a result of co-operation between racing men and the track authorities, the course is now greatly improved. Many thousands of square yards of concrete have been relaid during the win'er months, and the obliteration of the more famous bumps has been successfully tackled. In consequence there is good reason to believe that the existing lap record of 137.58 m.p.h. will be broken again before the end of the 1931 season.

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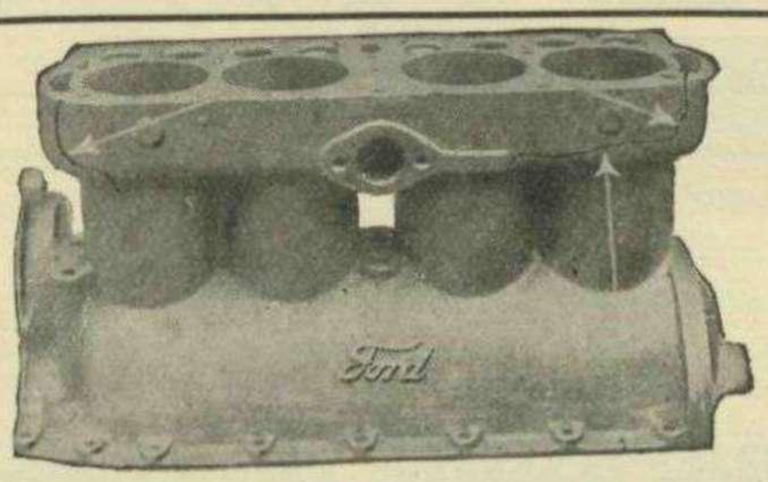
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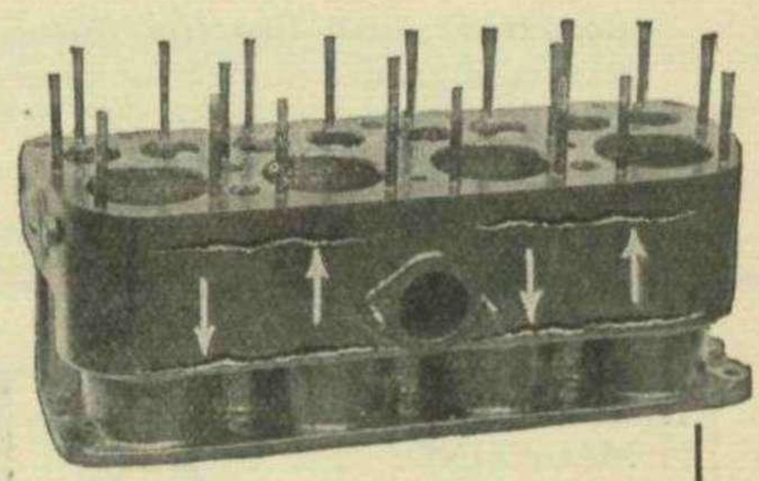
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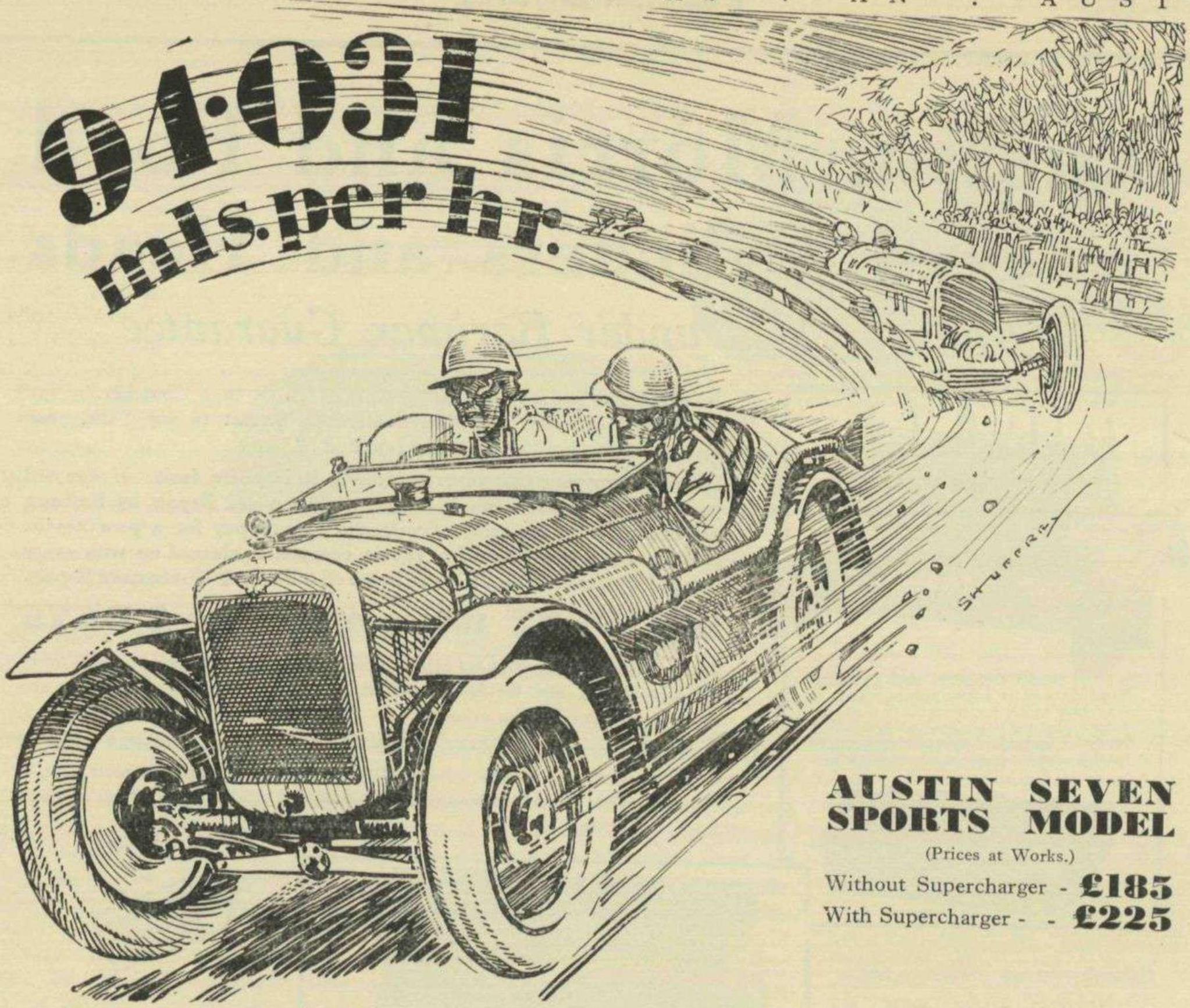
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AUSTIN 7

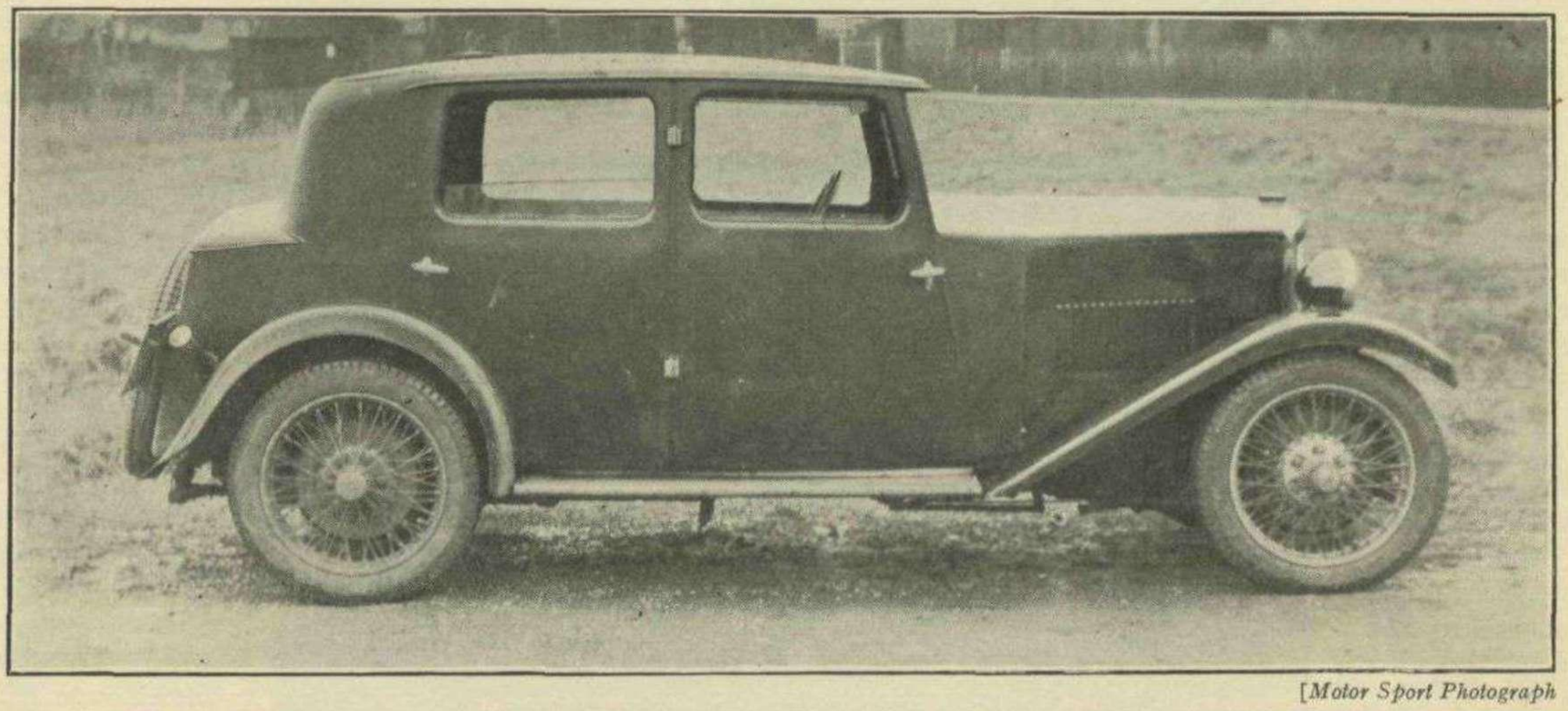
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[*Motor Sport Photograph*

The clean blended and well-proportioned lines make the Monaco "Special" one of the most handsome small closed cars on the road.

WHEN Mr. Leverett set the seal on the British successes in the Monte Carlo Rally by winning the 1,100 c.c. class on his Riley, yet another example was provided of the fact that other types than Brooklands models have a very good right to be termed sports cars.

Much as we all like to take the air on occasion in a stripped racer we must admit that the number of people to whom this can be of constant use is limited, and that many motorists who use their cars for competitions and trials, also use them for getting about the country in a normal manner, and therefore need a car which can be used for both purposes.

It is to such as these that the Monaco "Special" model of the famous Riley "9" should make a special appeal, and as it was good enough for Mr. Leverett to go from Stavanger to Monte Carlo in such a manner as to win his class, it should be good enough for other motorists whose tastes run to high performance, but whose pockets do not allow of high maintenance.

The specification is based on the standard chassis, which is of very high efficiency design, but modified to give a definitely increased performance. The engine is a 4-cylinder of 60.3 mm., and 95.2 mm. bore and stroke incorporating many special features. It has push-rod operated overhead valves, but owing to the arrangement of the 2 camshafts, it is possible to use a cylinder head with hemispherical combustion chambers and valves set at 90°. This gives an efficiency similar to that obtainable by the use of two overhead camshafts, but without the complication of drive, and lack of accessibility which this arrangement requires. Lubrication is by pressure to all main and big-end bearings by a submerged plunger type pump, which also supplies oil at a lower pressure to the valve gear. The magneto is in a particularly accessible position, high up at the front of the engine.

The special models differ from the standard in having two carburetters, while internal modifications include different pistons giving a higher compression ratio and increased power output. The 4-speed gearbox has a constant mesh type third gear with helical teeth, and in actual running this gear is definitely inaudible. Naturally, on a car of small engine size the gearbox plays a great part in getting a good performance, and the ability to put in long spells of hard climbing on third gear without any sound from the box adds greatly to the pleasure of driving.

When first taking over the latest model we were immediately conscious of an improvement over previous models, without, however, being fully able to decide where the improvement had been made. A model which has attained such success as this one has during the last few years is naturally unlikely to show any radical changes, and the improvements can be traced simply to a very exacting attention to details both of chassis and body.

The very low build of the car makes it handle in saloon form, better than the majority of open cars, and under all conditions the control is remarkable, and gives an idea of how this car was able, under appalling conditions of ice and snow to put up a higher average speed over the worst sections of the Monte Carlo Rally than many cars of much greater power.

The engine is more silent, and smoother in running, than any previous Riley we have driven, and from a mere crawl on top gear is without vibration up to its maximum revs. This model has a guaranteed road speed of 65 m.p.h. but we found that this was a conservative estimate and the car we tried attained 68 m.p.h.

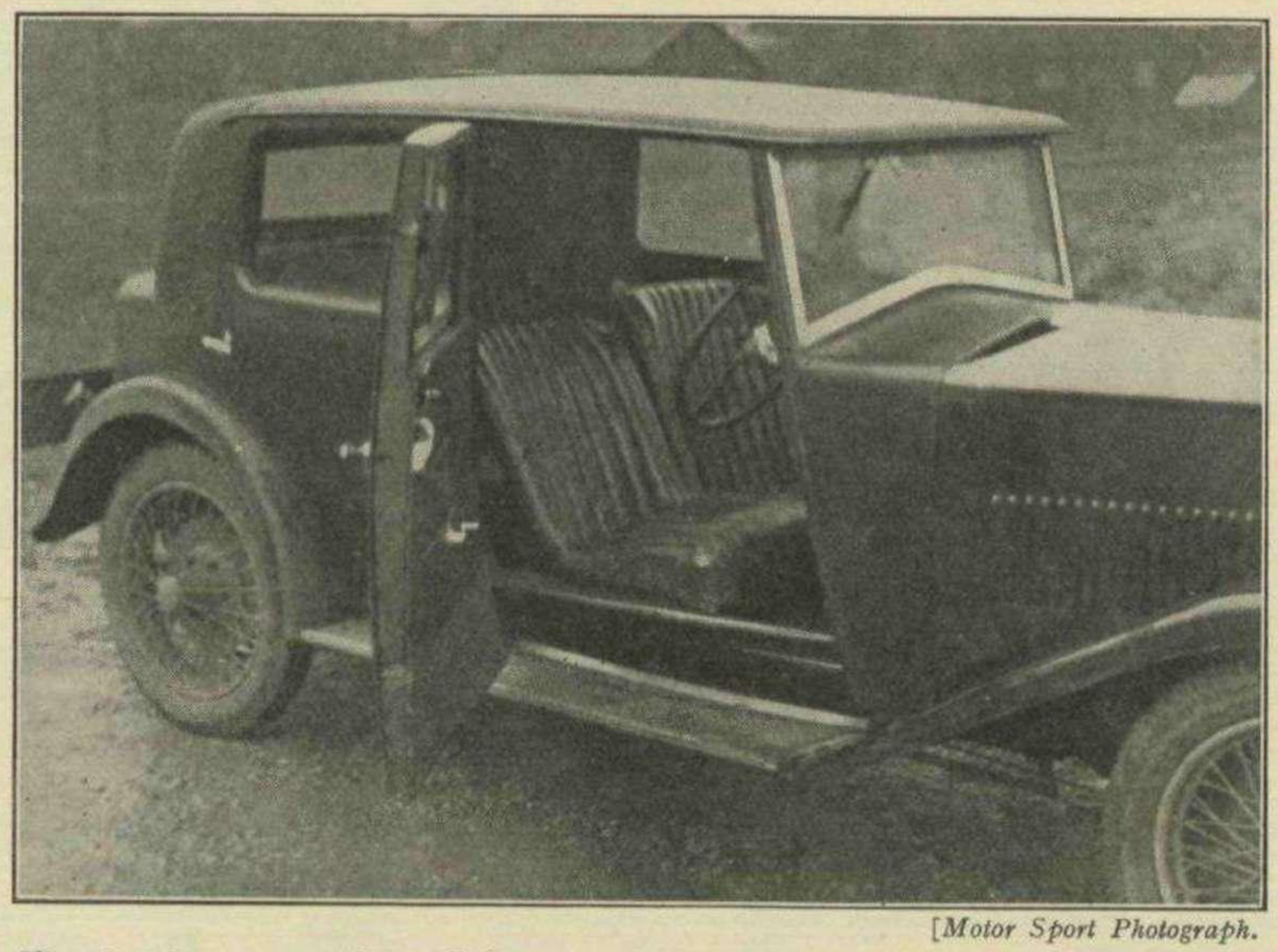
[*continued overleaf*]

THE RILEY MONACO "SPECIAL"—continued.

without difficulty, and showed no signs of fuss at 45 m.p.h. on third gear.

The brakes contribute greatly to the high average speeds possible, and the embodiment of hand adjustment which can be worked from the driver's seat while running is a great convenience. They bring the car to rest from 40 m.p.h. in 65 ft. without harshness or affecting the steering.

During the few hundred miles running we had on this car we were particularly struck by the remarkable fuel economy even when driven really hard. Many sports car enthusiasts are apt to scoff at the idea of going to any special trouble to tune for economy, and where this can only be obtained at the expense of performance there is something to be said for this. When a really remarkable performance is combined with economy it is a proof of very efficient design, and as sports car owners cover, as a rule, a greater mileage in the year than their slower brethren, it is specially important in these hard times to consider running costs with extra care. That a cheap car to buy is often dear to run is an old saying, but an economical car need not be expensive to buy, and even if it costs a few pounds more than a similar vehicle of lower efficiency it will prove a considerable saving in the end.



[*Motor Sport Photograph.*

Though in h.p. rating and overall dimensions the Monaco "Special" is small, the interior of the body is light, comfortable and roomy.

The bodywork of the Riley "9" is probably better known in external appearance than any other single type on the roads to-day, but many people do not realise the ingenuity which has gone into the detail work of that body. In addition to its very pleasing lines, its accommodation and convenience are far in advance of many larger cars, and strength and lightness have been very skilfully combined.

We have no wish to boost the closed car at the expense of the ultra sporting or pukka racing vehicle, which is suitable for entirely different work, and in the case of the Riley there is no need. This concern make one of the most successful 1,100 c.c. racers of recent years, and the repeated victories of this model in the hands of private owners will give increased confidence to the buyer of a more sober model, by the knowledge that the reserve of power which is utilised to give the Brooklands Riley such a remarkable turn of speed, means that his own model will have an abnormal factor of reliability. It has also given him a performance which is most exhilarating, and makes the Monaco "Special" a very attractive proposition to the man who wants to cover a big mileage, with the minimum expenditure of time and money.

A One-make Trial — Good Entry for M.G. Club Event

THE M.G. Car Club, which is steadily increasing in membership, held its first trial last month, the event taking the form of a half-day affair over a very sporting course.

Sixty entries were received, but owing to the prevailing malady—'flu—there were 10 non-starters. The start was at the well-known hostelry, the "Lambert Arms," at Aston Rowant, and the 45-miles course took competitors by devious ways to Berkhamsted. Several of the popular gradients to be found in the Chiltern Hills figured on the route card, including Lewknor, Kingston Blount, Whyteleaf and Kop.

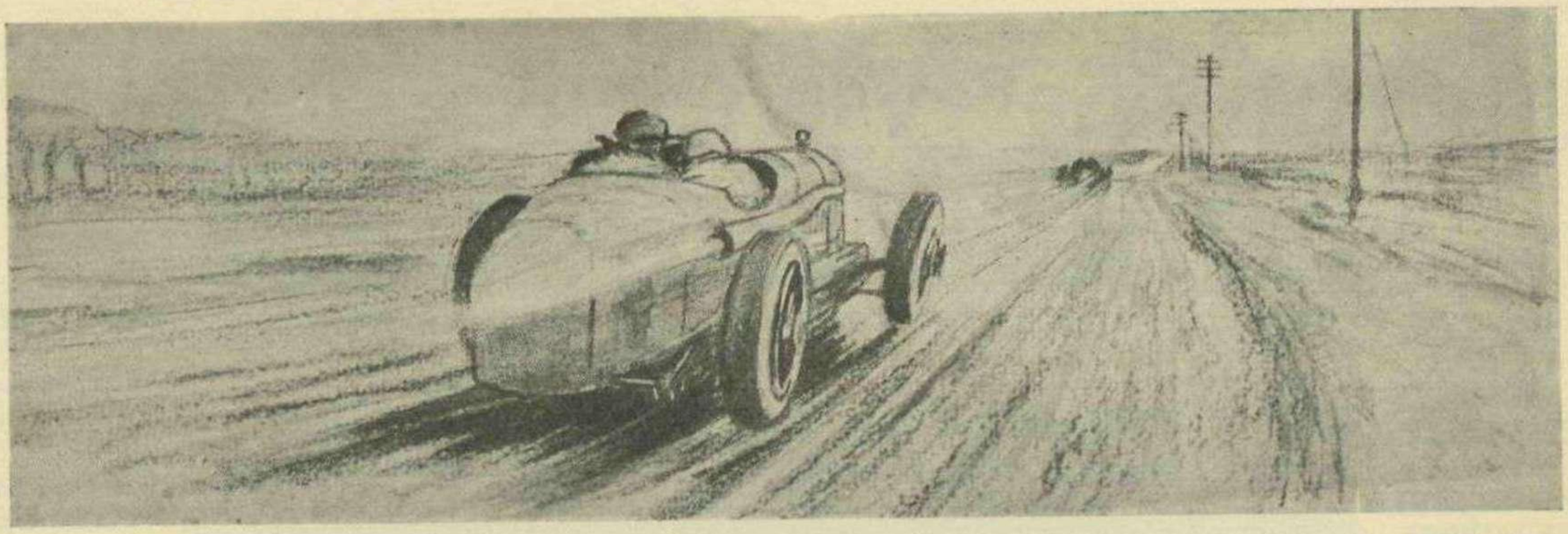
At the finish at Ashley Green only one driver failed to check in. This was L. Smith who was driving a Midget.



Some of the 40 M.G. "Midgets" awaiting zero hour outside the Lambert Arms, Aston Rowant.

The Choice of a Road-Race Course.

There is Much to be Done Before a Big Race is Run.



FROM time to time one reads in the correspondence columns of the motoring press suggestions that it would be a good idea if someone could arrange a road-race on Salisbury Plain, or some other spot favoured by the writers, but many of the letters reveal a complete ignorance of the factors which have to be taken into consideration, and it is the purpose of this article to set down some of the points which govern the choice of a circuit.

The first essential, of course, is that the laws of the country should permit the closing of roads for racing. As the law stands at present, there is no possibility of this in England or Scotland, except on private roads, for the Road Traffic Act expressly forbids the use of the highways for racing of any kind. This objection does not hold in Northern Ireland or the Isle of Man, since both these territories have their own legislatures, which can and have passed Bills allowing the closure of roads for certain periods, while the Irish Free State is entirely independent of English control, and has passed similar measures through the Dail. In the old days the greatest hope of getting permission to run a race was to show that it would be held in a place not likely to interfere with the normal traffic of the district, but the publicity value of such events is now widely recognised and local bodies are only too pleased when it is decided to promote a race in their jurisdiction.

Once the approval of the Government of the territory has been gained, the next step is to find a course physically suitable. Assuming that the roads of the district have a reasonable surface, the most elementary requirement is that of width. In modern car racing, especially that of the T.T. variety, there is generally a big entry, and the handicap against the large cars makes it necessary for them to pass the small ones four or five times before they can secure a winning position. The minimum width which can be tolerated in these circumstances, on a normal road is 28 feet, though it may be less where it passes through villages, but such narrowing will bar any overtaking at that point, naturally.

The next important dimension is the length of circuit, and modern courses have a short lap—usually of about 12 miles. This is not so important in the Grand Prix type of race, where all competitors start from scratch, but in T.T. races the crediting of one class with a whole lap more than the next larger may favour it unduly, while a time allowance in lieu of distance is apt to make the race difficult for the spectators to follow. A long lap is not popular with drivers, as they do not get sufficient practise time in which to memorise it thoroughly, and it may force them to carry a great quantity of fuel in order to avoid stopping too often, while the pits cannot keep their men properly informed of the progress of the race if the cars only pass them, perhaps, half-a-dozen times in three hours.

A Short Course Necessary.

The great increase both in spectators and the number of cars which take part in the big races make necessary a cordon of flagmen whose sole duty it is to warn drivers of accidents still hidden from view, and the number of these, together with the armies of police, marshals and doctors which are required, make it imperative to keep down the length as far as possible. Last and not least, spectators like to see something for their money, and the passing of a car every five minutes or so, as must have been the case in some of the early events, would not be considered very exciting nowadays.

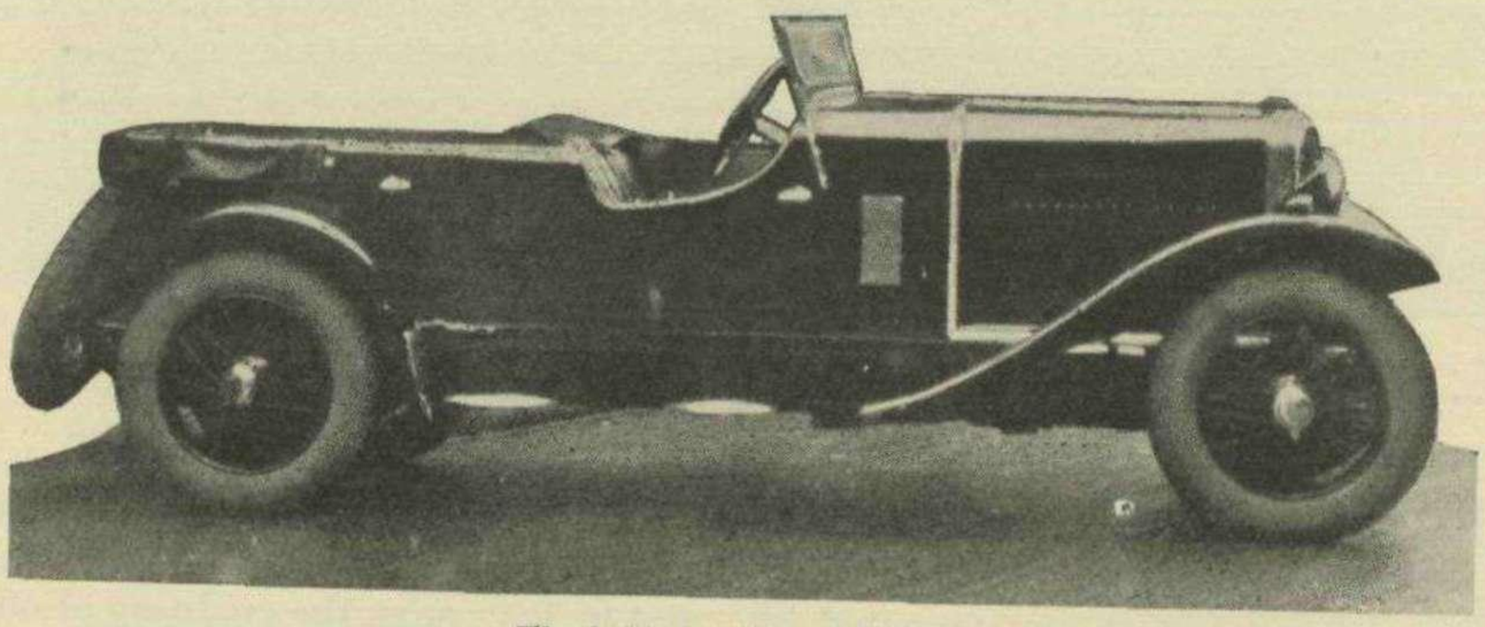
In comparison with width and length, the vertical dimension is not very important. Moderate hills demand from all cars a drop to a lower gear, which could equally well be arranged by the inclusion of more corners. Such long pulls as the ascent of the Mountain in the Isle of Man do provide a searching test, but unfortunately they cannot as a rule be embodied in a short course.

The proportion of straight stretches, bends, and corners has a great influence on the character of a circuit. The first give the big cars a chance to show their speed, which is after all the great idea of racing, and the grand-stand is usually set on one of these. Bends form an important part of the circuit, since a clever driver will be able to

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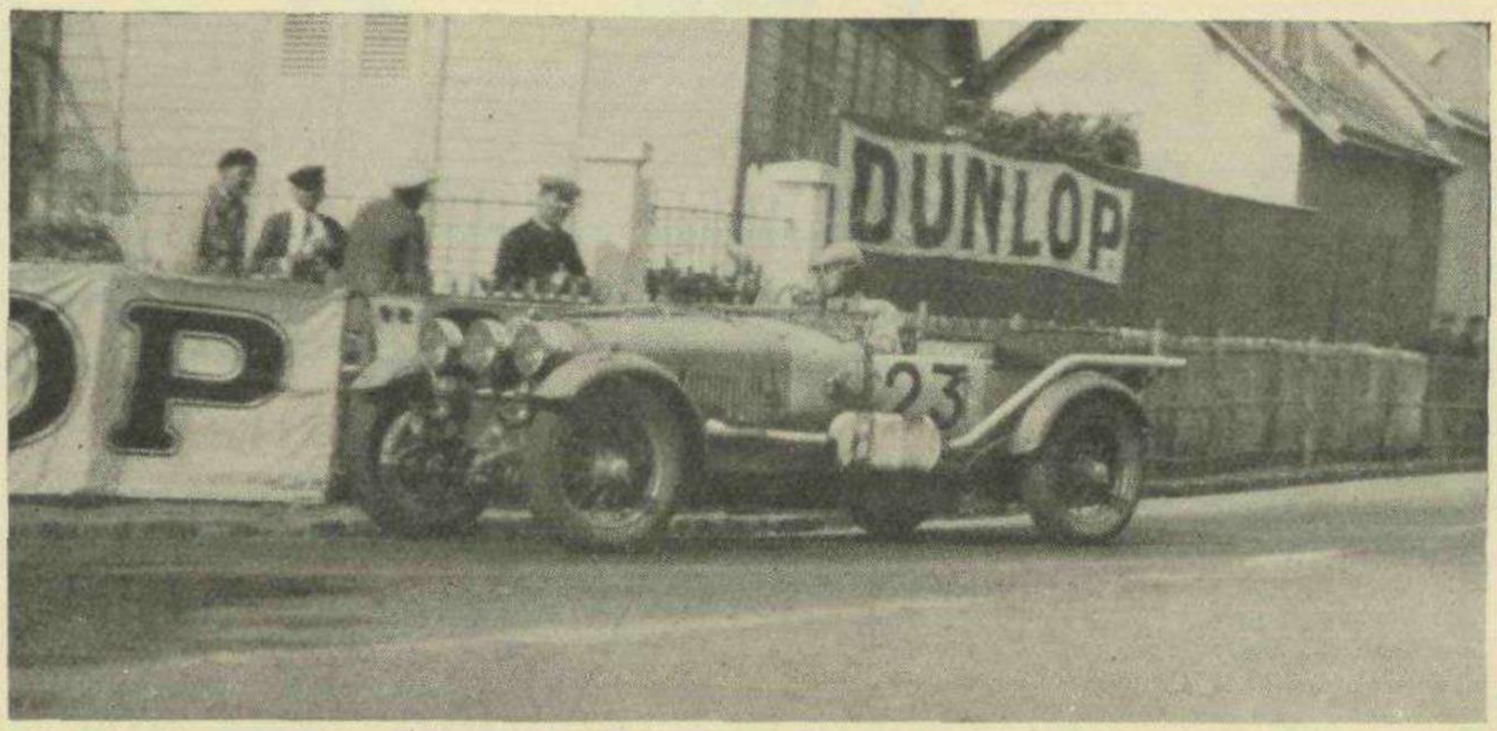
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CHOICE OF A ROAD-RACE COURSE—continued.

discover and maintain the maximum speed at which they may be taken, and in this way can gain considerably on a rival whose vehicle will not allow of such liberties.

Sharp corners have been decried to some extent by ignorant people, but their value is unquestionable, for they test braking and gear-changing very thoroughly, while cars which have good acceleration show up to advantage in the stretches immediately following. Thus, the ideal course, should have good stretches of straight to allow full speed and safe passing, bends to try the observation and daring of individual drivers, and a few sharp corners to weed out cars lacking in steadiness and good power-weight ratio. Towns are avoided if it can be managed, as the danger of children and dogs is one which can never be entirely guarded against, but in most courses at present in use this trouble has to be faced.



"Corners should be on the driver's side."

The race may be run in a clockwise or an anti-clockwise direction, according to the physical features of the course. It is desirable that the corners should be on the driver's side, so that in countries where cars are fitted with right-hand steering a clockwise course is usually chosen, but it may happen that lapping in this direction is dangerous, for instance when there is a sharp turn on a bridge at the bottom of a steep hill, where the failure of brakes would mean plunging through the parapet into the river. Should this be the case, the race would have to be run in the opposite direction. In Continental races one would expect an anti-clockwise course, but considerations similar to the one mentioned above may prevent this. The rule of the road may be either left or right hand, but this is fixed according to the side of the road on which the pits are placed.

Finding a site for the grand-stand is often a matter of some difficulty as it has to be placed so as to give a good view, and also where a service of feeder roads is available to deal with the spectators and other traffic. It is, therefore, usually erected at the end of a long straight, with the pits either in front of it or on the other side of the road. It is generally placed on the outside of the course to avoid bridging the road. The pits also require a good stretch of road on which the *chefs d'equipe* can pick out their cars as they approach, and the faster cars are placed farthest along the line in order to give the drivers more time to see their signals. The road is usually widened to some 40 feet at this point, to allow pulling off the fairway, and must be fairly level so that cars do not roll off their jacks when wheels are being changed. The pits should be preferably on the mechanic's side to facilitate re-fuelling, in which case the left-hand rule is in force, but at Phoenix Park, for instance, they were on the inside, with a consequent change to the Continental rule.

After settling these little details, it merely remains to get permission for the race, and to run it. The governing body for the British Empire (excluding the Irish Free State) is the Royal Automobile Club. When the Club has satisfied itself that the proposed race will meet with everyone's approval and will be properly run, it will approach the International Body for a date. As the supposed event would be an important one, they would have to ask for an exclusive date and contest our claim against other countries, who naturally also want dates in the middle of the season for *their* exclusive use. Assuming that the pleas of the R.A.C. are answered, a permit would then be granted, and the organisers can run their carefully-planned race with the knowledge that they have done everything possible to make it successful. The presence of a body of racing experience going back for many years makes it unlikely that any requirement would be overlooked, and the modern road-race, like the modern car, starts to work as soon as its parts are assembled.—T.M.

MID-WINTER AT MONTLHÉRY.

FOLLOWING closely upon Campbell's feat at Daytona and the success of British cars in the Monte Carlo Rally, Messrs. E. A. D. Eldridge, G. E. T. Eyston and P. Brewster have added another feather to the cap of the British motor trade by putting up a remarkable show at Montlhéry recently.

Taking turns at the wheel, these three drivers attempted to set up a record for three days' continuous running on a 10 h.p. Singer saloon. The weather conditions, however, were against them, for they encountered hurricanes, rain, snow and ice.

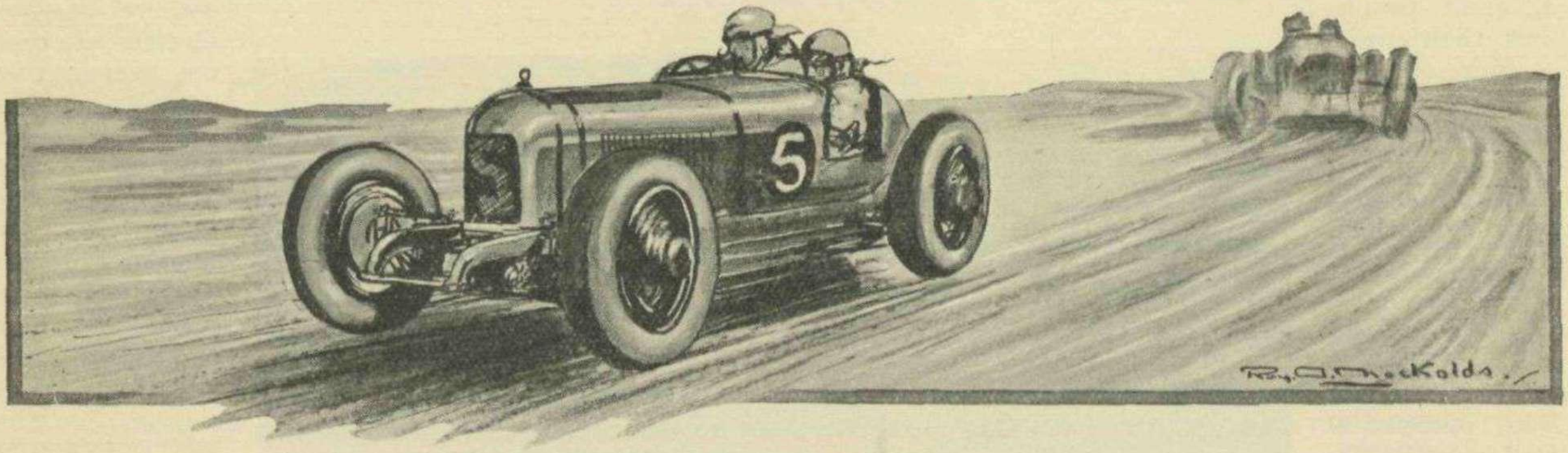
Nevertheless, they obtained world's records in Class F, covering 4,000 kilometres at 55.8 m.p.h. and averaging a speed of 55.92 m.p.h. for 48 hours' continuous running.

Cabling their progress, Mr. Eyston outlined the difficulties he and his fellow drivers were experiencing. The gales were so strong that the car was several times nearly blown off the track, whilst many of the hurricane lamps used to illuminate the concrete oval at night were blown to pieces. The cold was intense, and to make matters worse the track became ice-bound.

"Never experienced such arduous conditions. Heavy snow storm, but car running splendidly," ran one of Mr. Eyston's cables. Eventually the weather became so bad that it was necessary to give up the three-day attempt, although only four more hours' driving were required.

GREAT RACING MARQUES

MORS



By E. K. H. KARSLAKE.

OF all the great marques whose names have faded from the motoring world, there is none which must distress the enthusiast so keenly by its passing as that of Mors. Later than Panhard or Peugeot, earlier than Mercédès or Fiat, the Mors won for itself far back in the dawn of the automobile era a name which should have lived for all time. But to-day one seeks in vain for the descendants of the victor of Paris-Madrid in the lists of 1931 cars. I remember that shortly after the war those huge advertisements painted on the sides of houses which are such a prominent feature of a French landscape consisted very often of the words, "Mors—simples, souples, silencieuses"; but now even these reminders of past glories have gone, and the name of Mors lives on only in history.

A 5 h.p. Racer.

It was in 1897, the third year of real motor races, that the first racing Mors appeared. The great race of that year was run from Paris to Dieppe, the distance being 106 miles, and for it three 5 h.p. Mors were entered. These first racers of the marque had flat twin-cylinder engines, with a bore and stroke of 70 x 110 mm., the capacity thus being 847 c.c. The inlet valves of course were automatic and ignition was by low-tension magneto, while transmission was by belts giving three forward speeds and final drive by side chains. One of these cars fitted with a 2-seater body was driven by Mors himself, while in the 4-seater class two more were steered by Mouter and Viard.

In the first class Mors soon showed himself well able to compete with the racers of such well-established firms as Panhard, Peugeot and Bollée, and finally he finished seventh in his class, averaging 19.6 m.p.h. for the 106 miles, against the winner's 23.1 m.p.h. Both the other Mors cars finished being sixth and seventh in their class and finishing within a quarter of an hour of each other.

A month later, in August, the second great race of the year was held, the course this time being from Paris to Trouville, a distance of 108 miles. Once more three 5 h.p. Mors started, one of the drivers being again Mors himself, who was now accompanied by Andre Michelin, the sporting tyre manufacturer, and Marcel Cahen. Mors proved himself the fastest, and finished eighth among the cars, averaging 21.1 m.p.h., with Michelin ninth, and Cahen fourteenth. Thus the Mors' first season ended with great promise of success.

The 5 h.p. racer, however, appeared again in 1898, in which year the first important race was run from Marseilles to Nice, a distance of 141 miles, in March. This time the two brothers E. and L. Mors both drove cars, while the third machine was entrusted to Chesnay. Again E. Mors showed that he was capable of keeping up well with the famous Panhards, and at Hyeres he was seventh, while when Nice was reached he had climbed to fifth place, his average speed for the race being 18.2 m.p.h. His brother Louis finished eighth and Chesnay fifteenth, out of thirty-three finishers, and once again the Mors team had come home complete.

An Early Team.

In May of that year the first of the famous series of races was held from Paris to Bordeaux, and again the Mors team was entered. Emile Mors as usual drove one of the cars, but now for the first time he had as his second driver the great Levegh, who was later to score famous victories for the marque, while the third car was entrusted to Antony. On this occasion, however, the team did not enjoy its usual good fortune. Antony dropped out before Tours was reached, and Levegh having long clung to the tail of de Knyff's car in second place, was also forced to retire before Bordeaux. Mors himself collided with a cart near Angouleme and was thrown out, receiving a broken collar bone; and thus none of the team succeeded in finishing the race.

The great race of 1898, however, was the famous Paris-Amsterdam-Paris which was run in July, and for this event a set of entirely new Mors racers were constructed. These cars had 6 h.p. motors with four cylinders arranged in a V at the back of the car. The bore and stroke were as before 70 x 110 mm. and the capacity therefore 1,694 c.c. The cars still had belt transmission, but now only two speeds were provided, and for the first time a tubular radiator was fitted to cool the water.

23 m.p.h. for 889 Miles.

Emile Mors, not having completely recovered from his accident in the Paris-Bordeaux, Levegh now headed the team and was accompanied by Chesnay and Roscoff. But it was soon apparent that the 6 h.p. Mors was not as fast as the 8 h.p. racers entered by Panhard, Bollée and Peugeot. Roscoff fell out soon after starting the return journey from Amsterdam, but Levegh finished ninth, averaging 23 m.p.h. for the full 889 miles of the race, and Chesnay got back to Paris in eleventh place. It was, however, apparent that for racing something more powerful than the 6 h.p. car was necessary, although this model lasted on for some time as a most successful touring car. In fact Mors had by this time collected so enthusiastic a band of owners of his cars that in October he organised a special race for Mors cars only from Saint Germain to Vernon and back, a distance of 79 miles. The winner proved to be Levegh, who averaged 29.3 m.p.h., while it is interesting to note that the fifth car to arrive was driven by no less a person than Brasier. Levegh and Roscoff also ran early the next year in the Nice-Castellane-Nice race on Mors cars of the same type; but against the big racers which were now being built by other firms they were only able to finish tenth and eleventh.

[Continued overleaf].

Midget Car Breaks Records at 103 Miles an Hour!

For the first time in the history of motoring a 7 h.p. car has travelled at over 100 miles an hour.

On the 16th February at Montlhery Track Mr. George E. T. Eyston, driving Mr. J. A. Palmes' M.G. Midget, created the following new International records in class H :—

5	Kilometres	at 103.13	m.p.h.
5	Miles	at 102.76	„
10	Kilometres	at 102.43	„
10	Miles	at 101.87	„

(Subject to Official Confirmation)

Mr. Eyston relied upon B.P. for his fuel supplies

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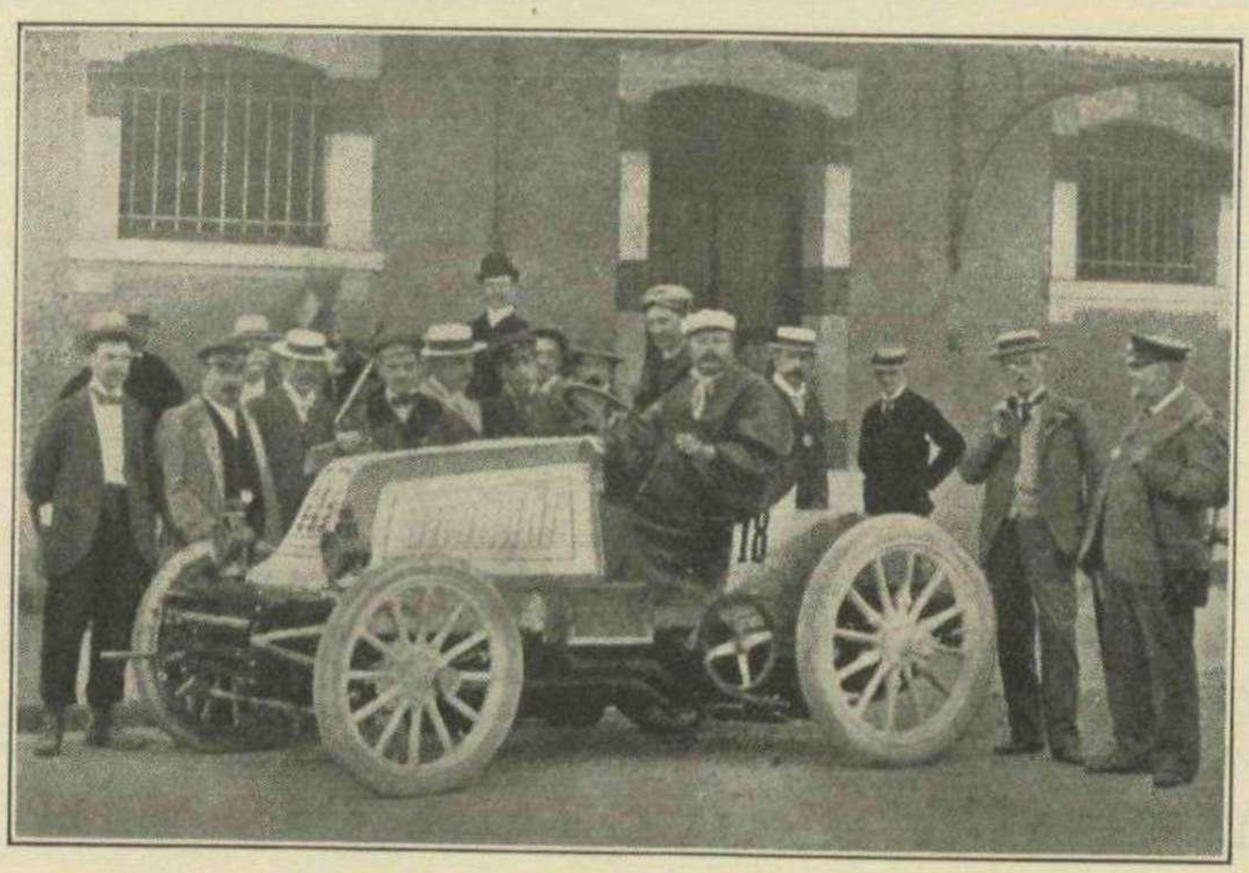
During the winter, however, the brothers Mors had been busy on the construction of some new racing cars which could worthily uphold the firm's colours against the sternest competition. These new cars were entirely unlike the earlier machines from the factory, and followed much more closely the now almost universal Panhard pattern. The engines developed 16 h.p. and had four vertical cylinders with a bore and stroke of 98 x 140 mm. (5,078 c.c.), while transmission was now by a conventional 4-speed sliding pinion gearbox and side chains.

Four of these cars were entered for the first big race of 1899 which was the second Paris-Bordeaux event, and had as their drivers Levegh, Antony, Broc and Fougerat. Levegh was early in trouble, but Antony kept up well with the Panhards, finally finishing sixth and averaging 26.4 m.p.h. for the 351 miles. Broc, the next member of the Mors team to arrive, was tenth, Levegh fourteenth and Fougerat sixteenth. Thus the traditional Mors achievement of the whole team finishing was once more repeated.

This race, however, was looked upon by all the competitors merely as a prelude to the great race of the year styled the Tour de France. In this event the course led the competitors right round France, the total distance of the race being 1,350 miles divided into seven daily stages. For this event the four 16 h.p. Mors were entered, three of their drivers being as before, Levegh, Antony and Broc, while the fourth car was now handled by the famous Camille Jenatzy, who thus made his first appearance in the great races. Both Antony and Broc fell out during the second stage from Nancy to Aix-les-Bains, but Levegh kept well up with the leaders. On the penultimate stage from Nantes to Cabourg he actually made the fastest time of the day, but he was then too far behind to hope for victory, and he had to be content to finish eighth, averaging 16.8 m.p.h. Jenatzy in the meantime had been experiencing innumerable troubles, not the least of which was that his car ran off the road into a ditch and broke a wheel. Nevertheless he continued and completed the whole course after driving throughout one night to catch up, his average speed being just over 8 m.p.h.!

Many Victories.

The last year of the old century was not however to prove devoid of victory for the new 16 h.p. Mors. At the end of July, a race was run from Paris to St. Malo, and in it Levegh, Antony and Jenatzy started on their Mors racers. The cars soon showed that they had got over the troubles which had delayed them in the Tour de France, and finally Antony and Levegh finished first and second, the former averaging 30.7 m.p.h. for the 231 miles, while Jenatzy was seventh. The success of the first two was repeated a month later when they again finished first and second, this time in the Paris-Trouville Race when Antony's average was 35.2 m.p.h. for the 105 miles. There followed Paris-Ostend at the beginning of September in which an amazing result was witnessed: for the cars were given a massed start, and Levegh on his Mors and Girardot on a Panhard raced neck and neck for the full 201 miles, finally finishing in a dead heat at 32½ m.p.h.! Jenatzy and Broc had also started in the race and succeeded in finishing fifth and sixth. A fortnight later was run Paris-Boulogne, and the Levegh-Girardot duel was refought on the new course. This time, however, Girardot got home first and Levegh had to be content with second place, less than two minutes behind his great rival, while Broc was third. The season's racing was, however, still not over for by the 1st October the Mors team had moved down to the South-West to take part in the Bordeaux-Biarritz race. In this event they scored another victory, Levegh proving the winner at 37 m.p.h. for the 163 miles, with Antony second and Broc fifth. Thus by the end of the old century, Panhard realised that in Mors they had at last found a really worthy opponent.



Fournier in the victorious Mors at Bordeaux, 1902.

But it was already apparent that chances of victory in the great races would be largely enhanced by the use of a more powerful engine and for the 1900 season Mors set about the production of some new racers which were destined to be outstandingly successful. The new cars had 4-cylinder engines rated at 24 h.p., with a bore and stroke of 119 x 165 mm. and a capacity of 7,343 c.c., while the rest of the chassis followed closely that of the 16 h.p. racer from which it was developed.

The first of these cars was ready by March, and Levegh decided to try it out in the Nice-Marseilles Race which was run in that month. It was soon apparent that the new Mors was the fastest car in the race, but Levegh was delayed for half an hour with tyre troubles and was only able to finish fifth. But the real speed of the car was amply demonstrated in the speed trials which were held shortly afterwards on the Promenade des Anglais at Nice when Levegh covered the flying kilometre at 50.3 m.p.h.

The next important race took place at the beginning of June and was run from Bordeaux to Perigueux and back, a total distance of 198 miles. By this time two of the new Mors were ready and Levegh had Farman as his teammate. Great excitement attended the race as after Levegh's performance at Nice it was wondered whether the new Mors were not really faster than the Panhards. Levegh set off in great style and reached Perigueux nearly three minutes ahead of Giraud on the first of the Panhards. On the return journey he increased his lead, and finally won the race by more than eleven minutes at an average speed of 48.4 m.p.h., while Farman who was fourth averaged 41.7 m.p.h. Thus the Mors claim to be the fastest car of the year was well on the way to establishment.

A Remarkable Performance.

The great race of the season, however, was to be the Paris-Toulouse-Paris, run at the end of July, and for this event three of the new Mors were entered, their drivers being Levegh, Antony and Hourgières. The race was run in three stages, Paris to Toulouse, Toulouse to Limoges and Limoges to Paris. On the first day Levegh went marvellously and made the fastest time by almost exactly one hour, and although he had minor troubles on the second and third days his adversaries could never catch him and he finally came home the winner. His time for the 837 miles of the race was 20 hours 50 minutes 9 seconds, and his average 40.2 m.p.h., a truly remarkable achievement. Antony on the second Mors finished fifth, while Hourgieres fell out soon after the start of the return journey. Thus for the first time Mors had won the great event of the motoring year.

The 24 h.p. Mors made one more appearance—in the Nice-Salon-Nice race which was run in March, 1901. The solitary Mors was driven by de Caters who finished third, covering the 244 miles at 33.7 m.p.h., the race being won by one of the new Mercédès. But for the important races of the 1901 season Mors had decided to build a set of still more power-

GREAT RACING MARQUES—continued.

ful cars. The new racers had 60 h.p. engines with a bore and stroke of 130 x 190 mm. and thus a capacity of 10,092 c.c., no striking alterations being made in the chassis. One of these cars, which was to be driven by Levegh, was chosen as one of the French team for the Gordon Bennett Cup, which was to be competed for in conjunction with the Paris-Bordeaux race at the end of May. In the open class of the race there were three more Mors which were driven by Hourgières, de Caters and Fournier, who now joined the team for the first time.

Levegh as usual got away well and at Chartres he was leading with Fournier fourth, and before Tours the latter had moved up into second place. Soon after leaving this town, however, Levegh dropped out with gearbox trouble, and the race was finally won by Fournier who covered the 328 miles at 53 m.p.h.

Thus the new Mors had scored first blood, and the factory set about preparations in earnest for the great race of the year, Paris-Berlin. No fewer than six 60 h.p. Mors arrived at the starting line, and it was obvious that they formed a very strong team. Levegh had now dropped out, but his old team-mates Antony and Hourgieres had two of the cars, Fournier, after his victory in Paris-Bordeaux, had a third, and Brasier the fourth, while the other two cars were driven by two Englishmen, the Hon. C. S. Rolls and Foxhall Keene.

Fournier soon showed himself a worthy successor to Levegh and took the lead from the outset. By the time Aix-la-Chapelle was reached he had a lead of nearly ten minutes over de Knyff who was running second, and he held it all the way to the finish at the trotting track in Berlin, finally winning at 44.1 m.p.h. for the 687 miles. Fournier actually had been marvellously lucky, for no sooner had the cars moved off after the finish for the procession through the Brandenburgher Tor, than the winning Mors broke a chain link, and the driver had to repair it. Brasier finished fourth, Hourgieres twelfth and Rolls twenty-ninth, and the reputation of the Mors, which had thus won the great race of the season two years in succession, was made for all time.

No sooner was Paris-Berlin over than the A.C.F. set about the organisation of the next year's great race which was to be from Paris to Vienna. For the first time a weight limit of 1000 kgms. with an extra allowance of 7 kgms. if a magneto was fitted, was imposed, and as the Paris-Berlin Mors had weighed some 1,300 kgms. it was necessary to set about constructing a new set of racers for 1902. The engines of the new cars, although still rated at 60 h.p., had a larger bore and a shorter stroke, the dimensions being 140 x 150 mm. and the capacity 9,240 c.c. The chassis of course was built very much lighter, the clutch was a leather cone instead of the previous all-metal arrangement and a device was incorporated by which the drive on top speed was direct and not through the gearbox, while a further improvement was the fitting of shock-absorbers working on the dash-pot principle.

Fournier after his victory in Paris-Berlin was chosen as one of the French team for the Gordon Bennett Cup, which was being competed for in conjunction with the Paris-Vienna race over the stage Paris-Innsbruck. The rest of the Mors team for the race consisted as before of de Caters, Foxhall Keene and Rolls, who were now joined by the later so famous Gabriel and the American enthusiast Vanderbilt, while smaller 40 h.p. cars were driven by Augieres, and d'Arnaud, and Godard-Desmarest and Fraignac drove 20 h.p. machines in the light car class.

Fournier, as in Paris-Berlin, took the lead from the outset and covered the 87½ miles to Troyes in 80 minutes. But he was not destined to repeat his performance of the year before, as just before reaching Chaumont he was put out of the race with transmission trouble. The Mors in fact were not lucky, as Rolls, Keene and Fraignac had all come to grief early on in the race at the level crossing at Ozoir la Ferrière, and the first of the team to finish was de Caters who reached Vienna ninth in the big car class.

At Ardennes.

Thus Mors had this time failed to repeat the success which had been gained in the most important race of 1900 and 1901. But the season was not yet over, and at the end of July the Belgian Club set about the organisation of the first Circuit des Ardennes race. For this event four of the big 60 h.p. Mors were entered, their drivers being Gabriel, de Caters, Vanderbilt and Augieres. The race was very hotly contested, but Gabriel soon gave a taste of his future quality by getting into second place on the first round and staying there till the finish, his average speed being 52.6 m.p.h. for the 318 miles. Baron de Caters meanwhile had fallen out on the second lap, but Vanderbilt finished third, and Augieres seventh. Thus was the defeat of Paris-Vienna to some extent revenged.

During the ensuing winter the Mors factory was busy on the construction of the new racers for 1903. This model had an engine rated at 70 h.p. as against the previous 60 h.p., and the bore and stroke were both increased. The dimensions now were 145 x 175 mm., and the capacity 11,564 c.c., while for the first time a great innovation was added in the shape of mechanically operated inlet valves, which were overhead and directly above the exhaust valves. The old solid axles were now discarded in favour of tubular members, and the new cars, of which thirteen were built had novel bodies much resembling an inverted boat.

The great event of 1903 was to be another international race, this time from Paris to Madrid. The enthusiasm aroused by the race was enormous and the entry list was the largest ever recorded and included all thirteen of the new Mors. Henri Fournier was of course to drive again, and he was accompanied by his brother, by Augieres, Gabriel, Salleron, Rigal, Vauderbilt, the Baron de Forest and other drivers not as yet so well known.

Paris-Bordeaux at 65 m.p.h.

The story of Paris-Madrid is so well known and is so great an epic that I do not presume to try and tell it here. But beneath all the tales of woe and disaster, of the triumphant tragedy of the Renault brothers, of the dramatic action of stopping the race at Bordeaux, there must never be forgotten the fact of Gabriel's wonderful drive. Starting number 168 he brought his 70 h.p. Mors through all that line of struggling cars and humanity and actually was the third driver to reach Bordeaux. On time of course he was an easy winner and in face of the colossal obstacles on the route he actually covered the 342 miles from Paris to Bordeaux at an average speed of 65.2 m.p.h.! It was an event that must make the name of Mors live for ever, make it a name which would never be forgotten if the firm had never won another race. But Gabriel's win was not all. Henri Fournier, Vanderbilt, Rigal and de Forest dropped out of the race; but second place in the big car class and third position in the general classification was taken by Salleron. A. Fournier was seventh and Augieres was twelfth. Never had the fame of Mors stood higher.

After his wonderful victory in Paris-Madrid it was only to be expected that Gabriel and his Mors should be chosen as one of the French team for the Gordon Bennett Cup. This year as a result of S. F. Edge's victory in 1902 the race was held in Ireland but Gabriel was unable to repeat his recent triumph and had to be content with fourth place.

Thus ended the 1903 season, and manufacturers retired to construct their new racers for 1904. More power was still the aim of every designer and the new Mors engines were rated at 100 h.p. These were the days of big bore-stroke ratios, and the dimensions of the new Mors engine were 170 x 150 mm., the capacity thus being 13,624 c.c. These engines had the novel feature of being desaxé, but the chassis of the cars did not differ materially from those of 1903, except that, presumably to save weight and keep within the 1,000 kilo limit in spite of the larger engine, three speed gearboxes instead of four-speeds were now fitted.

Three of these cars were entered for the French Eliminating Race for the Gordon Bennett Cup team which was run over the Circuit de l'Argonne near the Belgian border on 20th May, the Mors drivers being Salleron, Leger and Lavergne. Salleron completed the first round in sixth place but he gradually crept up to finish second behind Théry's Brasier, covering the net racing distance of 331 miles at an average speed of 58.4 m.p.h., his average speed over the timed flying kilometre being 74.5 m.p.h. Thus, although the other two Mors fell out, Salleron secured a place in the French Gordon Bennett team for the race which was this year to be run in Germany, and in which he finally took seventh place at 43.8 m.p.h.

A Spell of Ill-luck.

The Mors team appeared once more in 1904 in the Circuit des Ardennes race, but their former triumphs were not to be repeated. Lavergne fell out on the third

[*Continued on page 226*].

Another Speedway for Great Britain?

AN interesting scheme for the construction in the Isle of Man of an eight-mile speed track and other tracks suitable for road race courses was brought forward a short time ago. The suggestion was that the Curraghs, a large area of bog and swamp in the northern part of the Island, should be drained, and that on the reclaimed land, a motor track, an aerodrome, and other attractions should be built. The task of draining appears less difficult than that of reclaiming a large stretch of foreshore by building a sea-wall, as is to be done in Lincolnshire and, if it is carried through, will add greatly to the attractions of the Island, besides providing employment to a large body of men. The value of racing in improving the breed is widely realised, and it is hoped that support will be forthcoming for a plan which will materially assist manufacturers in their efforts to keep English cars and cycles in their present state of supremacy.

Captain Phillips and Mr. S. C. H. Davis, on behalf of the R.A.C. have recently been in the Isle of Man at the request of the Manx Government, in order to inspect courses, which have been suggested as being suitable for T.T. car races. We understand that they are satisfied that the island is admirably suited for such events, and it is possible that developments may occur in the near future.

Since the Isle of Man is one of the few places within the British Isles where permission is given to race on the public roads, sporting motorists have long cherished a hope that a motor race might once more be held there, and no doubt they will welcome this announcement as a sign of renewed interest in the subject.

New International Convention.

THE Automobile Association is in a position to issue the new International Certificate for Motor Vehicles and Driving Permits which now take the place of the old International Travelling Pass. These Permits are valid in the territory of no less than twenty-five Contracting States, and are available for a period of one year from date of issue.

Motorists wishing to tour with their own vehicles or cars hired abroad can obtain full particulars and application forms from the Touring Department of the Automobile Association, Fanum House, New Coventry Street, London, W.1. or from any branch office.

Do Motorists Hate Motorcyclists?

A SWEEPING attack on motorcyclists delivered by Mr. Justice Swift at Exeter Assizes recently has aroused widespread indignation. Motorcyclists, said the judge, are anathema to the ordinary motorist and everybody hates them.

Both the A.A. and the R.A.C. have vigorously denied the suggestion that enmity exists between motorists and motorcyclists; and, in the opinion of a leading motor insurance broker, the latter are as a class more skilful drivers than motorists themselves.

Motor manufacturers, even, have been prompted to protest. No less a spokesman than Mr. A. F. Sidgreaves, Managing Director of Rolls-Royce, has declared that if there were any feeling of the kind it would have been most in evidence among owners of the big luxury type of car, and nothing had reached his ears for a long time past in support of Mr. Justice Swift's scathing comments. "In fact," he continued, "we regard motorcycling as the field in which skilful motorists of the future are to be found."

Price Rumour Refuted.

AT a time of trade depression many rumours are afloat; one of these rumours at present is spreading the news that the Triumph concern intend to reduce the prices of their cars.

The Triumph Company invariably establish their programme at the commencement of the season. During their very long existence, they have never deviated from the plan of maintaining such programme during the year and it is understood that they have no intention of departing from that well-established principle at the present time.

This decision has been taken, not only in the interests of the Company itself, but of owners and the trade in general. Apart from this, the demand for Triumph cars and their popularity would not justify a change of policy at the present time.

Widening the New Zealand Market.

ONE of the biggest automobile distributing organisations in New Zealand, Todd Motors Ltd., who in the past only handled American products, have now decided to push wholeheartedly the sales of Humber and Hillman cars throughout their eight branches and seventy dealer's organisations.

The directors of this great concern have now fully satisfied themselves as to the suitability of these two makes for existing conditions and adequate servicing arrangements are being made throughout their wide territory.

Todd Motors Ltd., are the third important New Zealand distributors to turn over to British Cars since last December. Rootes, Ltd., of course, are the world exporters of Humber-Hillman-Commer products, and they are largely responsible for bringing about this happy result.

Mechanical Silence.

EVERY motorist desires mechanical silence, but not every car, by any means, approaches to within measuring distance of it!

To obtain mechanical silence, a manufacturer must attend to details in the construction of the engine and gear-box—details which make little or no difference to the running of the car and which yet cost money in wages and machinery.

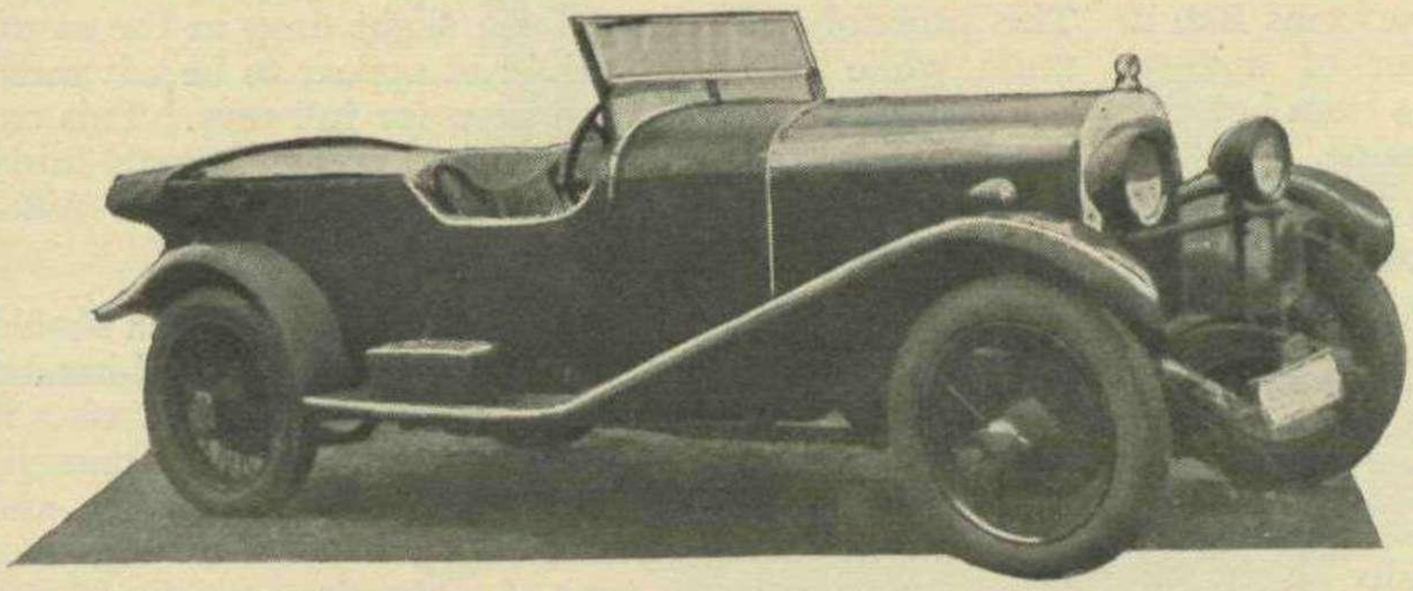
Two examples of the factors contributing to mechanical silence are crankshaft balance and the prevention of piston slap, and the Rover Co. pay very special attention to these two points in the production of their models.

Each crankshaft is placed on a delicately balanced machine. A small flywheel containing adjustable weights is attached to one end and the shaft is rotated at 1,500 r.p.m. Any lack of balance in the shaft is shown on a dial, and the weights in the flywheel are adjustable to compensate it. By a series of calculations the expert who does the job can determine in what place, and by how much, the shaft is out of balance. He records his verdict, metal is removed where necessary, and on its second test the shaft is usually found to be in perfect balance. If it is not, of course, the operation is repeated.

Even on a new car, piston slap is apt to occur. This is due to the relatively large amount of clearance necessary to the modern aluminium piston.

In order to prevent this, the Rover Co. fit anti-slap rings of a special design. These rings fit under the ordinary piston rings and exert sufficient pressure to hold the piston to the explosion side of the cylinder wall. Consequently when combustion takes place the piston is already on that side of the cylinder to which it would be thrown by the explosion pressure. This device permits ample clearance to be allowed in the first instance in a new engine, and the piston will not slap even when wear has taken place.

TRYING A "SECOND-HANDER"



II.—A TWO-LITRE 1928 SPORTS FOUR-SEATER LAGONDA

Brief Specification.

Engine: 4-*cylinder*, 72*mm.* x 120 *bore and stroke*, 1954 *c.c. R.A.C. rating* 12.9 *h.p. O.H. valves operated by two overhead camshafts.*

Clutch: Single dry-plate, fabric lined.

Gear-box: Separate unit, right-hand change. Ratios —1*st*, 13.83; 2*nd*, 8.64; 3*rd*, 5.53; *top* 4.4; *reverse* 13.83.

Suspension: Semi-elliptic. Rear underslung.

Brakes: Front and rear, pedal operated. Hand lever operates separate shoes in rear drums.

Dimensions: Wheelbase 10*ft. Track* 4*ft.* 8*ins. Ground clearance* 7*ins. Chassis weight* 23*cwt.*

WE have often heard people laying down the dogma that one should never buy a second-hand sports car, and although the contention is entirely unreasonable it seems to have affected the outlook of some of the very people to whom such a purchase would be of the greatest benefit. The argument chiefly used by these pessimists is that a sports car is driven much harder than a touring vehicle, and is therefore liable to be worn out in a comparatively short time. These gentry are liable to forget two vital points. First that sports cars are built for hard driving, and in having a reserve of power are often less abused than the overloaded family hack. Secondly, that the owner of a sports car is generally a fairly discriminating motorist, and as such takes good care of his vehicle.

The greatest argument in the favour of second-hand sports cars is, of course, the question of hard cash. It is an unfortunate feature of this world that the number of people who want, and can afford, the better class sports cars, is disastrously below the number who have equal desires but insufficient means. A new vehicle is, and always will be, the best for service, and also for efficiency of design, but in the case of a man whose pet make costs £800 new, and who has but £300 to spend, there is only one course open, and that is to wait till his favoured model can be obtained for this figure.

A good example of the way this can be done was shown to us in the form of a 1928 2-litre Lagonda which Messrs. Gaffikin Wilkinson, who specialise in this make, loaned us for a week-end recently.

The first thing noticeable about this particular model was the fact that it did not appear to be second-hand at all, until a very close inspection was made. This revealed the usual slight traces of wear in details, and it was evident from the pedals that they had been trodden on before! However, in essentials it looked much younger than its age, and after a few miles driving we realised that it was mechanically no older than it looked, although it had not been prepared specially in any way, and was just as the previous owner had turned it in to the firm when taking delivery of one of the latest models.

The brakes showed slight need of adjustment as they did not come on absolutely evenly, but they were extremely powerful, and the matter of adjustment is a small matter, and readily accessible. The steering had slightly more play than a new car, as was only to be expected, but this would only be noticeable to someone who was definitely looking for it. It was very pleasant to handle however, and the car as a whole was well balanced and steady on corners in spite of being anything but a small car. When the first 2-litre speed model was introduced a few years ago, the point which seemed most remarkable was the way that 2-litre engine performed in a chassis, which in weight and accommodation was more on the lines of a $4\frac{1}{2}$ litre car, and our experience with this 3-year-old edition of the same job shows that the performance was not gained at the expense of wearing qualities of the engine. This is a 4-cylinder with

TRYING A "SECOND-HANDER"—Continued.

overhead camshafts and is in every way designed and built for a very high efficiency. The firm avoided, however, the mistake of making it rough or intractable, and the compromise arrived at is a very effective one from the point of view of the hard driver who, while wanting something which handles and performs like a thoroughbred, does not want the bother of upkeep which is inevitable with a motor which has been hotted-up to the point of being almost a racing engine.

As will be expected from the relative sizes of car and engine, it is necessary to make very full use of the gear-box to get the best out of the car in the way of average speed, but this does not mean that the engine will not pull at low speeds. There is no tendency to harshness or pinking, but merely lack of acceleration unless the gears are used. The gear-box on this model was always a delightful piece of work, and the change was so good that it was really quite hard to change badly on it, and the far reaching effects of this, over a period of many thousands of miles, was particularly noticeable on this 1928 car. Rough engagement will do far more harm to a gear-box than any amount of running on the indirect ratios, and this ease of changing brought its own reward in the fact that the gears on this car were as quiet as a new one, and seemed likely to remain so indefinitely.

The maximum speeds on second and third were 40 and 60 m.p.h. while the highest speed we reached on the level was 70 m.p.h. The engine bearings appeared to be well nigh perfect, but there was a certain amount of piston slap which was the chief sign of age in the motor. This probably accounted for a slight drop in the maximum, while the ignition did not appear to be advanced as much as it should have been for full revs. This car should be capable of 75 m.p.h. and we feel it could fairly easily be made to do this with a little attention to minor adjustments.

Another pleasant feature of this vehicle, which should appeal even more to the impecunious second-hander than to his more affluent brethren, is the fact that it averaged over 24 m.p.g. when driven as hard as possible over a route which was both hilly and tortuous, and therefore not conducive to economy. This figure is definitely good for the type of car, and on a second-hand motor is a good indication of the general mechanical condition of the engine.

The price asked for this particular specimen is in the neighbourhood of £225 and particulars of this and similar models may be obtained from Gaffikin Wilkinson & Co., Ltd., of 17a, Hanover Square, W.1.

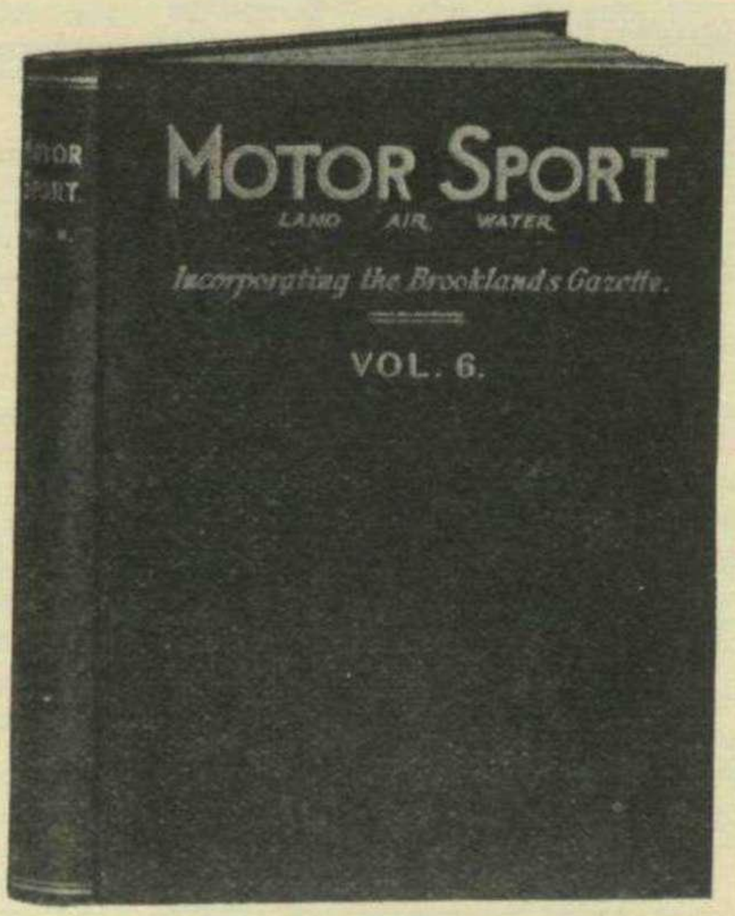
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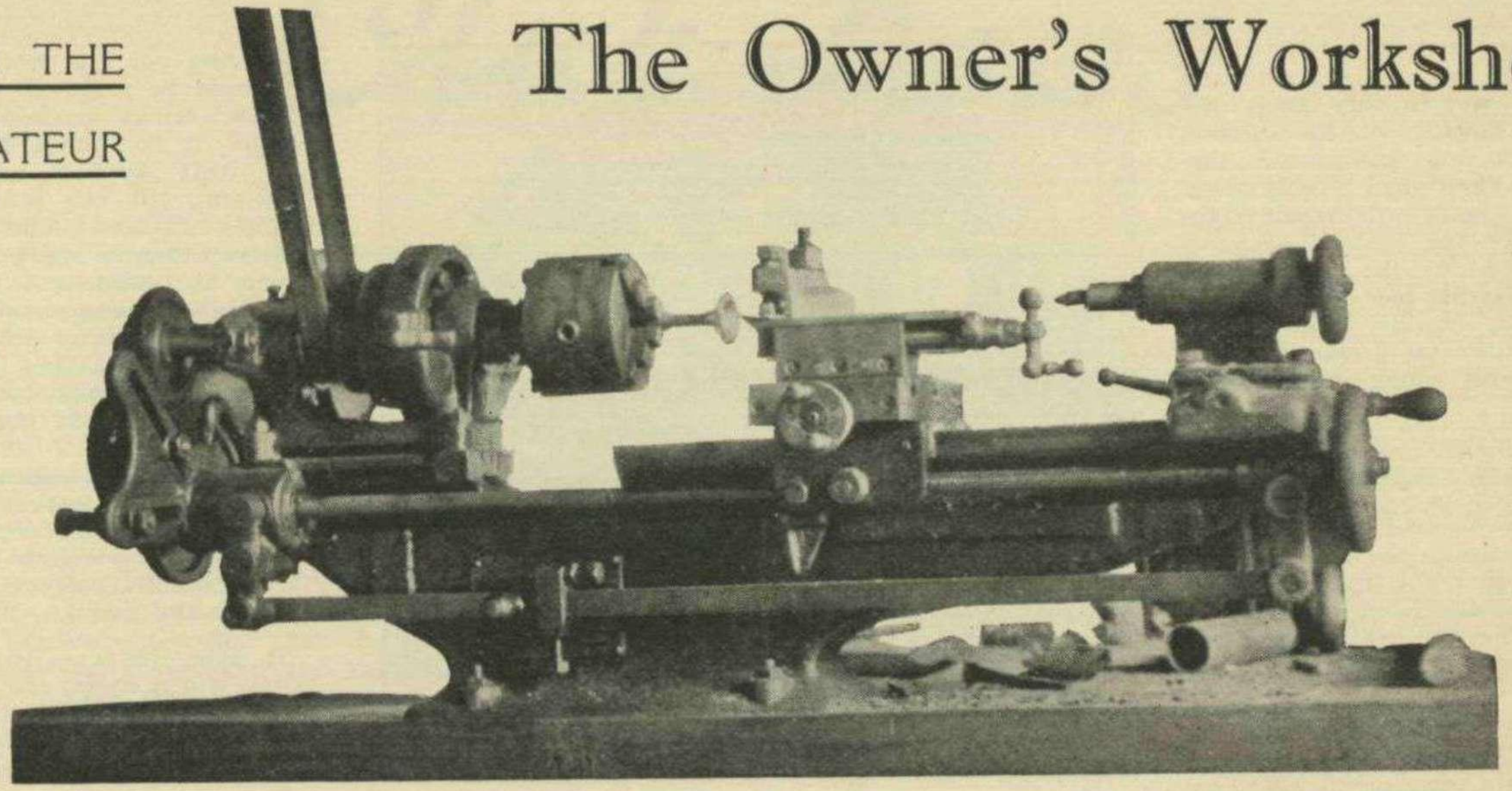


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FOR THE AMATEUR

The Owner's Workshop



The correct methods and means of soldering and brazing are discussed in this article—the fourth of the series.

IN the last article of this series there was a hint that it was time I considered the matter of working on engines, which many amateurs are apt to consider as being the only part of the car that needs any attention. Before coming to this subject however, there are still many other sorts of work to be considered, a few of which are well within the scope of the ordinary owner, and which, moreover, will save him quite a lot of money in the course of a season if he does them himself, thereby leaving some cash for the things which definitely come outside his province.

The number of people who think they are good at soldering is regrettably in excess of the number who are really able to do this successfully and neatly, so we make no apology for reverting to this somewhat prosaic subject, in an endeavour to smooth the path of the amateur in this particular direction. The rules for soldering are few and simple, but they must be followed. The two chief ones are firstly to get the work (and the iron, if used) absolutely clean, and secondly to use sufficient heat.

Simple Equipment.

Many of the jobs which come in the amateur's way, are to do with broken petrol and oil pipes and unions, which are more annoying than interesting. It is, however, on little things of this sort that the reliability of car, both in competitions and ordinary work chiefly depends, and a little care in this department will be amply repaid. The first essential is of course some suitable source of heat, and if gas is laid on to the garage this is a very simple matter, as there is a great variety of blowlamps and burners suitable for use with the ordinary supply. A ring will do well for heating irons, while one of the larger blowlamps with foot operated bellows is very useful if more ambitious work in the way of brazing or small forge work is intended. A small forge can easily be made up with a sheet of iron as a tray with some clinker in it, supported on a simple angle iron frame.

Small forges can be bought ready-made of course, but as the use to which it is likely to be put is very small, it is usually sufficient to improvise something as and when required, to avoid room being occupied by gadgets which are not often needed. I have found that a few bricks on a sheet of metal makes an excellent brazing hearth. However, brazing is another matter and before considering it we had better return to the matter of soldering and the heating required for the same.

The majority of owners will not have gas laid on to their workshop so they will need to resort to a paraffin or petrol blowlamp. Personally I would not be without a small blowlamp of this type however much gas was available, as there is nothing so convenient for small soldering jobs where it is necessary to heat up the work itself. In many cases this is a far easier way than using an iron, especially for pipe work. The pipe can be cleaned, heated, dipped in flux and "tinned," by applying the solder direct. The same method can be applied to many parts, and is a quicker method than using the iron. Once tinned they can be reheated and joined.

It is a great mistake to try and make one size of blowlamp compromise for all sorts of jobs. If brazing is to be undertaken a really large blowlamp is essential, and though it will cost £3 to £4, there is very little work in connection with the straightening out of a motor car which cannot be managed with it. I have straightened quite a heavy front axle by means of a paraffin blowlamp, using a few bricks by way of a forge, while any brazing job can be tackled with a large lamp.

For soldering a small lamp that is not going to be too heavy on the wrist is a sound plan for such work where a lamp is desired. It must not be thought from the previous remarks that a lamp will suit every soldering job, and an iron must be used in many cases. For work such as tank repairs or similar sheet work an iron is essential. Instruction in the use of an iron can be of little use compared with actual practice, while in these days the spread of the amateur wireless fiend has made the elements of soldering practice much more generally known than was the case a few years ago.

First Steps.

The fastening of wires to terminals is, of course, rather inadequate training for the various kinds of soldering needed on a motor car, but it is at least a start. In the more varied field, however, there are various snags which make neat work difficult. The chief of these is the fact that to make a neat seam on a tank or similar article, it is essential to have an iron which will retain its heat and so keep the solder flowing evenly. This means a large and heavy iron which is tiring to use on a long job, and also difficult to get into difficult corners. A light iron is pleasant to work with, but as it only retains its heat for a very short while it is comparatively useless.

A thing to remember about soldering, which is often lost sight of, is that it is not merely a matter of heating up and melting the solder itself. To make a join between, say, two sheets of tinplate, it is

[*Continued on page 220*

THE OWNER'S WORKSHOP—continued from page 219

necessary to heat up the sheet itself to such a temperature that it will in turn keep the solder flowing on its surface until it has penetrated the seam. Then when it cools down a firm joint will result. In this case the heating has got to be done by the iron, and it will be readily seen how a small iron will rapidly loose all its heat to the far greater bulk of metal with which it is in contact.

Fortunately the ideal of a light iron which remains hot indefinitely is not so impossible as it may sound at first. The solution lies in the electric soldering iron. This resembles the standard article in appearance and carries the heating element just behind the copper bit.

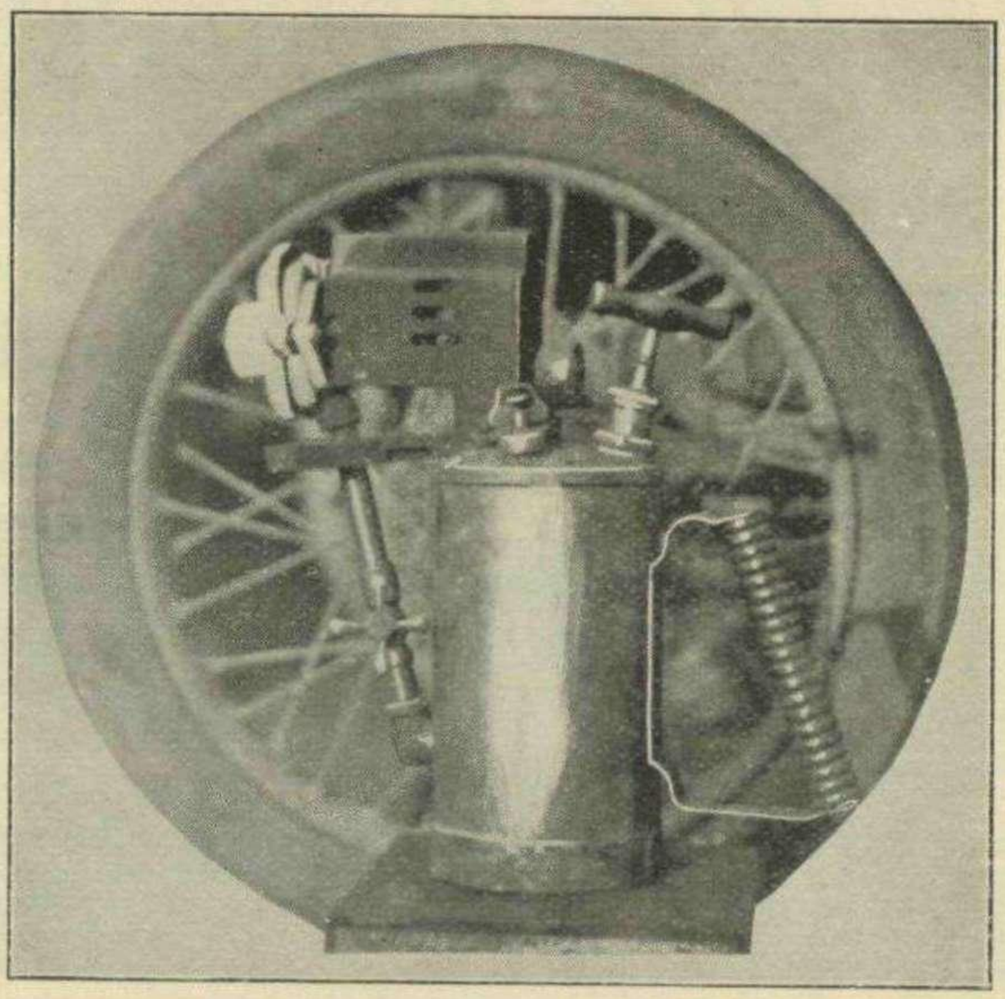
It is surprising that more of these useful instruments are not in constant use, as they are amazingly convenient, use very little current, and cost only 10s. to 15s. There seems to be an idea that they are delicate or unreliable, but one which I have had for some three years is still as good as ever. It has been used by all and sundry, and no care has ever been taken of it, but it does not appear to object. For soldering a long seam in a tank it is ideal, as the job can be carried through from start to finish without a stop.

Ideas vary in the flux to be used, but I prefer Baker's Solution to any other kind. For some special electrical jobs one is told to use special non-corrosive fluxes, but in motor car work there is nothing generally to worry about except making a firm joint, and the above mentioned fluid functions excellently.

Brazing is simple.

Brazing is often regarded as a rather mysterious process which is quite outside practical politics for the amateur. Actually, given a suitable source of heat, such as a real he-man blowlamp, brazing is almost easier than soldering, and for parts such as exhaust pipe and silencer stays, extra headlamp brackets, etc., is far the best way of fixing them. The process is similar in principle to soldering in that it involves the use of a joining medium with a low melting point in comparison with the metals to be joined, and employs a flux to prevent the cleaned surfaces from oxidising before the metal has started to flow. The process is chiefly suitable for, though not confined to, iron and steel.

As the name suggests, the joining medium consists of brass, usually in the form of a heavy wire, or else as a powder, when it is known as spelter. Probably the most extensive use of brazing is in the cycle trade and it is ideal for this class of work. There are many cases on a motor car where tubing and lugs can be used and made a wonderfully strong and very neat job. These can be obtained from Chater-Lea and similar concerns in a huge variety of sizes, and make a far better looking job than the crude affairs of strip and angle iron which so often spoil an otherwise decent vehicle.



An outsize in blowlamps, which "W.S.B." highly recommends.

The flux used is borax powder or one of the compounds sold for the purpose. The method of making a simple joint between two tubes by means of a T lug is roughly as follows.

The ends of the tube and the inside of the lug must be thoroughly cleaned with emery and then the parts fitted together with as much borax *inside* the joint as can be managed. On small size work where it will be difficult to get the brass to flow in easily, the joints should also be packed with spelter to ensure the join covering the whole surface.

Pinning joints.

In many cases it is advisable to pin the joint before brazing to stop it shifting while being joined. The mistake so often made is to imagine that the pin has some connection with the strength of the joint. A well brazed joint should not depend on the pin, any more than the drive on a taper should depend on the key. The essential point in both cases is that the join should be between the surfaces only. In one case this is due to friction, while in the case of brazing it is by the rather peculiar fusion between the metals, the exact theory of which is somewhat outside the scope of these remarks. For this reason I prefer to dispense with pinning the joint in any cases where the parts can be held in some other way until completed. There is then no danger of weakening the parts by drilling, and if it is required to take them apart again, this can be done by merely heating them.

Having got the work ready it should be propped up with a few bricks packed round behind it to retain the heat and heat applied with the blowlamp till the joint is a bright red heat. The brazing wire can then be applied to the top of the joint and when a sufficient temperature is reached the brass will flow like water into the joint. When it flows right through, the lamp can be removed and the work allowed to cool in the improvised forge. The heat required for brazing is considerable, being well above red heat, but it is bad practice to get it hotter than necessary as it tends to burn the metal.

It also renders the joint brittle if it is cooled too quickly so that it is advisable to let it drop to a black heat before removing from the hearth. As well as the numerous structures possible with tube, brazing can be used for various clips made from strip steel, such as pipe clips, etc., where it is more permanent and reliable than a nut and bolt.

The joint will be found to be covered with a hard scale caused by the melted flux and should be cleaned up with a stiff wire brush while still hot, as this will simplify the final cleaning up with a coarse file.

Annealing methods.

When any petrol or oil pipe is removed for repair it is a good thing to anneal these to avoid possible fracture due to vibration. The pipe should be heated to a dull red and plunged into cold water. Although this has a hardening effect on steel, its effect on copper is to make it soft and easily bent. It will be found that the vibration of use will gradually harden the pipes again, so the annealing should be repeated every few thousand miles.

Both soldering and brazing are simple processes in which a little practice will enormously improve the neatness of the work, and enable many jobs to be done which would have had to be done by a garage, or else left undone altogether.

W.S.B.

In this series, which will be continued next month, the subjects of the equipment of the workshop, brake system overhauls and axle springing repairs has already been dealt with.

Club News

THE JUNIOR CAR CLUB.

Sir Arthur Stanley was unanimously re-elected president of the Junior Car Club at the annual general meeting, which took place at the R.A.C. recently. The Council was also re-elected as constituted last year, the members of the 1931 Council therefore being Messrs. B. H. Austin, E. Burt, A. J. Crump, S. C. H. Davis, W. Urquhart Dykes, H. N. Edwards, E. C. Gordon England, F. J. Findon, H. R. Godfrey, E. Hancock, Prof. A. M. Low, Lionel Martin, Hugh P. McConnell, A. Frazer Nash, J. Gordon Offord, C. J. Randall, A. R. C. Waite, L. H. White.

The secretary reported that the past year had been a good one and that the membership had slightly increased. (The actual figure is close on 1,500 and the club is still the largest one affiliated to the R.A.C.). During the meeting a suggestion that the 200-Mile Race should be revived in a form which limited the entry to stock cars was made, and the new Council promised to give the matter its consideration.

YORKSHIRE CENTRE J.C.C.

About a hundred members and friends were present at the annual dinner and dance of the Yorkshire Centre of the Junior Car Club, which was held in Leeds. The chairman of the Centre, Mr. C. D. Wilson, presided, and amongst those present were several representatives from the London headquarters, including Mr. L. F. Dyer, the general secretary of the club. There were also a number of representatives from the club's Liverpool and North Wales Centre, whilst several members had come quite long distances for the function.

In the course of his speech, Mr. Dyer congratulated the Centre on the progress it had made, both financially and from the membership standpoint, during 1930. The opportunity was taken to present a memento from the council in London to Mr. C. Horner, the hon. secretary of the Centre, who is retiring at the annual general meeting in Leeds this month.

Dancing was started before dinner and continued after until 2 a.m., when the gathering broke up after a thoroughly enjoyable evening.

BUGATTI OWNERS' CLUB.

The secretaryship of the Bugatti Owners' Club has now been taken over by Mr. K. W. Bear, 5, Fenchurch Street, London, E.C.3.

ULSTER M.C.C.

At the first meeting of the new committee, held in Belfast a short time ago, Mr. J. W. Shaw was re-elected chairman, Mr. W. McWilliam was co-opted a member in place of Mr. W. J. White, and Messrs. Shaw, A. Waddell, A. G. Kennedy and G. A. Savage were selected as delegates to the Ulster Centre, M.C.U.I.

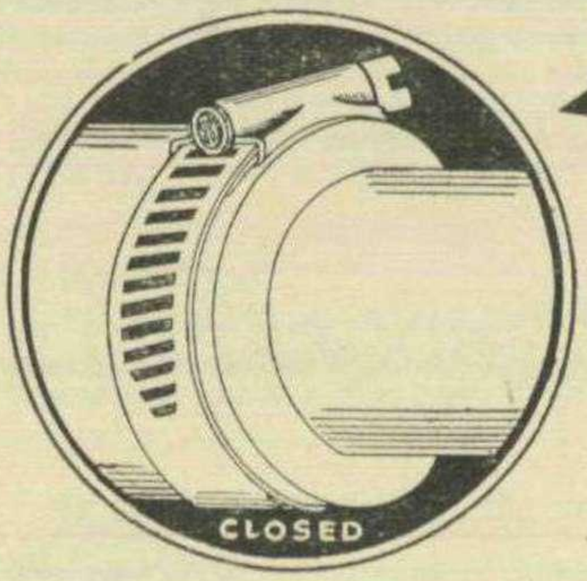
Twelve new members were elected, and Mr. W. J. McCracken said he would present a prize to the member of the club who got the largest number of members during the year.

It was decided to arrange Wednesday evening trials on April 22nd, May 20th, June 17th, July 15th, August 19th and Sept. 16th, and to have a cup for the member securing the highest aggregate marks in the events.

The Committee also decided to run the McCrum Cup trial on March 14th and the Moles Cup trial, on Easter Tuesday.

The Editor invites Club Secretaries to send details of their fixtures, sporting and social, for publication in these columns. These items should be sent to reach this office not later than the 16th of the month.

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The Story of Streamlining.

How Science and Design have Overcome Wind-Resistance in the Quest for Speed.

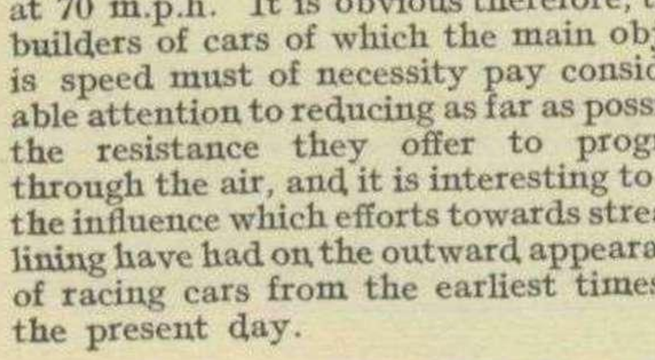
IN the course of extensive experiments carried out in the Polytechnic School in Berlin before the war, Dr. Riedler arrived at some extremely interesting conclusions with regard to the relative importance of the various forms of resistance to its progress which are encountered by a car when running at fairly high speed. As a result of his investigations he laid down that an ordinary touring car fitted with a 4-seater body, absorbed 118 h.p. when travelling at 70 m.p.h., and that the power was absorbed by the various resistances as follows :—

Loss from engine friction	...	18 h.p.
Transmission losses ...	...	17 h.p.
Rolling resistances (total)	...	27 h.p.
Front wheel friction ...	...	4 h.p.
Air resistance	...	52 h.p.
		118 h.p.

The average touring car of pre-war days had, of course, a body which it is easy enough to see now offered quite an extraordinary amount of wind-resistance, but even allowing for this fact it is nevertheless remarkable that the German Professor's experiments led to the conclusion that this one form of resistance was nearly twice as important as any other at 70 m.p.h. It is obvious therefore, that builders of cars of which the main object is speed must of necessity pay considerable attention to reducing as far as possible the resistance they offer to progress through the air, and it is interesting to see the influence which efforts towards streamlining have had on the outward appearance of racing cars from the earliest times to the present day.

The Very Early Days.

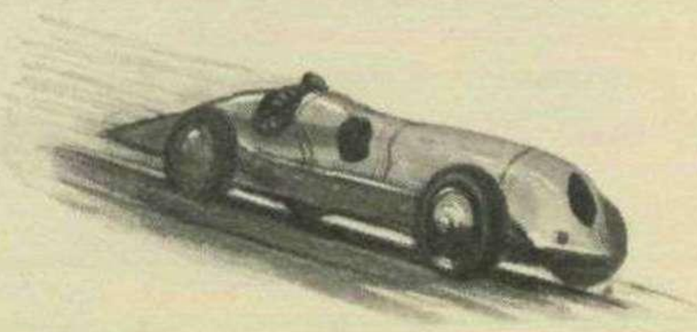
In the earliest days of the petrol vehicle the speeds attained were naturally not high enough to make the form of the



1899.

cars of any great importance from the streamlining point of view. Fitted with little motors developing about 4 h.p. the original racing cars were only capable of about 20 m.p.h. They were regarded at this time as " horseless carriages," and as such their outward appearance strongly resembled that of the earlier vehicles. Not only high themselves, the seat was usually the highest point of the machine and the whole body of the driver was thus exposed to the air. However at 20 m.p.h. no great inconvenience was apparent from this cause, and no one bothered much about it.

The long distance races which were monopolising attention at this time had entirely excluded from prominence the electric car, which, it had been found, was unsuitable for anything but short journeys owing to the frequent necessity of recharging the batteries. In 1898, however, M. Paul Meyan of " La France



1924.

Automobile " instituted the idea of holding a meeting on a deserted stretch of road at Achères, when cars could be let out and their actual maximum speed recorded. This idea was the origin of the kilometre record which was to become so important in later days. At any rate among the cars which collected at Acheres in 1898 was a Jeantaud electric car driven by the Count de Chasseloup-Laubat which covered the flying kilometre at an average speed of 39.24 m.p.h., and succeeded in easily outpacing the petrol cars, the fastest among which were certainly two Bollées, though whether owing to their streamline form or not it would be hard to say.

At all events in the Count de Chasseloup-Laubat's machine an interesting attempt at streamlining had been made. The front of the car consisted of a vertical knife-edge like the prow of a boat, the sides were vertical and there was a flat deck, while the flat tail sloped downwards to end in a horizontal knife edge. The driver, however, sat on the top of the deck, with his legs in a well, and was thus almost entirely exposed.

The success of the Count resulted in a challenge on the part of the great Camille Jenatzy, who in January, 1899, also appeared at Achères with an electric car. This famous machine, named " La Jamais Contente " had a cigar shaped body, with a sharp point in front and a fairly blunt tail.

At his first attempt Jenatzy clocked 41.42 m.p.h. ; the Count answered with 43.69 m.p.h. ; Jenatzy reached 49.92 m.p.h., and then the Count 58.25 m.p.h., and finally in April, 1899, Jenatzy recorded the really astounding speed of 65.79 m.p.h., at which one feels that he must have considered that it would be advantageous to provide rather more protection for the driver !

The next machine which is worthy of mention is probably the Vallée " Slipper," as it is possible that in this car one finds the first attempt to achieve this object of including the driver in the streamline form.

Equally interesting were the De Dietrich cars which were built for the Paris-Madrid race, and which bore a most striking outward resemblance to a modern racing car. In this machine, the bonnet started in a vertical knife edge behind the gilled tube radiator, and gradually swelled outwards to its broadest part about level with the driving seat, behind which was a streamline tail of most modern appearance ending in another vertical knife edge. The cars were thus eliptical in plan. The topline of the bonnet rose steadily from behind the radiator to the centre of the scuttle, and behind the seat fell again to join the vertical knife-edge at the back. The undershield of the car was quite carefully streamlined, and the top of the scuttle was about on a level with the driver's throat. Thus these cars were among the most interesting from the streamlining point of view that had as yet been built ; but unfortunately when it came to the weighing-in for the race it was found that they were considerably

1928.

above the 1,000 kgm. limit, with the result that their tails had to be cut away and their undershields removed in an attempt to get the weight down. The condition in which they ran in the actual contest therefore, did not allow of any interesting comparisons being made with the more orthodox designs of the day.

THE STORY OF STREAMLINING—continued.

While energetic attempts were thus being made to save the wind resistance caused by the driver, little attempt had so far been made to facilitate the passage of the car through the air by building it lower. The credit for this development must probably go to the Wolseley Company. A car built by this firm had actually run in the Paris-Vienna race of the year before, 1902, and its designer, by using an underslung frame had succeeded in getting it so low that the top of the bonnet was not higher than the top of the front wheels. Little attempt was made to streamline the car, and the driver and mechanic were almost entirely exposed, but it obviously contained the germ of the right idea. It was succeeded in 1904 by the Wolseley "Beetle," the outward appearance of which is probably familiar to all. In this case, although the underslung frame was dispensed with, the car was built very low, by virtue of the use of a horizontal engine, and the bonnet represented quite a good example of the "beetle-back" form of streamlining. The driver, however, sat very high up, quite unprotected, and no attempt was made to treat the tail to conform to the bonnet.

Thus streamlining was relegated temporarily to the background and little of interest happened for several years. Mention may just be made in passing of the Hotchkiss which took part in the French Eliminating Trials for the Gordon Bennet Cup Race in 1904, and which had a bonnet reminiscent of Gabriel's Mors; and of the racing Napier of 1905, which had a bonnet of the wind-cutting type, with the radiator tubes running along its sides and brought to a vertical knife-edge in front. But neither of these designs can be considered as advanced as those of the Paris-Madrid Mors and De Dietrichs, and it was not until the cylinder capacity limit led designers to seek to gain speed by methods other than that of increasing the engine size that streamlining was again accorded serious study.

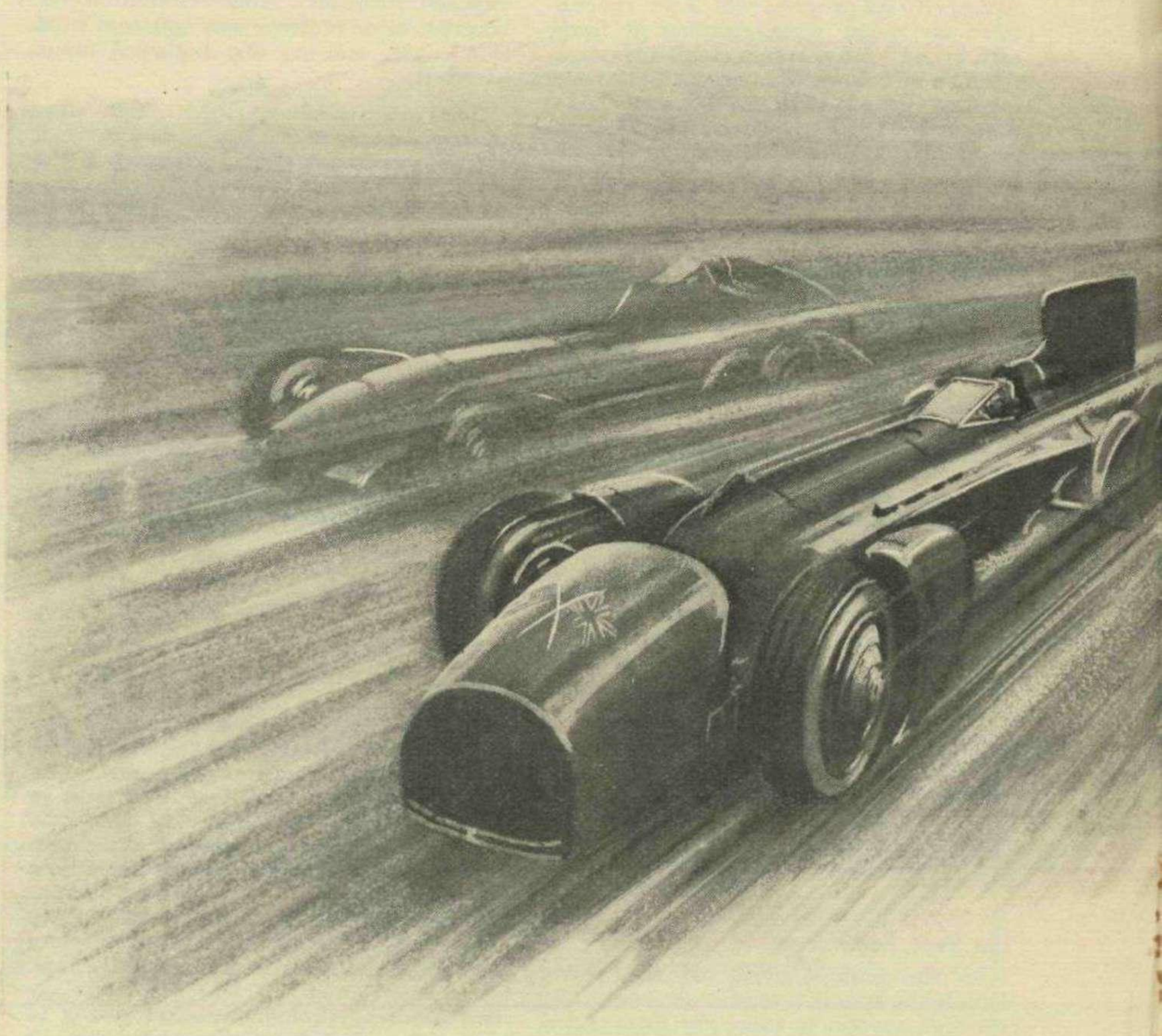
The Intermediate Period.

In the early Grand Prix races from 1906-8, Continental designers thus showed considerable indifference to streamlining as an aid to speed. Even in the early Voiturette races, where the bore of the engines was limited, designers seem to have been too intent on increasing piston speed by using longer strokes and higher revs. to pay much attention to the outward form of the little racers. In the meantime, however, Brooklands track had been built and opened, and there can be no doubt that the speedway which permitted continuous very high speeds focussed attention on air resistance problems to a degree never attained in the continental road races. By about 1910 in fact the Brooklands racer in its most specialised form consisted of a very narrow single-seater, built fairly high and with a long tail ending in a vertical knife-edge, thus approximating in general design to a modern American track-racer.

It was not until 1911, however, that the principle really gained general recognition. In that year the limited bore regulations were done away with for the Coupe des Voiturettes, and the cars thus lost the enormously high appearance necessitated by their exaggeratedly long piston strokes. In its place the 3-litre capacity limit was instituted, and immediately the outward appearance of the cars underwent a remarkable change.

The Sunbeams which ran in the race had rather low radiators, but showed distinctly that the lessons of Brooklands had been learnt. The bonnet sloped up steeply to the scuttle, there was very little cut-away for the cock-pit, and the tail fell away also rather sharply to end in a vertical knife-edge. The Vauxhalls in the same race were fitted with wind-cutting V radiators, but had fairly workmanlike tails which were, however, more boat-shaped at the back. Some of the Continental designs were no less interesting. The Peugeots, whose designers were still faithful to the long-stroke engine, had of necessity rather high bonnets, and behind the cock-pit they were fitted with full streamline tails ending in a vertical knife-edge of most modern appearance. The top of the tail, however, was not nearly high enough to carry on the top line of the bonnet and from back-view a rather large proportion of the driver's back was thus exposed. The Excelsiors also were fitted with long streamline tails ending in a blunt point, while among the non-starters an interesting design was that of the Sizaire, which had a long narrow tail ending in a very short vertical knife-edge behind a rather bulbous bonnet.

In 1914, however, there came a marked revival. In the first place Peugeot, then the unquestioned leader in the racing world, decided to fit his Grand Prix cars with streamlined bodies. The racers thus had good full tails, sharply up-swept underneath and ending in a short rounded

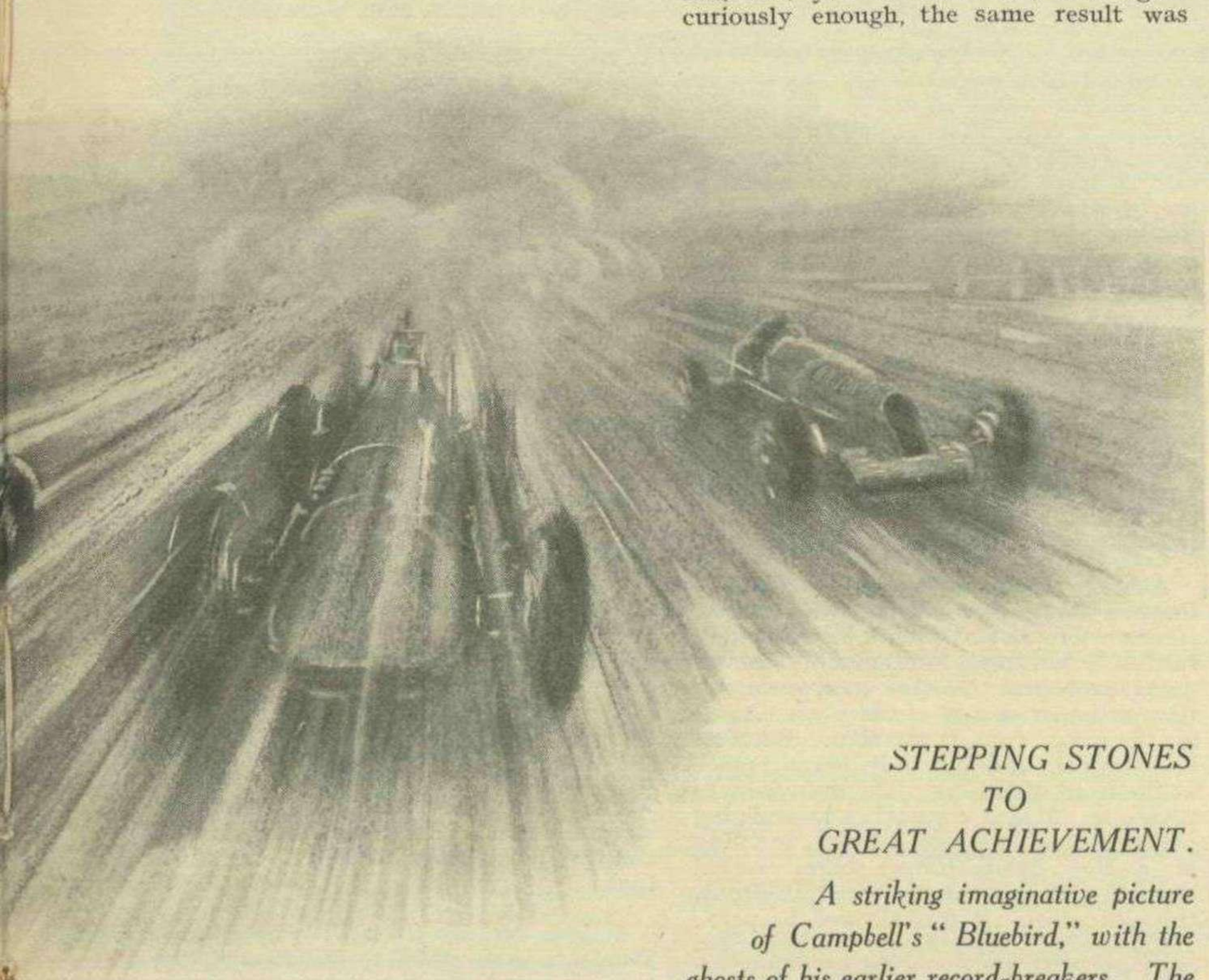


vertical line, while a large faring in the top enclosed the spare wheel. That year also Fiat returned to racing, and the Italian racers also had full streamline tails, commencing as high as the top of the scuttle and ending in a bulbous point at the back. Thus on the eve of the War streamlining was beginning to find its way back into favour for road racing, though it was still far from universal.

The Post-war Racer.

The War itself, as a time of intensive study of aeroplane design, naturally focussed attention on streamlining to a degree never previously witnessed, and when after it was over, designers again turned their attention to racing cars they naturally attempted to apply the lessons

which they had learnt in the air during the previous four years. The early post-War Brooklands cars, such as the A.C., and the machines built for the international races such as the Ballot, thus tended to assume an extremely smooth exterior appearance terminated by a long blunt-pointed tail at the back. The Ballots which ran in the first post-war Grand Prix at le Mans in 1921 were excellent examples of this type of racing car, while they borrowed from the pre-war Peugeots the idea of mounting the spare wheel vertically in the tail.



STEPPING STONES TO GREAT ACHIEVEMENT.

A striking imaginative picture of Campbell's "Bluebird," with the ghosts of his earlier record-breakers. The variation in streamline contour forms an interesting contrast.

The most interesting cars from the streamlining point of view which appeared in 1921, however, were undoubtedly the 3-litre Fiats which ran in the Italian Grand Prix. These cars were designed after very lengthy and exhaustive experiments in wind tunnels, and represented a definite breakaway from the rounded cross-section fashion of the day. Their sides in fact were nearly vertical, and converged in the tail to a vertical knife-edge, while the underside was also flat. They were in fact streamlined on specialised automobile as opposed to aeronautical lines, and their interest lies chiefly in the fact that the design has survived to this day as the ordinary form of what may be termed the typical racing car such as the Maserati or Bugatti.

The opposing school, however, were to reach the limit of their advance in the next year. The 1922 Grand Prix Fiats were, it is true, externally developed editions of the 1921 racers; but the Ballots and Bugattis which ran in the race had a most extraordinary outward appearance. In the case of both these makers the idea prevailed to make a vertical cross-section of the cars almost perfectly circular, which earned the latter machines the appelation of the "Barrel Bugs." The nose consisted of a truncated cone shaped cowl, and the bodies tapered away at the back.

By the next year, however, Bugatti had had yet another idea, and again curiously enough, the same result was arrived at by another maker in the form of Voisin. The fundamental idea of these two entrants for the 1923 Grand Prix was that the best form for a racing car was not something resembling an aeroplane's fuselage but a thickened edition of its wing. The new Bugattis were termed the "beetle-backed Bugs.", and there is perhaps no better way of describing them. In elevation their outline was semi-elliptical; the undersides were quite flat, the sides vertical, and the top plane only broken in front by an oval orifice through which air reached the radiator. All four wheels were sunk in recesses in the vertical sides, the wheelbase and track being reduced to about 6ft. and 3ft. respectively for the purpose.

The design of these cars was undoubtedly of very great interest, and the principle was afterwards adopted for the highly successful 1,100 c.c. Chenard et Walckers. As far as the Grand Prix is concerned, however, the "beetle-backs" represent the last machines of outstanding interest from the streamlining point of view, and in 1924 even the original Bugatti had come round to what may be termed the Fiat streamline form. It is true that the 1927 Talbots represented something of a combination of this now almost universal form with that of the "beetle back" exponents, possessing as they did sloping radiators and decidedly flat tops. But the Grand Prix was by then definitely on the wane, and it is not surprising that manufacturers lacked the interest to try their hands at novel streamline forms.

The Modern Record-Breaker.

With the decline of the Grand Prix, coincided a revival of interest in world's short-distance records, and it is to this field of activity that one must now turn to trace the further development of stream lining as applied to automobiles. It is in fact curious how for a good many years after the War interest in the short distance records was practically non-existent, with the result that the field was for long held by such cars as the original 12-cylinder Sunbeam and Eldridge's veteran Fiat "Mephistopholes." The change, however, came in 1926/7, for that winter saw the completion of three special cars all built or reconstructed specially with a view to capturing the kilometre record.

The first of these cars, the Napier-Campbell was very carefully streamlined, and attention was chiefly directed on keeping the car narrow. As a result the machine was not particularly low, but in order to save width a special faring was made on either side of the bonnet to accommodate the heads of the lateral blocks of the Napier "broad arrow" engine. The driver's head projected well above the top of the bonnet and had behind it a faring above the level of the narrow tail which ended in a vertical knife-edge.

The second of this season's record breakers, J. G. Parry-Thomas' Higham Special known as "Babs," was also by reason of its origin, fairly high, but was streamlined on quite a different principle. In this case a sloping "cow-catcher" cowl was used to deflect air over the flat-topped bonnet which merged into a fairly narrow body ending in a long tail of which the top line dropped sharply to the final point. The underside of the car was kept as flat as possible, and the bottom line of the tail did not rise at all to the point in which it ended.

This car, in fact, represents the halfway house to the famous 1,000 h.p. Sunbeam which was to prove the most successful of the trio. In the case of the Sunbeam the beetle-back principle was adopted whole-heartedly, and no attempt was made to keep the car narrow, the body being built right out to enclose the wheels. It differed, however, very materially from the 1923 Grand Prix Bugatti, which was in some respects its prototype. In the first place no effort was made to

THE STORY OF STREAMLINING—continued.

reduce the length of the Sunbeam which amounted to 23ft. 6ins. overall, and in consequence the top consisted of a nearly flat deck, while the angle between this deck and the sides was bevelled over and not acute as in the case of the Bugatti.

Segrave's success on the Sunbeam in raising the record to over 200 m.p.h. spurred Campbell on to further effort, and in the following winter the Napier Campbell was entirely reconstructed. By far the most interesting feature of the redesigned car was undoubtedly the attempt which was made to deal with the rad'ator problem. The most careful streamline form, designed to allow air to flow freely past the sides of the car at speed must of necessity be vitiated if air has to be allowed to enter the shell in order to pass through a radiator. For this reason in the revised edition of the Napier-Campbell the radiator was removed altogether from its traditional place in the front of the car and in its place four sets of cooling tubes were mounted, two on either side of the tail, above and behind the back wheels. Much less attempt was made to keep the car narrow, and the bonnet was swept down in front to a horizontal line level with the front spring shackles so that the front of the car resembled the toe of a boot. Finally as a most interesting innovation a large stabilising tail fin was used.

Lockhart's Stutz.

Campbell's success with this car was followed by an attack on the record by the ill-fated Stutz racer driven by Frank Lockhart, and this little car is of interest in that its designer employed a streamline form radically different from that which had been used on the English cars. The general outline of the machine in fact resembled a long and narrow cigar, with a blunt nose in front and the radiator arranged saddle-wise across the top of the bonnet, while each wheel was protected by a special streamlined faring. In view of the fact that this little 3-litre racer attained a speed of over 200 m.p.h., the streamline form adopted was obviously more successful than its defiance of accepted principles in automobile streamlining would have led one to expect. In fact, it must have owed its speed largely to its outline and it is curious that immediately afterwards the protagonists of careful streamlining should have received a moral blow when the record was lowered by White's Triplex which consisted of three engines set upon a chassis with no more bodywork than a bonnet to cover the front one.

"Schneider" Influence.

The next year, 1929, however, saw the appearance of an entirely new record breaker embodying the result of further streamlining research, in the form of the "Golden Arrow." This car was designed largely on the lines which had proved so successful in the Schneider Cup aeroplanes, and owed its shape in part to the special features of the Napier broad-arrow engine which was used. The car may in fact be said to have been built in two sections, ine of which was represented by a low beetle-backed shell enclosing the inclined cylinder blocks and on the centre of which was mounted the second stream-lined structure covering the central vertical block and providing faring in front and behind for the driver's head. The radiators for this car were used as part of the separate streamlining for the wheels, between which they were arranged, and the striking success of the car provided perhaps, one of the best examples of how the automobile and aeroplane can contribute to their mutual development.

At the same time the redesigning of Captain Campbell's "Bluebird" for its record attempts at Verneuk Pan provided further interesting solutions of streamlining problems. In this case, owing to the particular nature of the place chosen for the record runs, it was found desirable to restore the radiator to its normal place at the front of the car. The machine was therefore, divided from thes treamlining point of view into two halves, consisting of a low flat-bottomed barrel-shaped bonnet with an annular cowl in front, through which air was allowed to pass; and behind it a much higher beetle-backed shell which enclosed the driver. This car must be considered something of a makeshift, but in view of the adverse circumstances with which it had to contend, it was remarkably successful.

The Spring of 1930 saw the appearance of another car designed specially for records in the form of the "Silver Bullet." This machine incorporated many of the features of the earlier 1,000 h.p. Sunbeam, and was built on the beetle-back principle. Probably, however, it had been found that the very large surface area of the earlier car had negatived some of its advantages in creating little disturbed air currents by causing considerable skin-friction, and the new car was therefore built much narrower and no attempt was made to include the wheels in the streamlining. In the "Silver Bullet" also, air was not allowed to enter the shell in order to reach radiators, as in the case of the 1,000 h.p. Sunbeam, but the problem of engine cooling was solved by the use of ice-chests and water pumps—this machine being perhaps the only motor car ever made in which engine was neither directly nor indirectly air-cooled.

Le Dernier Cri.

The story of streamlining may fittingly be closed with a few remarks on Captain Campbell's latest record breaking car. This machine is another most interesting study in streamlining and differs in material respects from those already described. In this case quite the same use is not made of the special features of the Napier engine as in the "Golden Arrow." The body, however, consists of a beetle-backed section covering the engine and continued right through to the tail, while the driver sits behind the highest point of the curved top line and has his head streamlined by a separate faring projecting very slightly from the main body in front and terminating in a huge directional fin at the back. In this case the cooling problem has been solved by placing the radiator of streamline shape at the front of the car but not allowing the air which passes through it to enter the streamline shell, with which it is connected simply by the pipes leading to the water tank.

It is a far cry from the boat-shaped Bollée racer of 1898 to Malcolm Campbell's latest "Bluebird," but the change which has taken place has been brought about by gradual evolution and is one of the many arguments against those people who cannot understand the value of attempts to drive motor cars ever faster and faster.

GREAT RACING MARQUES—continued from 215.

round, but the other two cars finished, Leger being tenth and Salleron fourteenth.

Whether owing to disappointment at the comparative lack of success of the 1904 racers or to some other cause, no new Mors were built for the 1905 events, and it was not until 1908 that the famous French firm made its reappearance in racing. In that year the Grand Prix, which had now become the premier event of the season, was for cars with cylinder bores limited to 155 mm., and the new 100 h.p. Mors engine thus had dimensions of 155 x 170 mm., giving a capacity of 12,836 c.c.

The cars had been prepared at the very last moment, and out of the three entered, only two actually reached the starting line. Of these one was driven by Landon and the other by no less a person than the great Jenatzy. Even he, however, was unable to make much of a showing, and he finally finished sixteenth with Landon seventeenth.

Thus ended the racing history of Mors. One would have liked perhaps to have concluded the story with Paris-Madrid, but most true stories have something of an anti-climax, and whatever may have happened subsequently, the memory of Gabriel's wonderful drive must remain for ever.



OF all the names connected with motor racing since the beginning, that of Malcolm Campbell stands out as representing the triumph gained by perseverance. Although having longer motor racing experience than any other Englishman now taking part in the sport, his career has not been one of unbroken good fortune. On the contrary, the record of his steady climb to fame as our foremost all-round driver, has been a story of continual difficulties and repeated misfortune. The fact that in spite of every setback his skill and perseverance have established an unrivalled reputation, makes this achievement even more remarkable. His crowning success, the breaking of the land speed record at Daytona by the very handsome margin of 15 m.p.h. and the raising of this record to the amazing speed of 246 m.p.h. is a fitting end to his endeavours for many years.

A Long Career.

Twenty-five years ago Campbell started racing, being at the same time interested in aviation, on which he did a lot of work in the very early days. Then came the war, and it is only natural that he continued his flying in the R.F.C., and the experience of engines in those days gave him valuable knowledge. After the war he returned to motor racing and in 1920 handled Talbots, as well as Schneider and Peugeot. These were the days of hill climbs and sprint events and he was a prominent figure at these functions. In 1921 and 1922 he broke various hill-climb records but then his ideas turned to larger game, and when K. Lee Guinness, on the 12-cylinder Sunbeam had reached 129 m.p.h., Campbell bought the car and proceeded to raise the record to some 136 m.p.h.

His next attempt on the land speed record was at the meeting in Denmark at the Fanoe Islands, but owing to the electrical tuning apparatus not being passed officially the speeds achieved could not be claimed, and it was not until 1924 that he reached new figures. Still driving the Sunbeam, this time at Pendine, he raised the mean speed to 146.16 m.p.h. for the kilometre, but did not gain the mile record until 1925 when he exceeded 150 m.p.h. for the first time.

It was evident that the limit of the old Sunbeam had been reached, so in 1927, he started to build the first " Bluebird " with a Napier engine, which was the basis from which the present record breaker was evolved. In this car 174.2 m.p.h. was reached at Pendine. He was still working against disappointments, however, and his record fell to the big Sunbeam in the hands of the late Sir Henry Segrave. Spurred on rather than discouraged, he reconstructed Bluebird, and raised Segrave's speed of 203.79 m.p.h. to 206.956 m.p.h. only to have his record again beaten by Ray Keech by half a mile an hour.

Once more he set about the reconstruction of his car and went to Verneuk Pan, in South Africa, where he was not only faced with terrible difficulties due to the country and climate, but further knew that Segrave, with the Golden Arrow was at Daytona. Before he could get conditions suitable for his attack on the record he was to learn that the Golden Arrow had put up the astounding speed of 231.36 m.p.h.

The Verneuk Victory.

Such a series of discouragements would have daunted most men, but Campbell was determined not to leave Africa without some records, and he performed the remarkable feat of averaging 211 m.p.h. for 5 miles, and 216 m.p.h. for 5 kilometres, records which are likely to remain unbroken for a very long time to come.

Still determined to gain the coveted record for the highest speed on land, he started the greatest reconstruction in " Bluebird's " career. This was carried out by Thompson and Taylor of Brooklands and the design was carried out by Mr. Railton. Campbell's troubles were not over when he left for America, as there were still financial arguments in connection with the Daytonaa uthorities. However, these were eventually smoothed over, and at last the car was ready for her trial runs.

The actual breaking of the record was carried out just as it should have been. There was no undue waiting about, no violent last minute alterations. Everyone connected with the design, building, and equipment of the car had carried out their work with such accuracy and thoroughness that after the trial runs Campbell went out for his actual attempt.

Those few seconds during which the shapely blue car flashed down the sands of Daytona at a speed never before reached on land, may have seemed all too short to the watching thousands. To the driver they were the crowning effort of a career of dogged persistence in the face of difficulties, a fitting reward to the many who had helped directly and indirectly in the attempt, and a fine vindication of the efficiency and enterprise of British engineering.

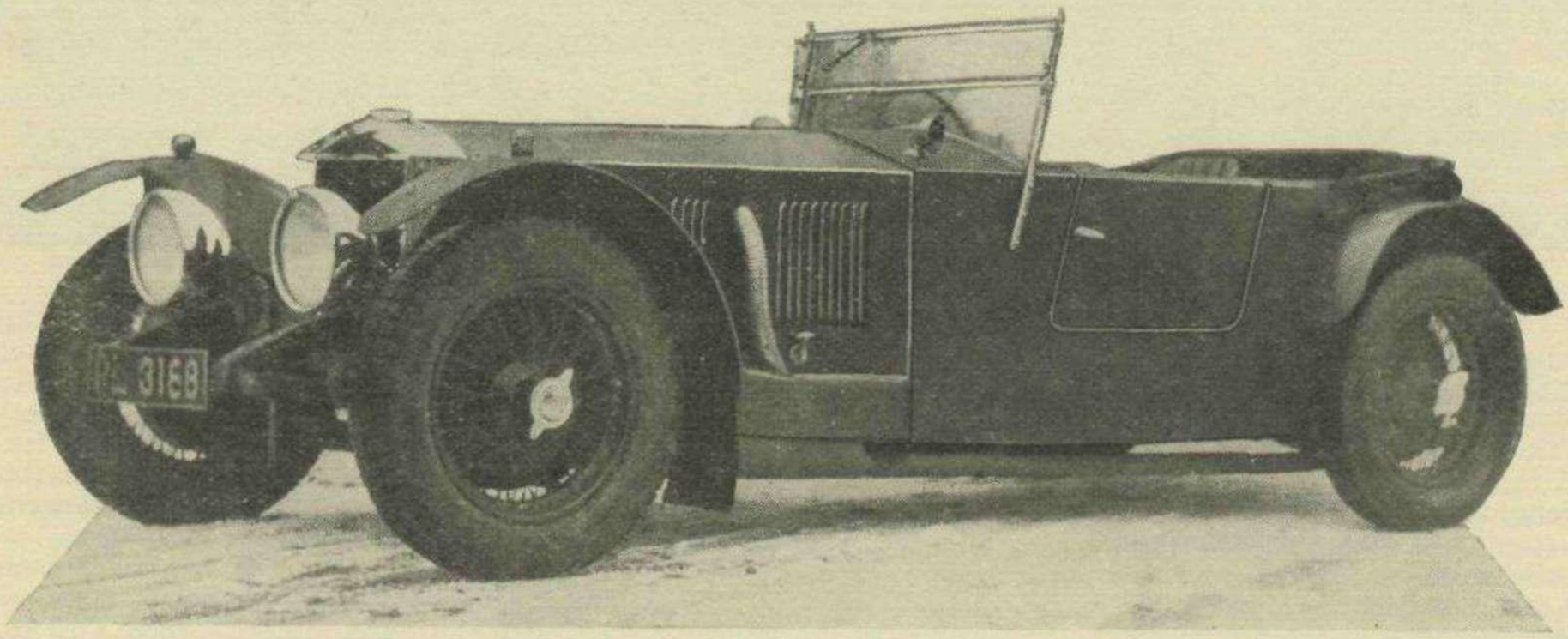
Accessories Before the Fact.

The following contributed to Campbell's great achievement :—

1,450 h.p. Napier supercharged racing aero engine ; car designed by Mr. R. A. Railton, of Thomson and Taylor, Ltd., Brooklands ; car erected by Thomson and Taylor, Ltd. ; chassis frame by Vickers ; Hoffman ball bearings ; petrol tank by the Gallay Radiator Co. ; Ferodo lined clutch ; gearbox built by K.L.G. Sparking Plugs, Ltd. ; Marles steering gear ; Woodhead road springs ; Alford and Alder brakes with Clayton-Dewandre vacuum servo ; Serck honeycomb radiator ; Silentbloc bushes by T. B. Andre and Co., Ltd. ; Claudel-Hobson carburetters by H. M. Hobson, Ltd. ; Watford magnetos by North and Sons, Ltd. ; bodywork by J. Gurney Nutting and Co., Ltd., London.

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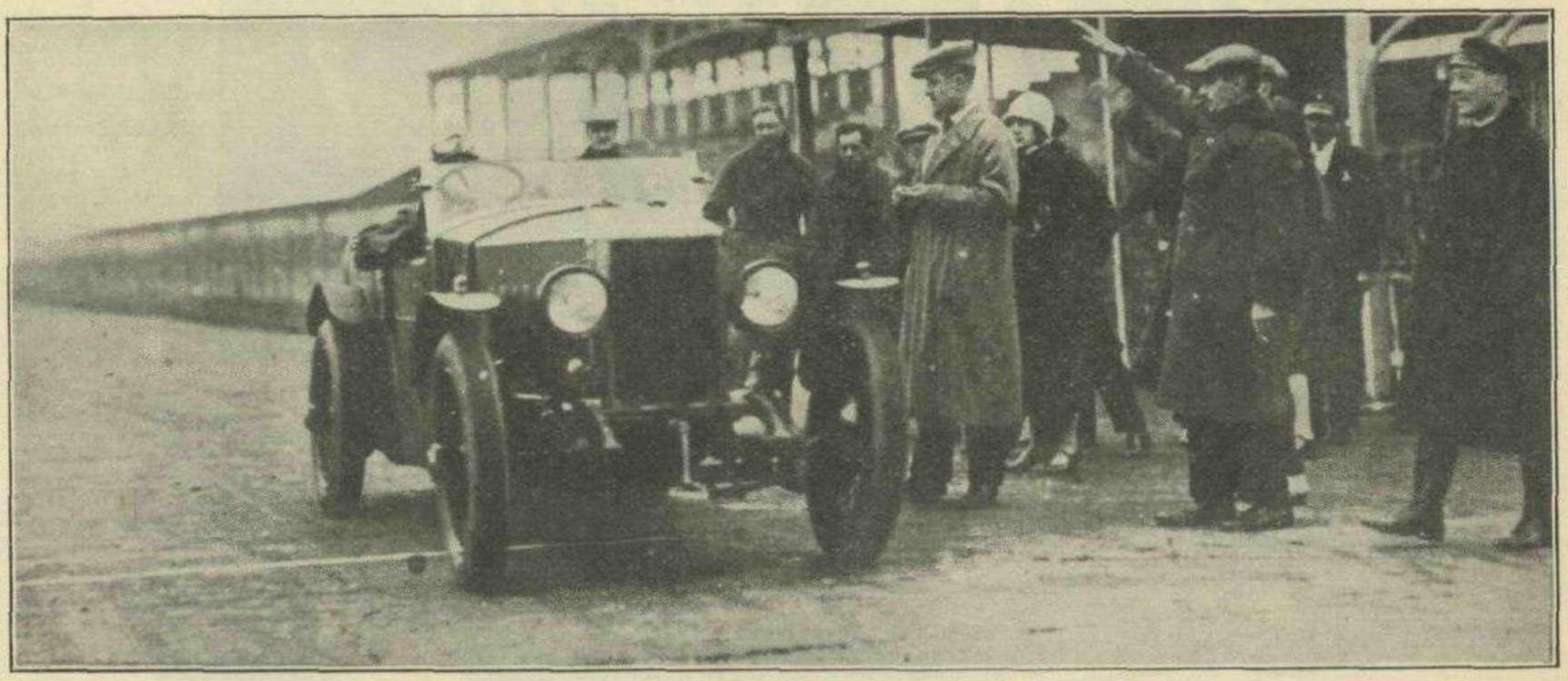
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THE EVOLUTION OF THE INVICTA.

The Story of a Car's Advance to Fame.



Miss Violette Cordery finishing her record run of 5,300 miles at 70 m.p.h. at Monza in 1926.

THE history of a sports car is a history of individualism. In other branches of industry the attainment of an ideal is always subject to the domination of more sordid considerations of production, appeal to the masses, and drastic economy of manufacture. In the case of any sports car worthy of the name these considerations must always be subordinated to the main idea of the designer to produce something which will fulfil a definite purpose with the greatest possible efficiency, and by introducing individual features embodying its designer's ideals, so create a new demand as well as filling one which already exists.

In the case of the ordinary motor cars which today fill so excellently the transport requirements of the age there is nothing outstandingly new in the performance or mechanism of the cars themselves. They improve in value, economy, and convenience, but to ride in one is merely to make use of one of the advances of this century, rather than to undergo a new experience or feel enthusiasm for hitherto unknown possibilities in motoring.

The breaking of this new ground is left to the enterprising few, who are never satisfied with things as they are, to exercise their imagination in setting new standards, and then to turn these standards into practical possibilities. To such a class belong the pioneers behind the Invicta car, which in a few short years has sprung from quiet but purposeful beginnings to the position of being able to boast of records and achievements unequalled in the world of automobiles.

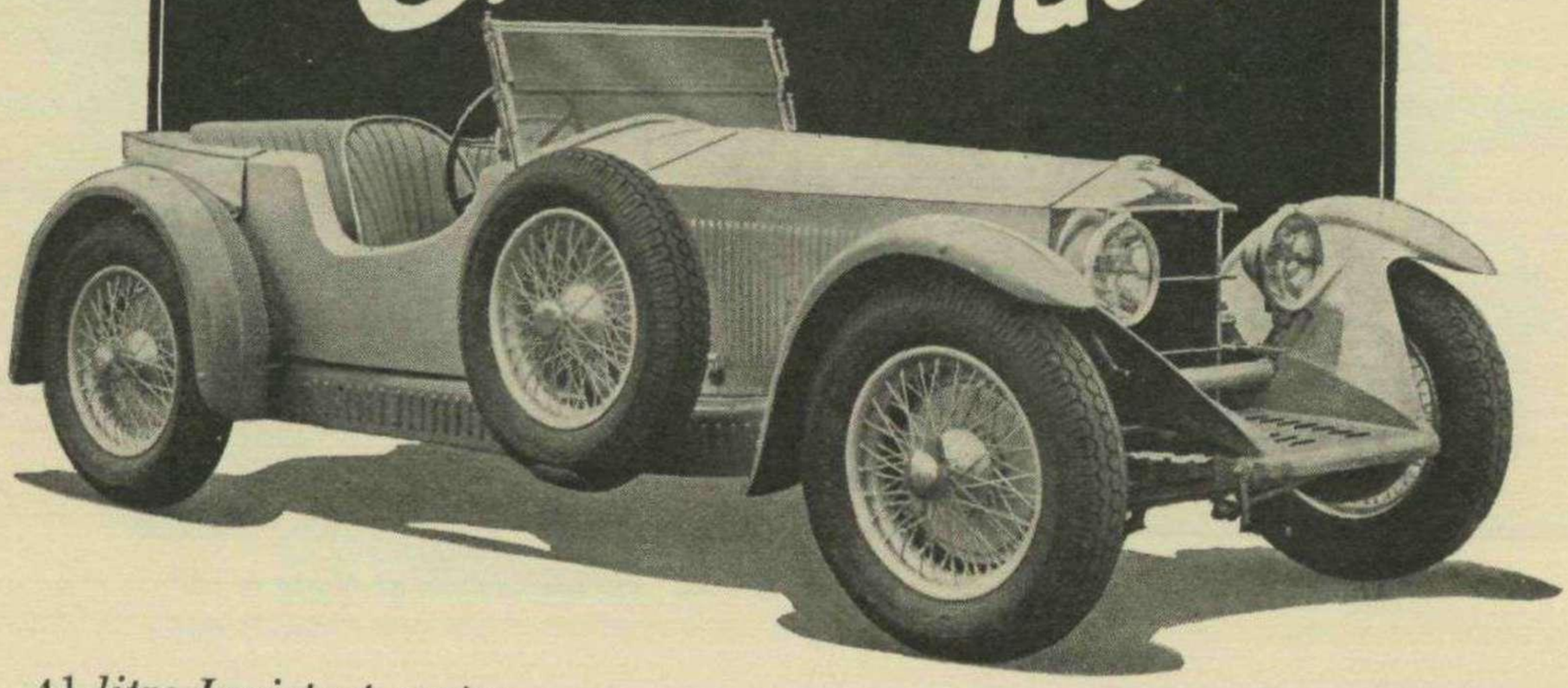
Although it was not until five years ago that the first car bearing this name was put on the market, Capt. Macklin, who is chiefly responsible for the design and development of this marque has been, since long before the war a motoring enthusiast. His enthusiasm was combined with very exacting requirements of what a motor car should be able to do, and the way in which it should do it.

However the war put an end to all activities of this sort, and it was not until 1925 that Capt. Macklin commenced designing and experimenting with the Invicta. His aim in building this car was, above all things, to provide a really lively performance combined with extreme flexibility on top gear, as he did not see why it should be necessary to indulge in excessive gear-changing. The first of these models was a very snappy little car, having a wheelbase of 8ft. 4ins. only and its light weight gave it an excellent performance in the way of acceleration. Having a fairly low top gear of 4.5 to 1 the maximum speed was little over 65 m.p.h. but even this was good going for a car of its type in those days. Later, owing to the demand for increased body space on this model, the wheelbase was lengthened by a foot.

In the hands of Miss Violette Cordery, whose name has been associated with many of the best performances of the make in competitions, this car annexed numerous awards at Southport meetings and similar events. To demonstrate the top gear-performance many hills, usually considered stiff enough for trials work, were climbed on top gear. Pebblecombe in Surrey was a favourite venue for this stunt, and was certainly a difficult test for a top gear climb.

Following the 2½-litre of 1926 came the 3-litre model which will be much better known to most of our readers in view of the numerous long distance records which it set up. Many will remember the occasion on which the 25,000 kilometres record was put up to 89.64 kilometres per hour at Monza. This attempt was chiefly memorable for the crash that occurred during the attempt owing to one of the drivers falling asleep at the wheel. In

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THE EVOLUTION OF THE INVICTA—continued.

spite of the damage to the car, repairs were proceeded with on the spot and the attempt was carried through successfully.

The 3-litre was on similar lines to the older car in the fact of being light for its power, and the larger engine gave it an even better range on top gear. This car had a 10ft. wheelbase and a 4ft. 4in. track, and one of its first appearances was the occasion of its attacking the 5,000 mile record under R.A.C. observation, and completing the distance at the remarkable average speed of 70.7 m.p.h. and for this performance was awarded the Dewar Trophy for the most meritorious observed performance of the year.

This success developed their enthusiasm still further, and Miss Cordery's next effort in this line was a round-the-world trip under R.A.C. observation, which further proved their reliability. This model continued until 1928 when preparations of the new model were complete, and the 4½-litre was introduced. This car, as might be expected, had a considerably improved performance, as the size and weight of the chassis was very little greater than the old model, though the actual frames and parts were suitably strengthened to deal with the increased power.

By way of demonstrating their confidence in this model, the first one was entered for another R.A.C. observed test in the hands of Miss Cordery. The proposed trial was to show that the car would average 60 m.p.h. or over for 30,000 miles on Brooklands track. Many experts considered the project to be mad, and said so, but Invicta Cars were not disturbed by these warnings, and in spite of suggestions that the distance should be reduced to increase the chance of finishing, insisted on attempting the full schedule. Everyone knows how effective the surface of Brooklands can be in disintegrating the best motor cars, but in this case it proved to have met its match, and the success of the Invicta is now a matter of history. The full 30,000 miles was covered at 61.57 m.p.h. and this without having to hurry over the last part of the test, owing to the time in hand.

This achievement gained the Dewar Trophy for Invicta for the second time, and it is a notable fact that, in spite of the comparatively short time this make has been in existence it is the only British car which has ever won the Dewar Trophy on two occasions. The writer drove this car shortly after this record and found that there was very little sign of the work it had gone through. It was later entered for the Austrian Alpine Trial when it was driven by Donald Healey and won the Alpine Cup for the best performance in its class, and also made fastest time in the Arlberg Hill Climb. Healey was evidently impressed with its capabilities for this class of work, and drove it later in the Austrian Alford-Alpehfahrt Trial of last year, when he succeeded in carrying off the Premier Award. [*Continued overleaf*].

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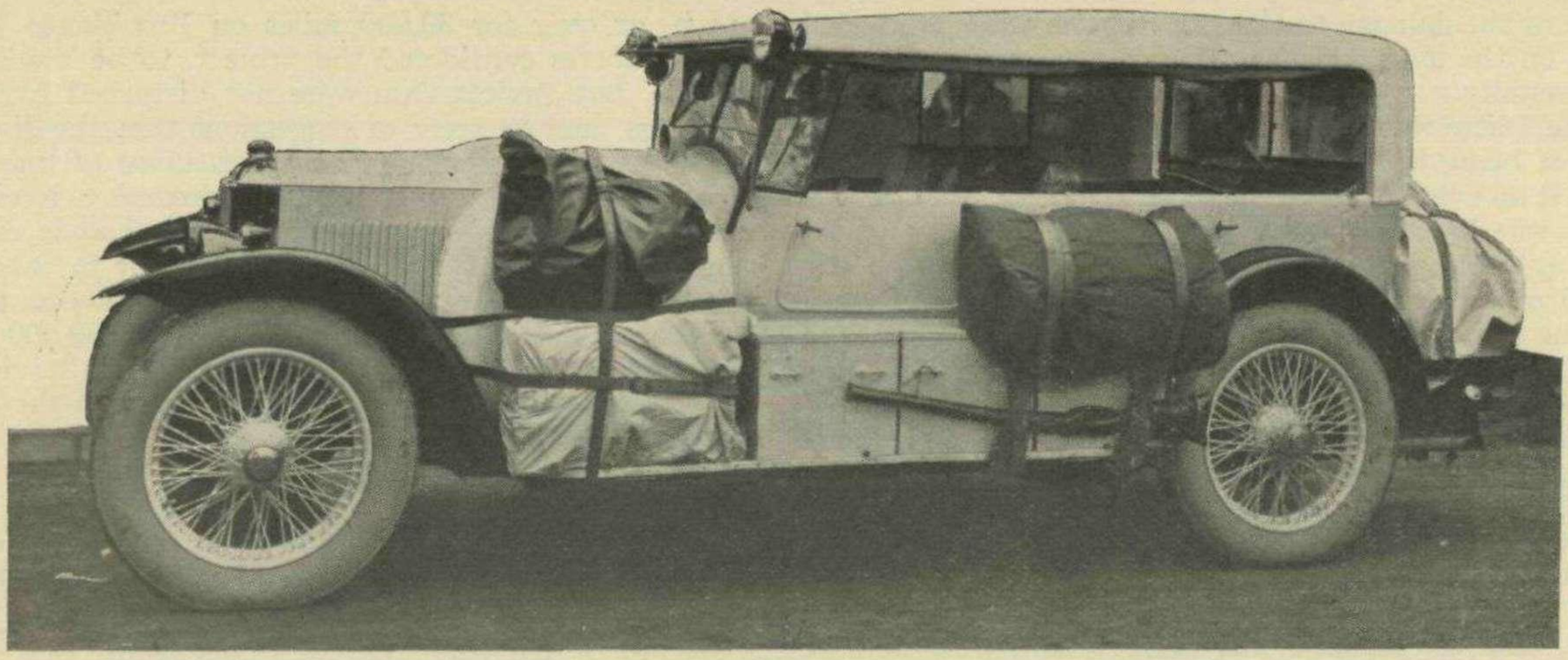
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THE EVOLUTION OF THE INVICTA—continued.



Another famous Invicta. Miss Cordery's world-tour car with full and varied equipment.

At the 1930 Olympia show a considerable sensation was caused by the introduction of the latest low-chassis 4½ sports model, one of the most striking cars exhibited, and something to make the sportsman's mouth water. The fact that its looks did not belie its performance has been demonstrated in startling fashion by Donald Healey's great victory in the Monte Carlo Rally when starting from Stavanger he came through successfully in spite of appalling conditions, and won the general classification prize in addition to numerous other awards, including the 5-litre class in the Mont des Mules Hill climb. This model was introduced primarily for fast road work under normal conditions, as its small clearance made it hardly suitable for the snowbound conditions of the roads in Northern Europe in mid-winter. It was suggested to Healey that he should use the old 4½-litre which had served him so well in 1930, but he was so struck by the new model that he insisted on using it, and proved the soundness of his judgment.

Wonderful performance as this trial required from a car, it also required amazing skill and hardihood from its driver, and we had some interesting sidelights recently on Healey's powers of endurance. He is one of these people who shut up like an oyster when questioned on their achievements, but he cannot entirely conceal his prowess when he has witnesses in the shape of his crew to tell of their experiences! The fact that he appears able to drive indefinitely without sleep was demonstrated when he came to the works to collect the car shortly before starting out for the Rally.

Having come up one day from his home in Cornwall, he took over the car, presumably to go home that evening. On being asked his programme he said he was going up to London for dinner and a show first. The next day passed, and on the following morning he appeared at the works at Cobham before anyone of the firm was about, to have some things done to the car, before starting out. In the meantime it transpired that he had driven home to Cornwall after the theatre, got to work on the car and fixed up boxes for carrying picks, shovels, chains, etc., altered the exhaust system to give more clearance, and fitted an enormous pair of headlamps for the trial, which he found took so much current that another dynamo of heavier output would be needed. Therefore, he had driven up again during the night from Cornwall, and presented himself once more at Invictas, as fresh as paint, in spite of having completely missed two nights' sleep. Of such are Rally winners made!

His performance in the Rally was all the more remarkable in that the car completed the course in a considerably damaged condition.

In crossing Norway he struck a more than usually slippery piece of ice bound road, and the resulting slide was only arrested by hitting a telegraph pole with a rear wheel with such force as to cut the nine inch pole off short. The car ended up over the stump with the pole alongside and most of the telegraphic system of Norway holding down the car itself. This might have deterred some people from further desire to go motoring, but Healey and his crew, having summarily dealt with the said telegraph system, and lifted the car off the stump and on to the road, made to proceed. The first effort revealed the fact that the brakes were permanently hard on, owing to that side of the axle being pushed back 2½ inches. Healey merely slacked off the brake adjustment on that wheel until it was free and proceeded, partly crabwise and with distinctly uneven braking, to win the Monte Carlo Rally and the Mont des Mules hill-climb. In fact, the chief reason he did not also win the acceleration and brake test was the fact that, owing to the considerable derangement of the braking system he had to start pulling up long before the end of the speed section of the test.

The great thing about an event such as the Monte Carlo Rally is the abnormal test to which every part and accessory of the car is subjected. It has to run day and night, without chance of adjustment or attention, under extremes of temperature. The Rotax electrical system deserves a special bouquet for its excellent performance, while the Halo brake linings stood up excellently under the abnormal strain of maladjustment due to the crash.

The remarkable success of this model on its introduction, in spite of mishaps which would have put a less robust vehicle out of action altogether, is bound to cause a big demand for this very attractive car, especially in view of its low price.

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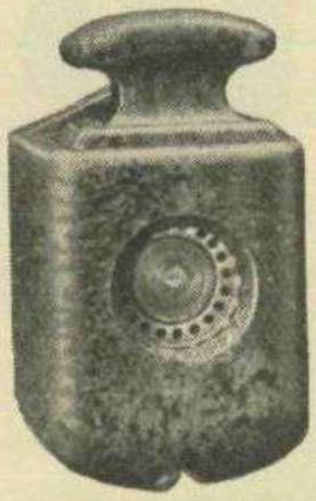
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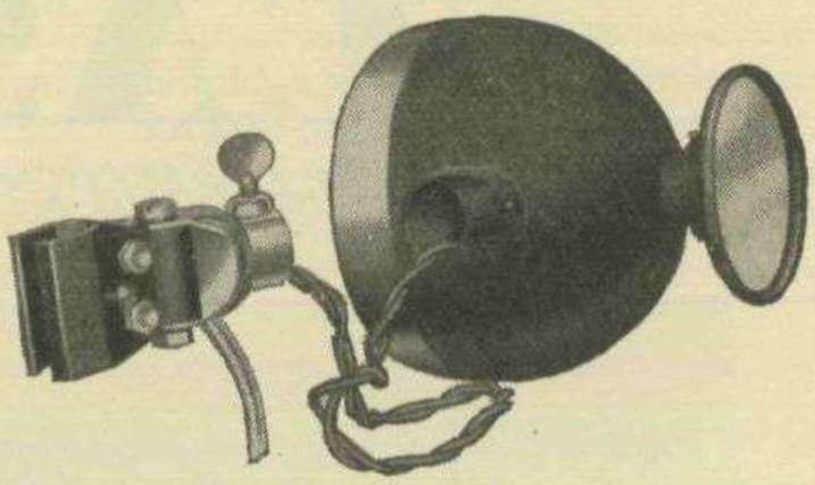
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Screws flat ton to dashboard.

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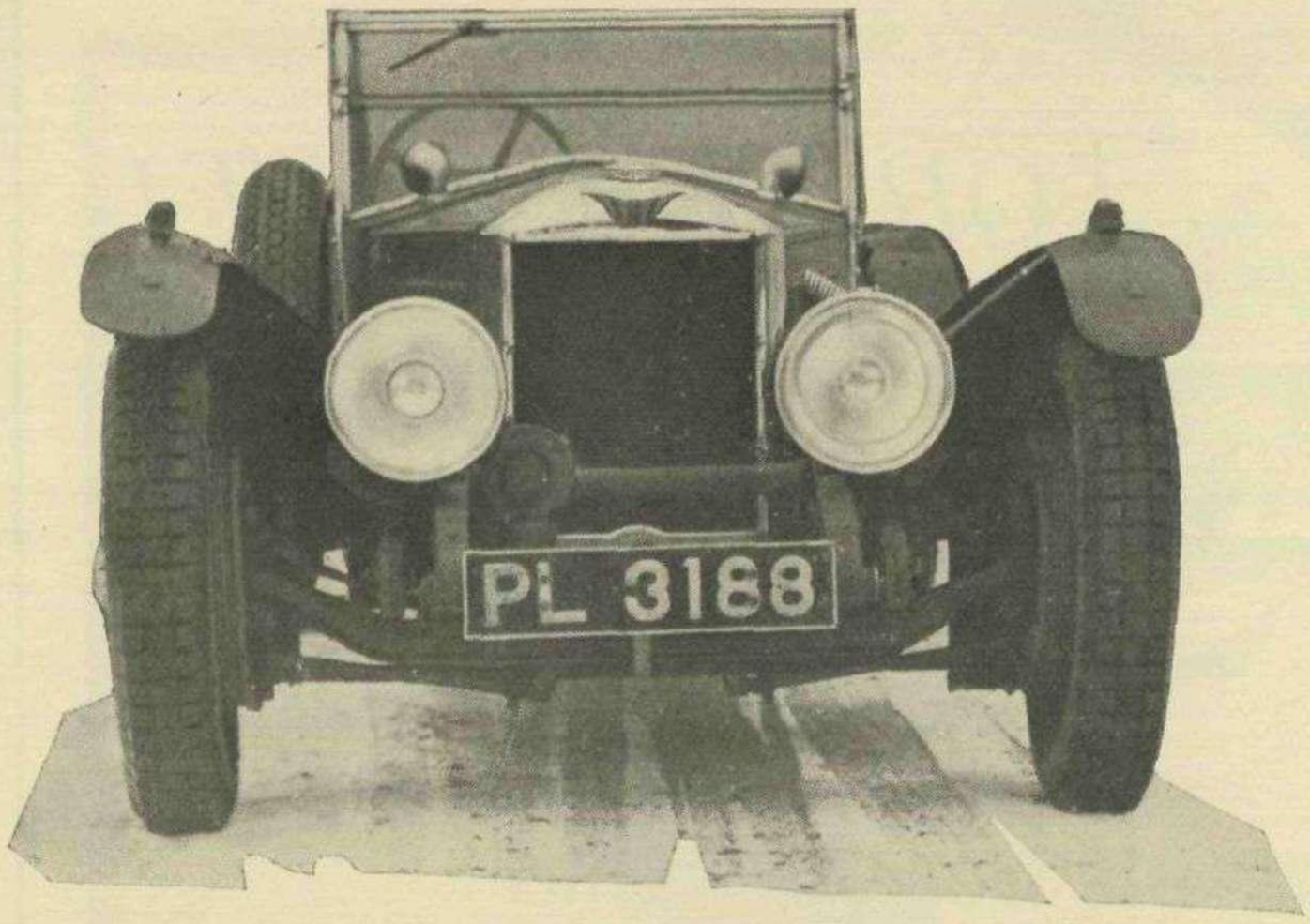
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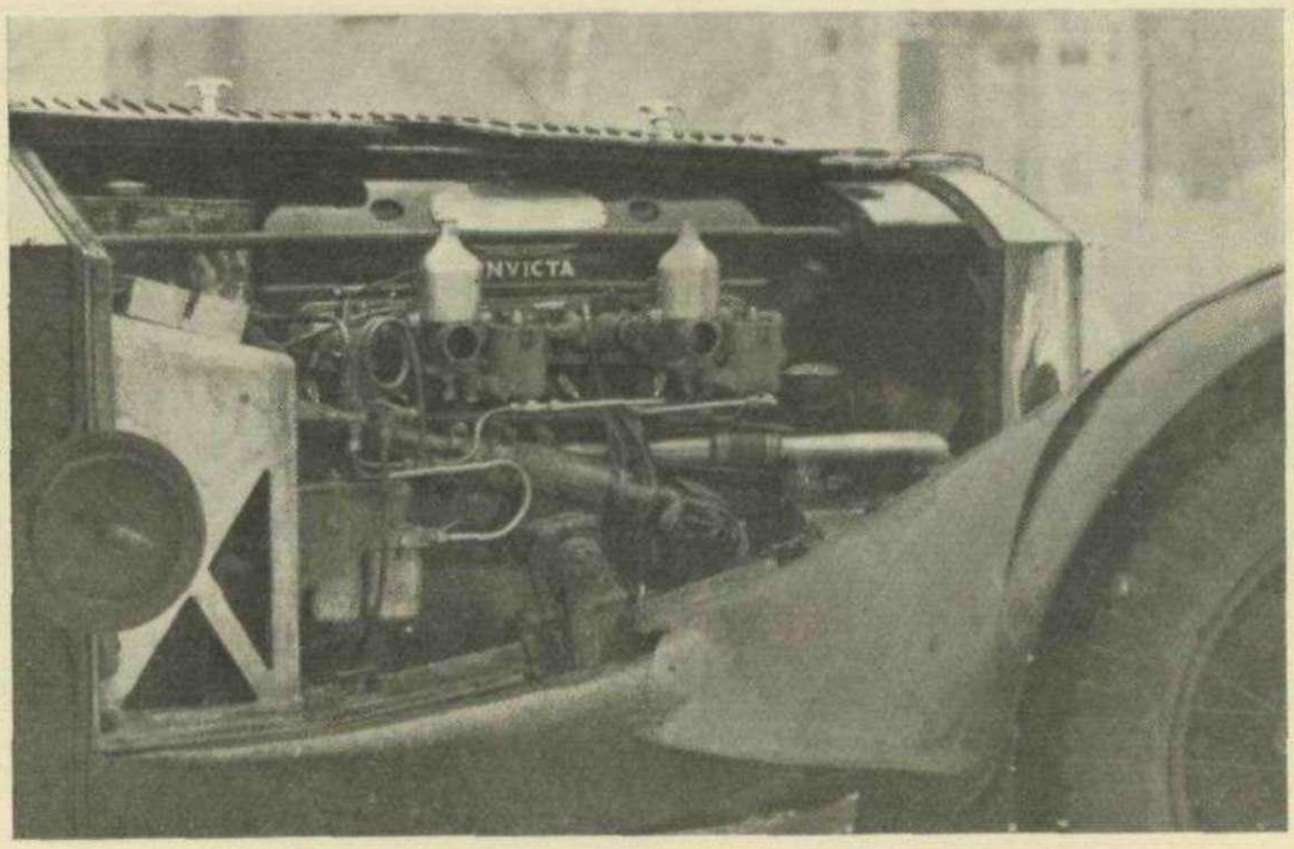
WHEN Invicta cars came to the 1931 Show with the new low chassis 4½-litre, the most blasé of motorists were ready to admit that here was something with distinct possibilities, with the reservation that these had not as yet been demonstrated. When, however, the next news of this model was that, in the hands of Donald Healey, it had won the Monte Carlo Rally against the best cars and drivers of Europe, it was generally realised that here indeed was something new in sports cars.

To produce a pretty looking motorcar which is amusing to drive under normal conditions is one thing, but to turn out a model which combines the handiness and "pep" so desired by the sporting motorist, with the toughness and thorough reliability necessary for the success this car has achieved, is something far rarer and more difficult.

Therefore, when Healey's car, after a brief look over to remedy the effects of his crash, but otherwise untouched, was handed over to us to try out under normal road conditions, we were confident of an interesting experience. Not only were we not disappointed, but the performance and behaviour of the car left us more than enthusiastic about this newcomer to a class which is all too small.

A motoring journalist is by nature a cynical creature, who only allows the good points of a motorcar to filter through a barrage of criticism. Now and then he is fortunate enough to drive a car which, by bringing a new exhilaration into his faded existence makes him forget his usual attitude, and experience once more the real joy of motoring.

The equipment of the car is extremely well and neatly thought out and this is specially noticeable in small details which save so much time and bother. The Remax bonnet clips for instance, were quite the best we have come across. Just a tap with the hand to open or close them, and they are absolutely secure. Certainly a small point, but it is such things that make or mar a vehicle in these days when motor cars are so greatly improved in their essentials that equipment becomes increasingly important.

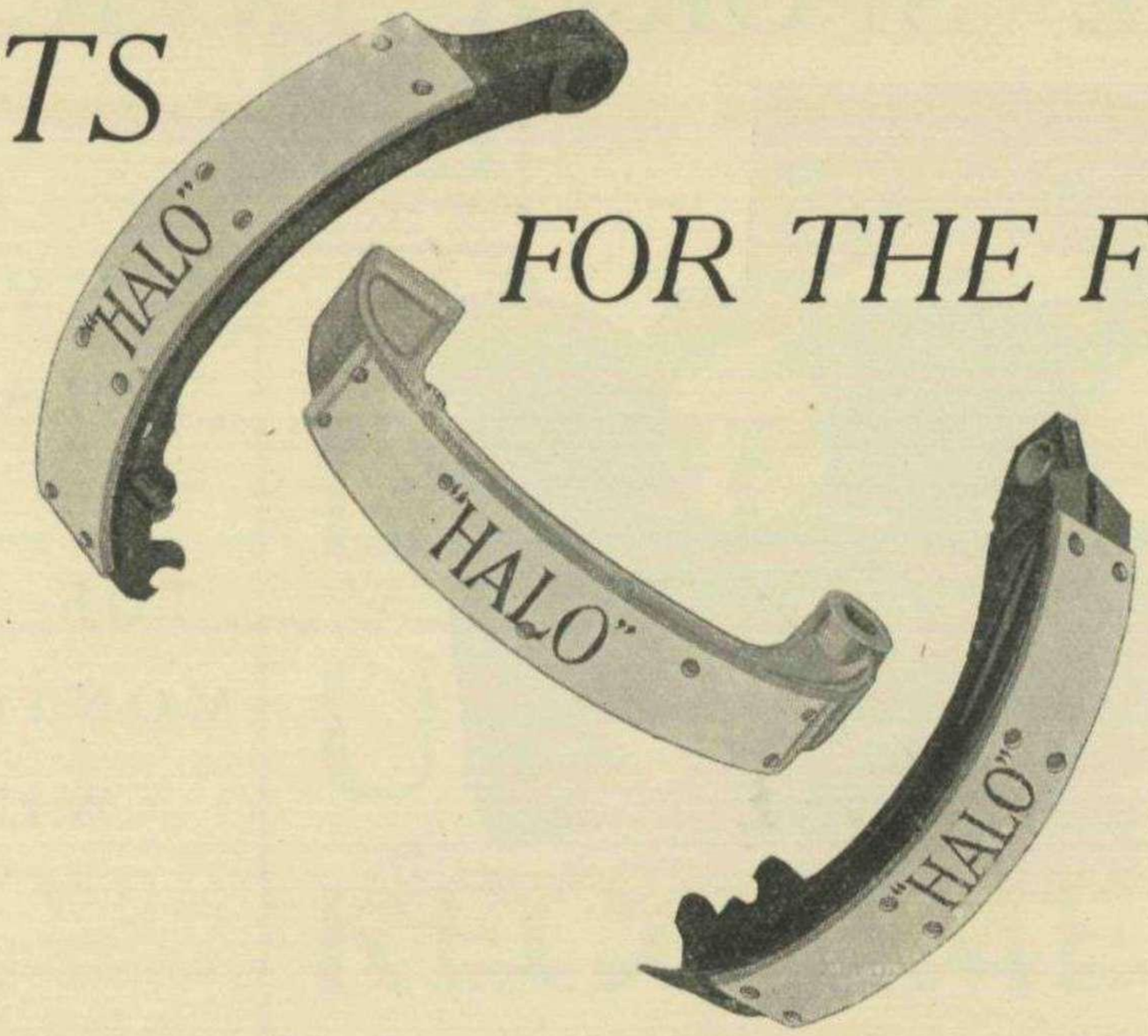


A bonnetful of power. The induction side of the Invicta, showing the twin S.U. carburetters, position of the steering box, and the upswept frame member.

The actual body on Healey's car was not a standard one, having been made in a hurry for the event. We have had an opportunity of examining the standard, body a very nice proposition, while for those who can afford a little more for their car will find the

(*continued on page 238*).

FACTS FOR THE FAST!



We refer of course only to the fast *driver*—to you, Sir, or you, Madam, of the skilful hands and steady eye, with the little habit of leaving the crowd behind. You realise, of course, that for fast driving, especially in traffic, the ability to brake swiftly, suddenly and safely is no less important than rapid acceleration. If you keep your car constantly in trim for really rapid work, you should have HALO on your brake shoes.

HALO is a non-metallic wound asbestos brake lining with a high co-efficient of friction. Its grip is like the "hands" of a good horseman—it checks instantaneously and powerfully but it does not "tug"; neither will it seize nor bind at awkward moments. It has vast endurance, wears for years, and is efficient to the last.

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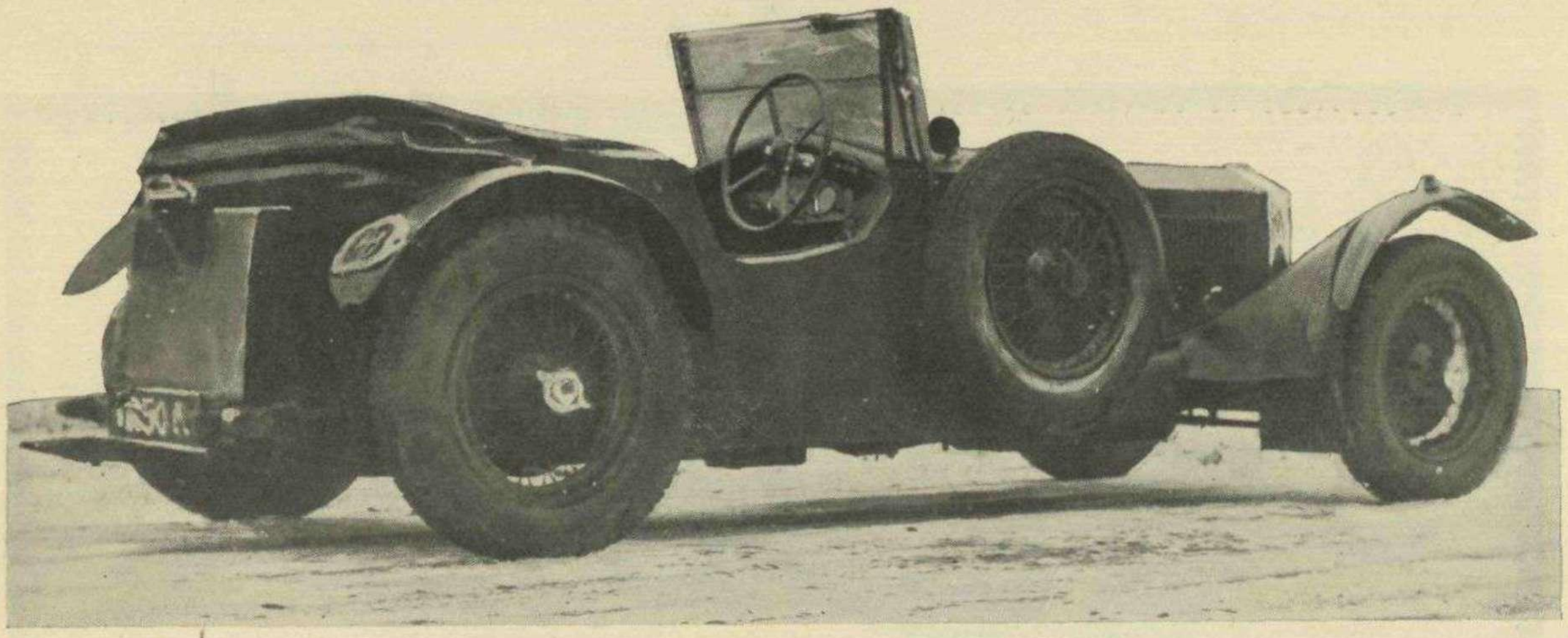
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THE SPORTS INVICTA—continued.



A three-quarter rear view of the Monte Carlo winner, which gives an excellent idea of the general build and lines of the car.

de luxe edition by Van den Plas a thing of beauty and convenience which makes it excellent value.

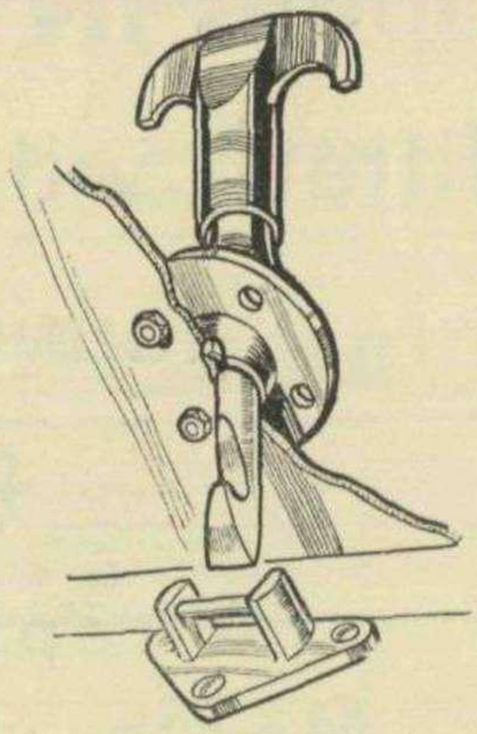
After the first run up through the gears to the accompaniment of a crisp but pleasant snarl from the exhaust we realised that this was one of our lucky days. Within a few miles we were completely fascinated with the acceleration, and became unable to refrain from occasionally "putting in their place" various drivers who thought they were getting off the mark rather well. The car is wonderfully small for a "$4\frac{1}{2}$" and gives that feeling of confidence which enables one to "chuck it about" without any difficulty. The Marles steering is amazingly light, without being too low geared.

As the general compactness and behaviour of the motor made us feel frolicsome we made liberal and continuous use of the gears, and, of course, the fullest performance can only be got by their use. We soon found however, that this was only one aspect of the Invicta. It is definitely not one of those cars where you must use the gears—far from it. Thanks to one of the smoothest and most flexible six-cylinder engines we have ever known to be fitted to a sports car, it is not only possible but very pleasant, to remain in top gear continuously.

Although top gear is 3.6 to 1, the car can be driven gently through traffic and round sharp bends at 10 m.p.h. and then by merely stepping on the loud pedal the car steams off the mark without a murmur and in a few seconds is cruising along at 50 or 60 m.p.h. At this speed practically no throttle opening is required.

It is this dual quality of silent speed and flexibility in addition to crashing acceleration when needed that makes this the sort of car that simply must be driven, even if there is nowhere to go. It would seem to make the one reason why it would be an expensive car to run, as to allow such a vehicle to stand in the garage when there was the slightest excuse for going out in it would be beyond the powers of resistance of most owners!

On Healey's car we found comfortable maxima on the gears to be 50 m.p.h. in second and 70 m.p.h. in third, while 90 m.p.h. was exceeded in top gear, at which speed the car was perfectly steady and could be held to any course with absolute accuracy. In considering the performance of this car it must be remembered that the engine has done well over 4,000 miles without being touched, and that these particular miles were under such conditions, largely in indirect gears, as to be equivalent to several times the distance in normal use, and some of the "snap" had gone out of it. There is no doubt that another 5 m.p.h. all round, together with even better acceleration, will be available after a top overhaul, or alternatively on a new car when run in, and an owner who is not satisfied with the performance then attained would, we are afraid, be beyond all hope.



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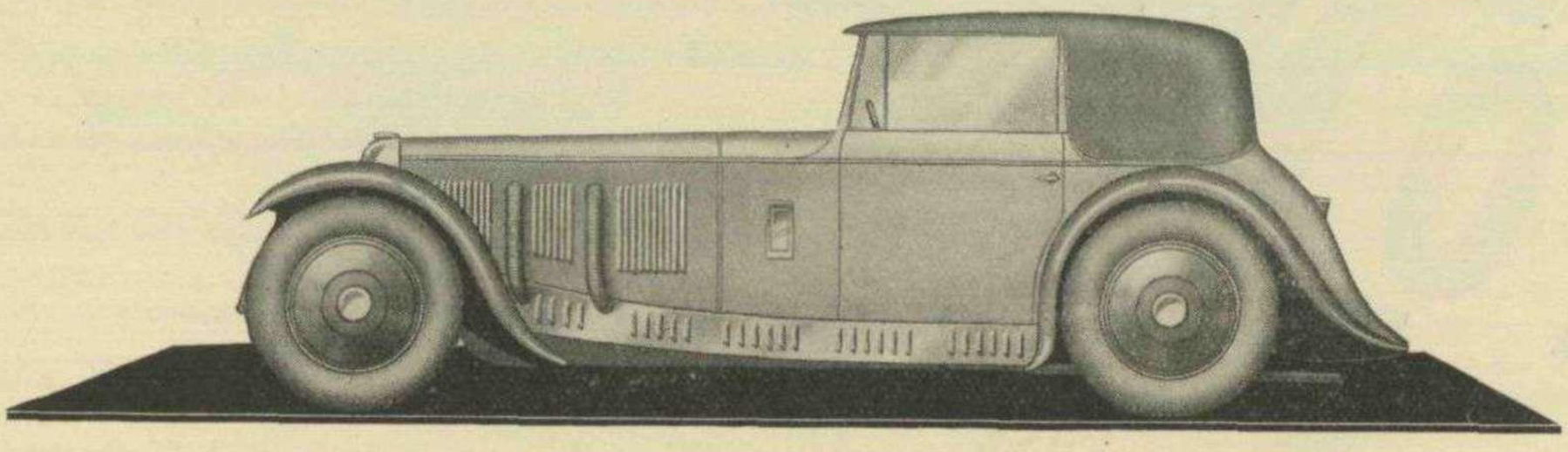
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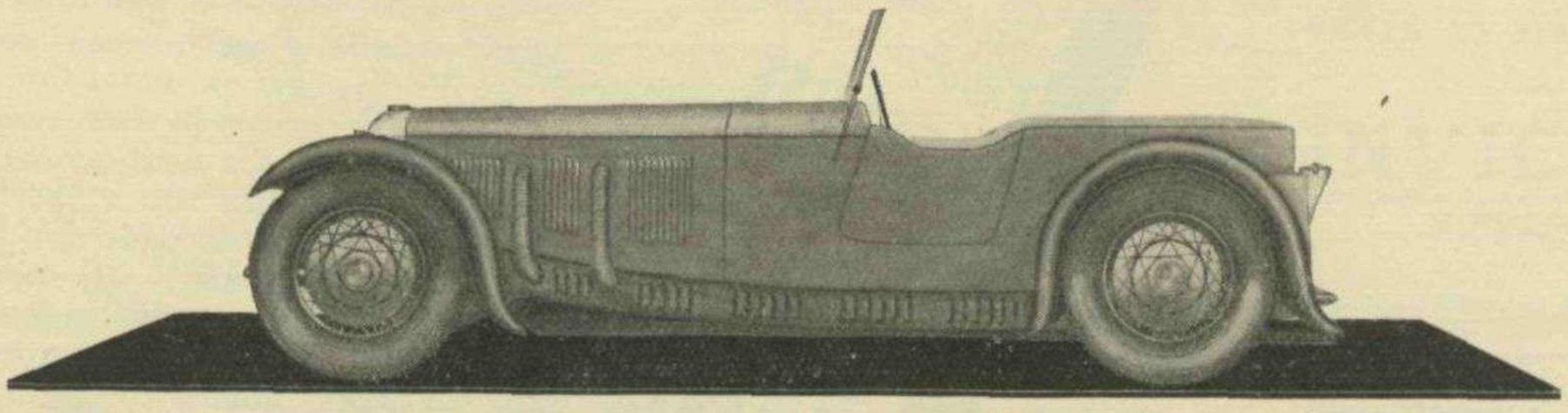
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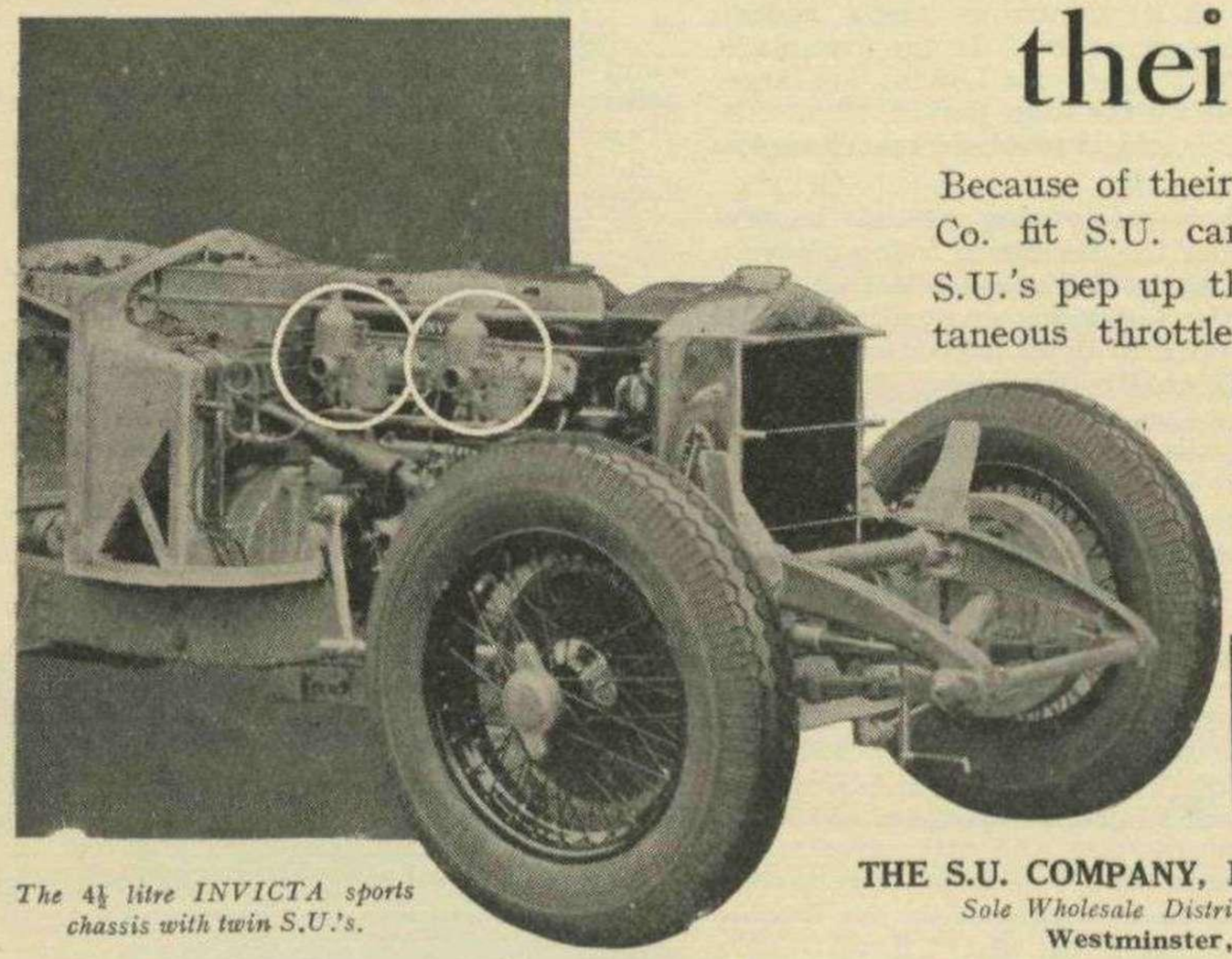
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THE MOTOR SPORTSMAN'S DIARY - 1931

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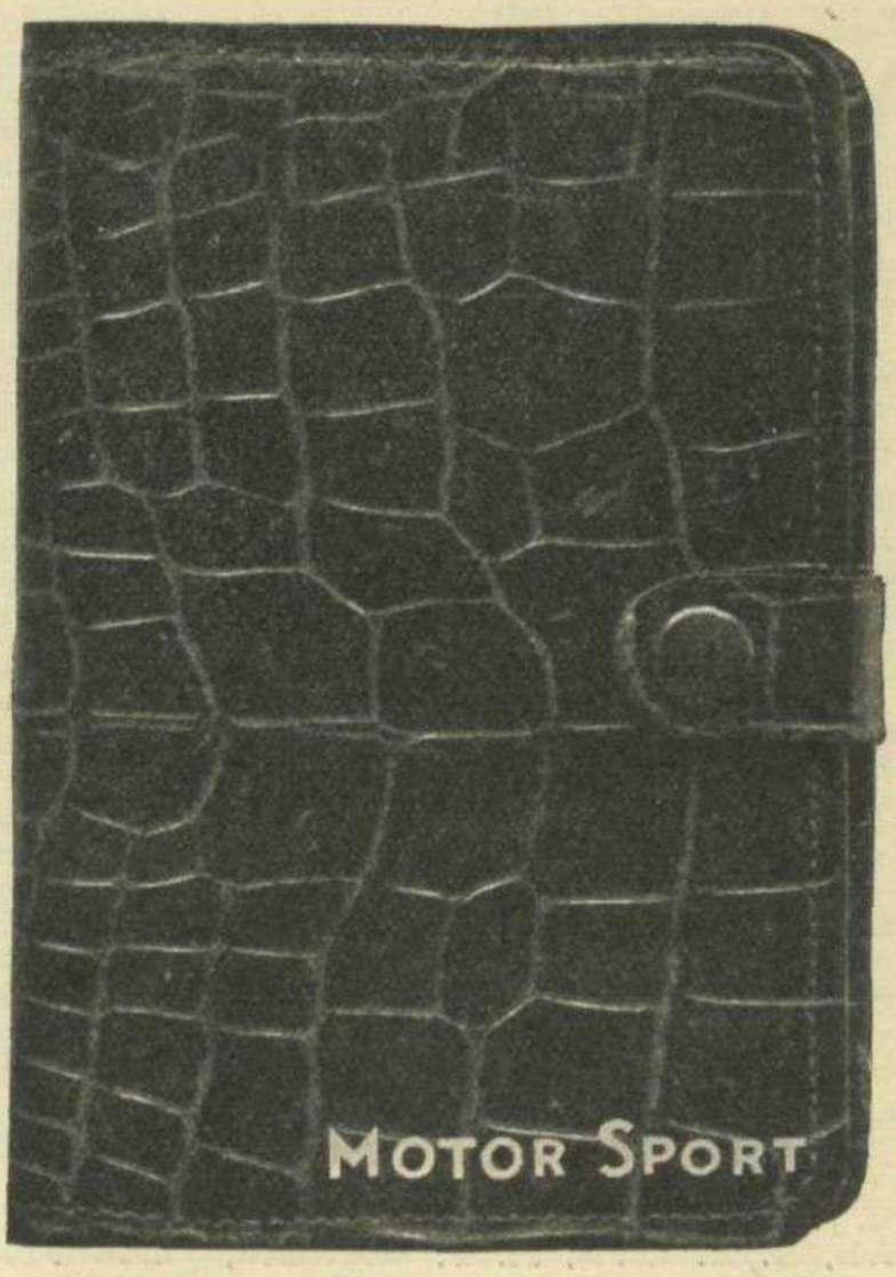
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ACTUAL SIZE

ITEMS OF INTEREST

FROM VARIOUS SOURCES

Diesel Car at Daytona.

IN a private cable to Messrs. C. C. Wakefield & Co. Ltd., Mr. C. L. Cummins, the well-known American engineer, announces that in the course of a trial officially observed by the Contest Board of the American Automobile Association his Diesel-engined car established a record for this type of vehicle of 100.75 m.p.h.

This remarkable success should encourage still further experiments with this type of power unit, not only in commercial vehicles but also in private cars. Next to its extreme simplicity, the leading feature of the Diesel engine is its low running cost. Not only is fuel consumption lower, but the actual cost of the fuel is only a few pence a gallon, since it is designed to run on heavy oil.

An interesting feature of this record at Daytona is that although both the driver and the car were American, the lubricating oil used was "Deusol," a product of C. C. Wakefield & Co. Ltd.

From Sands to Stands.

IT has been decided to exhibit the Austin Seven on which Captain Malcolm Campbell recently broke the International Class "H" Record at Daytona, on the Austin Company's stand at the Buenos Aires Exhibition.

As the Campbell-Napier "Blue Bird" will also be on view, visitors to the Exhibition will have an opportunity of comparing Britain's latest record breakers.

B.R.D.C. Officers for 1931.

AT the Annual General Meeting of the British Racing Drivers' Club, confirmation was given of the presentation of the Club's Awards of Merit for outstanding performances during 1930 as follows:—

Road Racing Star.—Capt. Woolf Barnato.

Brooklands Star.—S. C. H. Davis.

Brooklands Lap Record.—Kaye Don.

Ditto and French Grand Prix performance.—Capt. H. R. S. Birkin.

It was also decided that the Club should recognise, by means of a special award, the magnificent achievements at Montlhery of Mrs. G. M. Stewart.

The following officers for the ensuing year were elected by ballot:—

President.—The Earl Howe.

Vice Presidents.—Capt. Woolf Barnato, Dr. J. D. Benjafield, Capt. Malcolm Campbell, John R. Cobb, K. Lee Guiness.

Hon. Secretary.—H. N. Edwards. Hon. Treasurer.—H. W. Cook. Hon. Press Secretary.—Alan C. Hess. Hon. Auditors.—E. Fronteras and Major C. G. Coe.

Committee.—Capt. W. Barnato, Dr. J. D. Benjafield, Capt. W. O. Bentley, L. G. Callingham, Capt. Malcolm Campbell, J. R. Cobb, Major C. G. Coe, S. C. H. Davis, B. E. Lewis, H. P. McConnell, Capt. A. Frazer Nash and Capt. A. C. R. Waite.

Winter Motor Tours.

A GENERAL survey, by the Automobile Association, of applications for winter itineraries now being received at its numerous offices, reveals some interesting facts. In the first place, comparative figures for London are larger than those for the same period, 12 months ago, but in the Provinces the change is not appreciable.

The choice of touring grounds has extended and the tendency is for pleasure traffic to go farther afield. Motorists are seeking the lesser known resorts even if these happen to be at a greater distance. The continually improving roads, the faster cars and the greater comfort of saloon bodies are, no doubt, additional factors in these developments. It has been noticed that the A.A. weather and road reports, broadcast by the B.B.C., have a direct influence on the choice of routes.

There is also a marked increase in Continental touring, with a tendency to greater distances and wider interests.

2,500,000 Miles.

AN informative and attractively produced little booklet on tyre testing has been published by the Dunlop Company. It is entitled "How Dunlop Quality Is Maintained." It deals with the Dunlop test fleet which annually covers 2,500,000 tyre and wheel miles and contains illustrations and descriptions of the laboratories, rotary testing machines—which whirl a tyre at the end of a long arm round a roughened track—impact testing machines and other novel devices for ascertaining what the tyres can stand. There is also a description of an unusual temperature test, in which special needles, which give rise to minute electric currents as the temperature changes, are stuck into the tyre.

Copies of the booklet can be obtained from the General Service Manager, Fort Dunlop.

Batteries and Winter Starting.

BEFORE the electric starter became a fully-developed and standard part of a car's equipment it was the unfortunate driver who had a strenuous time in setting the motor in action during the wintertime. Now it is the battery. Everyone with a "mechanical mind" and a general knowledge of the working of the starter must experience an uncomfortable feeling on hearing the laboured grinding of the Bendix as a gummed-up engine is set into reluctant life.

The stresses imposed on the battery under such conditions are, of course, very considerable, and unless it is of sound and robust design, its life is bound to be a limited one.

During the past few months, we have had the opportunity of testing a "Pertrix" battery on a Motor Sport staff car, and a special point was made of ill-using it in order to reproduce the ordinary every-day treatment to which this part of the electrical installation is subjected in the average private-owner's hands.

No attempt was made to "nurse" it, and in addition to being called upon to start up an engine of a rather stubborn type, every morning for several months, the battery supplied the current for the usual five-lamp lighting set for long periods at a stretch.

The "Pertrix" showed up extremely well during the whole period of trial, and upon being dismantled for the purpose of examination, the internal condition was found to be perfect. "Pertrix" batteries are made by Britannia Batteries, Ltd., of Redditch, who are, of course, one of the oldest firms in the accumulator industry.



For Electrical Equipment—The latest type "Pertrix" battery.

New Traffic Control's Nick Names.

MOTORISTS who are not keen to borrow the American term "speed cop" as a nick-name for our new traffic police are trying to evolve something snappy and appropriate.

Many names have been suggested. A coach driver who was held up and cautioned on the Great North Road last week applied a few striking and expressive names, but they are not suitable for general circulation.

Two suggestions which find favour are "Mounties," suggestive of a chase over great open spaces, and "Berties," in honour of Herbert Morrison who sponsored them. But the one with most popular appeal is "Crikeys"—after the two-headed policeman in the famous petrol advertisement.

Pedestrians, enjoying the chase from the comparative security of the ditch, will soon be taking up the slogan "That's a Crikey, that was"—or so we're told.

Letters from Readers.

Handicapping.

SIR,

Great Britain holds the World's speed records for land, air and water and I am not alone in believing that this speed supremacy is of immense value to our motor and engineering trade.

If we are to expand this trade, however —and expansion is the only hope for the motor industry—I consider motor racing essential for all sizes of cars. We are practically the only big nation in the world which is prohibited from holding road-races almost whenever it likes, and the result is that we have only one real road race—the T.T. in Ulster.

Even this, I am afraid, is of little benefit to the industry because it is run on a handicap basis. It is obviously impossible for the organisers to evolve a handicap which will be fair for a huge Bentley, a "baby" Austin and all the intermediate sizes. Last year, for instance, three Italian Alfa-Romeo cars beat the fourth car, a British-made Alvis, by a narrow margin, but the cars were in different classes and the handicap—unintentionally, of course, but quite obviously—favoured the foreigner.

Handicapping fails to bring out the best points of a car; it merely incites the manufacturers to beat the handicapper and, with their much greater knowledge of the wiles of racing, the foreigners can usually do it better than we can! The T.T. in Ulster is the only road-race of real benefit to our industry, and I appeal to the organisers and to all who can use their influence to cut out the absurd handicap (which amuses the crowd alone) and run this important race on a straightforward basis. I hear, at any rate, that the Alvis Company, who last year saved the British bacon, have decided to withhold their support this year unless some different system is adopted, and I am afraid that other manufacturers will follow suit.

Edgbaston. Frank Hallam.

Those Push Bike Rear Lights.

SIR,

Your correspondent "Searchlight," of Birmingham, has acted for the public's good by urging that cyclists should be compelled to carry rear lamps.

When he says, however, that cyclists are "lax" about their reflectors he is under-estimating the case. I took a census of cyclists I passed the other day, and I found that about 25 per cent. of them were not carrying reflectors at all! The police do not seem to trouble much about them, the reason, perhaps, being that without headlights the absence of a reflector cannot be detected.

Cyclists would not be able to evade the law in the same way if they were compelled to carry lamps. I am surprised that the otherwise excellent Road Traffic Act has overlooked this point; but it is never too late to mend.

Worcs. V. Spence.

The Starting of Outboard Engines.

SIR,

With reference to the comments made by "F.M." in your February number under "Sport Afloat" it is stated regarding electric starting outboard engines, that no provision is made for cord starting.

We would point out that the Johnson "Sea Horses" have provision for cord starting, should the battery for starter fail.

We also consider your remarks regarding the "inability of every outboard motor ever manufactured to start with certainty, except in the hands of an expert" somewhat rather stretched—if outboard motors did not start in the hands of a novice then we can assure you that neither we, nor anybody else would sell them.

London, S.W.1. C. Hecht,
(Vanadium, Ltd.).

Letters on any subject of interest to readers of "Motor Sport" are always welcome, but correspondents are asked to be as brief as possible.

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An upper lubricant should, besides softening carbon, lubricate the piston on **all its four strokes,** keep the rings and grooves clean and free from gumming, lubricate the valve-stems and keep the seats bright and prevent their pitting. It must reduce wear and friction losses thus giving the engine an increased output; a **sustained** output over a considerably increased period. It should also reduce the **Ash contents** and **dilution** of the sump oil, and owing to the reduced friction and better condition of engine, a saving in petrol.

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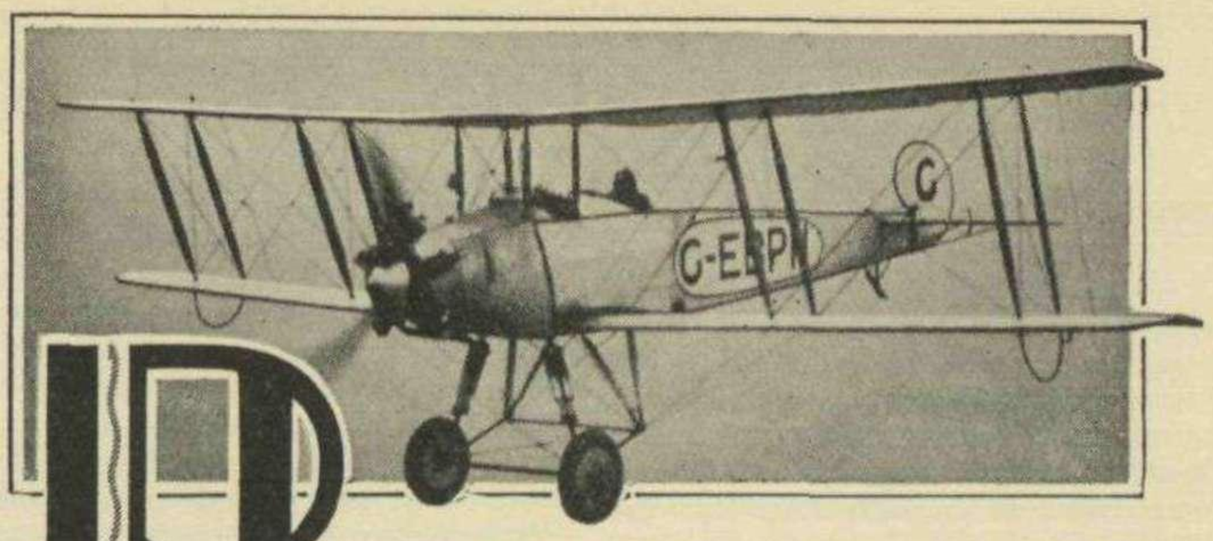


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AIR



LET US HAVE—

A REAL AIR RACE

IT is a peculiarity of the human mind that the value of things is enhanced in recollection with the passing of time. We talk of " the good old days " in referring to events that may have occurred five, ten, twenty or any number of years ago, and are filled with a feeling of regret that things are not what they were. It is the antique complex, and often, if we would analyse our thoughts and feelings, we would discover that we are placing a grossly exaggerated value on the past while being lacking in appreciation of the present.

But this is not always the case, and certainly not so when we consider English sporting flying. Those of us who are old enough and fortunate enough to recall the pre-War meetings at Hendon and Brooklands and elsewhere can say in all truthfulness that " those were meetings—those were." Granted, aviation was more or less in its infancy then, but novelty alone did not make up the attraction. The variety of the machines, which to present day eyes would appear weird, wonderful and comic, the enthusiasm of those who tended and flew them, and the cosmopolitan atmosphere gave to these events a character which is almost entirely absent in their modern equivalents. Long cross-country races, until just before the War, had not been developed to any extent, of course, but some of those aerodrome circuit events with the old Deperdussin, Morane, Valkyrie and other craft, flying low and banking close to the pylons, provided a spectacle which one would dearly like to see again. Hamel's, Hucks' and Manton's extraordinarily fine stunt shows formed part of the excellent fare and thrilled the crowd no less than do the aerobatics now seen at the annual R.A.F. Display. One also recalls the night-flying meetings, inaugurated just prior to the War, and therefore cut short by that calamity; and there was the Round-Britain Contest. Organisers in those days showed enterprise and a keen perception of things. No doubt their task was made easier by virtue of the fact that there were few if any restrictive Government regulations to hamper them, and flying was a sport and had not become a commercialised, every day form of transport. Their public, if unsophisticated, was intensely interested; one recalls the terrific pedestrian traffic jambs which occurred regularly in Colindale Avenue at the conclusion of the Saturday meetings at Hendon which showed in a striking manner the popularity of those week-end fixtures.

After the War the aircraft industry went through troublous times; firms which had been engaged in turning out machines for the flying services by day and by night, and had enjoyed a colossal prosperity were faced with a dead market and became defunct. Nevertheless, there were a few survivors of the slump, and these had enough foresight and keenness to support the few events which were arranged during the lean years of the early post-War period. There were, of course, the light 'plane competitions at Lympne which were highly successful and thoroughly sporting in the fullest sense of the term; the Aerial Derby (which was first held in 1912) was revived, and some real racing machines figured in the entry lists; something of the old pre-War spirit began to emerge, even though money was tight and the private flying movement had scarce been born.

The Post-War " Derby."

One can remember the Derby of 1920 in which such special 'planes as the Nieuport " Nieuhawk," the 400 h.p. Bristol " Bullet," and the famous Gloster " Mars I " competed. All these machines were real racers. It was in 1922 that the Aerial Derby was abandoned, and in its place the King's Cup Air Race was inaugurated. This has always been a handicap event, and until recently, open to all types of British aircraft. Opinions may differ on the point, but there is a strong feeling that the Aerial Derby should never have been dropped and that it is high time that it should be reorganised and run again. Apart from the King's Cup, we now have no big all-British race, and it seems merely farcical when freight-carriers and 10-seater cabin machines compete in this event.

To be sure, in the first few years in which the King's Cup was run there were a few machines which could be fairly placed in the racing category, but with the advance in standardised production of the light 'plane, the entry lists have become more and more swollen with this type, and it is developing into a sort of garden party affair.

LET US HAVE A REAL AIR RACE—continued.

The situation has now been further aggravated by new regulations for this year's event which bar the professional pilot, and confine the contest to amateurs. A "professional" is defined by the Royal Aero Club, the organisers, as "proprietor, partner, director, official, or employee of any firm of manufacturers, dealers or operators in aircraft or aircraft engines, or one employed as a professional pilot." It may well be asked why this rule should have been introduced. Just imagine a similar stipulation enforced in any of the big races in the motoring world—the Ulster T.T., for instance!

Again, the handicapping arrangements are open to criticism, since the minimum speed at which airacraft will be handicapped is 80 m.p.h. It seems likely, therefore, that the combined effect of these two rules will be to bar special, high-speed machines which would have been entered by the "trade" and flown by their own p'lots, and make it an event for club members with "A" licences and a handful of private owners in perfectly ordinary and relat'vely slow machines. What a very exciting prospect!

Another snag which faces the would-be competitor is to be found in the fact that the aircraft entered "shall have been registered in the name of the entrant and the C. of A issued not later than 31st May, 1931." This will mean that between the issue of the latter and the day of the race the machine ought not to be flown in case some damage might occur to it and so wipe out the Certificate. So much for the King's Cup Air Race, 1931.

And what else does the calendar hold? The Schneider Trophy, being in a class entirely to itself, may be ignored, and save for sundry club meetings there is nothing at all.

Here is an extraordinary and ludicrous state of affairs. We are supposed to be an air-minded country; we are the originators of the popular flying club movement; we hold the World's Air Speed Record, and our machines have a reputation second to none. Yet we have no air race worthy of the name.

Surely it is not too much to ask of the Royal Aero Club, and of the aircraft industry as a whole that they should introduce and support at least one flying race during the year which would be comparable with our earlier efforts—particularly the Aerial Derby—or some of those events, which are so well-run and so successfully arranged abroad.

Let us have a *real* race, a Grand Prix of the Air.

Schneider Trophy News.

INTRIGUING though unconfirmed reports have been circulating during the past few weeks in connection with both the French and Italian entries for the forthcoming Schneider Trophy Contest.

General Balbo is reported to have said that Italy will send four machines to England for the race, though what type they will be was not revealed. It is also rumoured that instead of choosing new pilots, the Italians will rely on Major de Bernardi (the 1926 winner) as commander, with Lieutenant Guazzetti, Ferrarin, and Donati forming the rest of the team. All of these are old and highly-experienced pilots, of course.

Major de Bernardi has recently been flying a tandem-engined Savoia-Marchetti monoplane, of a type resembling that which was at Calshot (but not used) in 1929, and it is rumoured that his test flights, contrary to certain opinions, showed this 2,000 h.p. "mystery 'plane" to be quite controllable on turns, while its speed was over 400 m.p.h. Signor Donati, who is chief test pilot of the Fiat concern, will fly, so it is said, a modified Fiat C.29, which was also brought to this country for the last contest, but not used.

From various sources it is gleaned that several entirely new types are being carefully considered, and it is evident that Italy means to make a very determined effort next September.

In regard to the French entry it is interesting to find the name of that veteran high-speed pilot, Sadi Lecointe mentioned. It is said that a machine with two engines arranged in tandem (as in the Savoia-Marchetti) is now being built for him by the Nieuport Co. While there is some doubt about this statement, it seems certain that M. Paillard will definitely be in the French team, particularly as he has been doing a number of test flights with a very special Hispano-engined Bernard monoplane. Further news is that a dozen picked pilots of the French naval air service are now undergoing training, preparatory to a final selection.

The Life-saving 'Chute.

IN some statistics recently published regarding R.A.F. crashes during 1930, it is revealed that 24 lives were saved by the use of parachutes.

The accidents concerned with these escapes were of different nature, being:—Engine failures, 3; collisions, 5; Airframe failures, 7; errors of judgment, 3; and other causes 1.

As examples of the efficiency of the modern parachute it is interesting to note that several of the pilots involved in these crashes and who made good their escape, had never made any practice "jumps" previously, while the 'chutes were often not opened till within 300 feet from the ground. Yet they landed without serious injury.

Private Owners Increasing.

THE Automobile Association anticipates that touring by air in private aircraft will, during the coming season, show a marked increase over the records for 1930.

Over a million miles were flown by A.A. members last year, and A.A. flying maps were issued covering a distance of over 400,000 miles.

Requests now being received for air routes indicate that longer distances will be covered, and that the seasonal nature of private flying is diminishing for the reason that pilots make for countries where good weather conditions prevail. During the Winter, Nice has been a popular destination, while several members flew to Egypt, Northern Africa and Palestine.

In preparation for greater demands by flying members the Library of A.A. air route maps for hire has been extended to cover over 7,500 miles of routes in Europe.



SLIPSTREAMS

The Autogiro.

IN almost any sphere, anything which breaks away from common or garden practice is inevitably faced with an uphill fight against a powerful feeling of conservatism. This fear of the unorthodox is particularly noticeable in aviation, and it is not surprising, therefore, that Don Cierva, when he first introduced his Autogiro, found the world sceptical, cautious and critical of his amazing craft and the claims he made for it.

Nevertheless, as time went on and the practicability of his machine became no longer a matter of doubt, the aircraft industry was bound to sit up and take notice, and it is to our credit that we in this country were the first to recognise its possibilities. In 1926 I discussed the Autogiro with Frank Courtney, who at that time was carrying out tests and demonstration flights with the earlier type. This machine, it may be remembered, was built up mainly of a standard Avro 504 fuselage with a 130 h.p. Clerget engine. Courtney (who is now a naturalised American) is the most critical of all pilots, and I was therefore greatly impressed at his enthusiasm for the " windmill " 'plane and the prophesy he made about its future. Much that he said has come to pass, and now both in Europe and America the Autogiro is looked upon no longer as a freak, but a 'plane which in many ways is ideally suited for private flying. The Cierva Autogiro Co., have certainly left no stone unturned in " showing the flag," and in addition to making a 3,000 miles demonstration tour of England and the Continent some years ago, the Autogiro has been giving daily demonstrations for many months at over fifty air ports in the U.S.A.

Brie, who has been doing a lot of flying with it in France tells me that it is gaining a lot of adherents over there. He himself, says that it is the most pleasant and restful machine he has ever flown ; curiously enough, the revolving rotors far from worrying or fidgetting the pilot and passenger, as some people imagine, perform their function without being noticeable in the least. And on flights over difficult country, the knowledge that engine failure will not entail one's entry into a field (ploughed or otherwise) at 55, 45 or even 30 m.p.h. relieves the pilot of a great deal of conscious or sub-conscious mental strain.

I hear now that one of the latest developments in connection with the Autogiro is that the de Havilland Aircraft Co. are to collaborate with the Cierva Co., in the design of a new model. The experience gained by " D.H.'s " in the design and operation of the Puss-Moth is, I understand, to be turned to good account in the new project, while an inverted Gipsy engine will also be used.

War Kites in South " Ken."

Some people have the idea that museums are places to which one goes only when it is raining and when all popular places of amusement are closed. One brief visit to the Science Museum at South Kensington—and in particular, the aeronautical section—will definitely dispel that fallacy. Goodness knows how many times I have been there, or how many times I shall go again, for it is a place which possesses an almost irresistible attraction for me. Where else can aviation history be seen in so complete a material form under one roof ? There one can find the early Wright, complete in every detail, rubbing wing-tips with Alcock's " Vimy " ; W. O. Manning's masterpiece, the little " Wren " ; engines galore, and models of more historic craft than I can remember.

Below in the basement, if one makes the necessary request, it is possible to see the last of several War machines ; these include a fully-rigged R.E.8, a Sopwith triplane, a deck-flying Camel, and a B.E.2.C. There these warriors stand, with their engines stilled for ever, and alongside them one will also find a Roland two-seater, and the remnants of a Fokker D.VII, splintered and torn, grim reminders of thirteen years ago.

Moth to the Rescue.

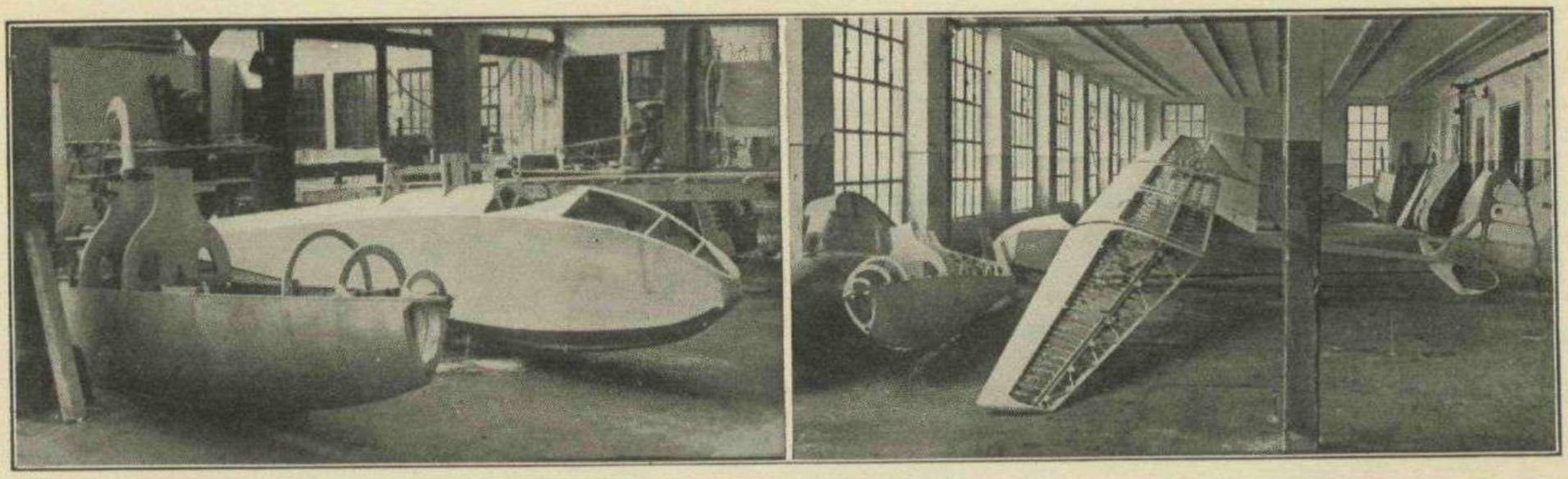
A good story, with a distinctly American appeal, comes from the West Indies. Friday was a gala day in Kingston, Jamaica, with the consequence that the firm of H. M. Kalphat, agents for " Grouse " whisky, found themselves cleared out of stock at night. And Saturday is Saturday everywhere. Kalphat had supplies at Black River, a seaport town a hundred miles west along the coast. There is no railway on this route and cars would take at least five hours each way. Kalphat had the enterprise to get into touch with Caribbean Airways Limited, who hold a Government contract to operate the first and only air mail service in the West Indies. To a frantic enquiry for rates for *guaranteed* delivery of five cases by 8.30 a.m. in the morning, the laconic reply was : " Ordinary rates—so much a mile."

Early in the morning, Captain Holland, Caribbean Airways' chief pilot, left Kingston in a Moth seaplane, breakfasted at Black River, and at 8.15 a.m. was back at Kingston delivering the whisky to Messrs. Kalphat's van. So the town was saved.

Caribbean Airways report that this Moth is flying daily, carrying mails and passengers, giving piloting instruction, doing advertising flights for various films, and never gives a moment's trouble. As an indication of the faith placed in this Moth, the Chairman of the Company recently flew it over the mountains right across the island from south to north, attended to business fifty miles away, and was back in Kingston in time for 1 o'clock lunch—and the machine was fitted with floats !

RUDDERBAR.

Gliding Gossip and News



Sailplanes in the making. Two views inside the well-known Kegel Works at Kassel, Germany. On the left can be seen the fuselage erection shop, and on the right, the general assembly shop.

LAST month some reference was made to an interesting all-British intermediate glider, known as the "Scud." This machine represents a clear breakaway from orthodox practice in that instead of having a big wing-spread it has a span of only 25 feet. Its wing area is only 85 feet, its overall length 13 feet 4 ins., and it weighs but 103 lbs. So it will be realised that in every way it is a miniature amongst all other types.

The idea behind the general design was to produce a machine of the intermediate type possessing a much higher efficiency than its contemporaries, while having a better degree of control and the additional advantage of ease in man-handling, due to its low weight.

Preliminary tests showed the "Scud" to be a machine of exceptional promise, and while its first flights were necessarily of short duration, its qualities as a soarer have just recently been proved. On the 15th of last month Mr. I. Mole took her off from the London Club's site at Tottenhoe, and although the wind was only of about 14 m.p.h. he at once proceeded to gain height, and finally reached a ceiling of some 500 feet. Mr. Mole then continued to soar for exactly 1 hour 2 minutes; throughout his flight the machine appeared to behave extremely well, and retained its height without any apparent jockeying on the part of the pilot. Big things are, therefore, expected of this little machine.

FULL advantage has been taken of the milder weather, which has been experienced during the past few week-ends, by the London Gliding Club, and members have turned up at Tottenhoe in large numbers. Besides the "Scud's" excellent show, the club can also boast of further achievements.

On Saturday, 21st February, two more members qualified for their "C" certificates. The pilots in question were Messrs. Graham Humby and A. Smith, and their flights on the "Prufling" lasted twelve and eight minutes respectively. Neither of these men has ever flown powered aircraft, and their sole aviation experience has been gained on the L.G.C.'s machines. They are, therefore, the first sailplane pilots to qualify in this country as a direct result of glider training. Another member who has been doing well is Mr. Williams, who recently kept the "Prufling" flying for 11 minutes. A few weeks ago the "Prufling" was fitted with a special low-reading air-speed indicator, and pilots are finding this instrument extremely useful in making sustained flights. The best speed of this machine for soaring appears to be about 30 m.p.h., and for landing, about 18 to 20 m.p.h. Work is now in hand for the erection of a hanger for housing the whole Club's fleet—another step in the right direction, which will make the L.G.C. one of the most progressive and up-to-date clubs in the country.

A LECTURE was given before the Westland Aircraft Society recently at Yeovil on the "Design, Development and Construction of Sailplanes and Gliders." The lecturer was the well-known aircraft designer, Herr Lippisch, who is responsible for Kronfeld's famous soarer the "Wien," and several other successful machines which have appeared in Germany.

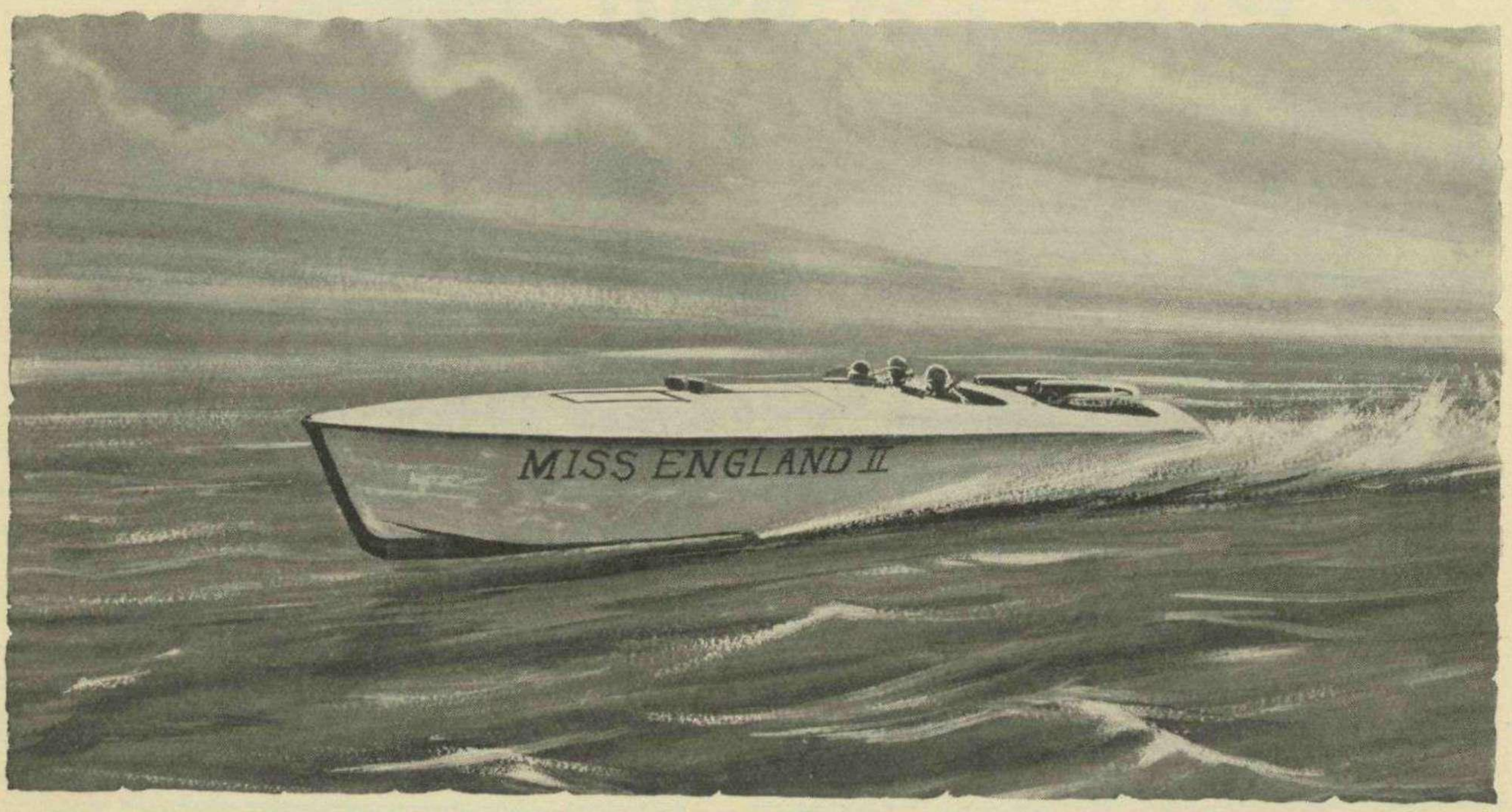
The lecture, which was exceedingly interesting, was illustrated by lantern slides. A large number of members of the Dorset Gliding Club were present, while members of the Bristol and Gloucester branches of the Royal Aeronautical Society also attended.

THE Surrey Gliding Club have now changed their location. Their new site is at Stocks Farm, Meonstoke, which is on the southern slope of Old Winchester Hill.

FOUR machines were in use at Weeton on the occasion of the inter-club meeting held there by the Leeds Gliding Club last month. These were the Bradford Club's Dickson, the Harrogate Dickson, the Leeds Club's "Reynard," and Mr. Sutton's "Airedale."

It is reported that several members of the club are now occupied in constructing machines of their own, so that it is likely that the Weeton site will have a busy aspect before very long.

THE SPORT AFLOAT



The Fastest Boat In The World. [*Drawn by R. A. Nockolds.*]

BEFORE long Mr. Kaye Don will be taking out "Miss England II" for his attempt to raise the late Sir Henry Segrave's record, which stands at 98.7 m.p.h. While he is preparing for this attempt at Buenos Aires, Mr. Gar Wood, who has for so many years been the leading exponent of speed on the water, is making preparations at Miami to wrest the record from Britain. His boat, "Miss America IX" remains unchanged except that the two Packard engines have been supercharged. They previously developed 1,000 h.p. apiece, and it is understood that this has now been increased to 1,300 h.p.

In view of the great effect on export trade of these records, the competition is keener than ever before, but although Gar Wood has a wonderful experience of racing craft, there is no foreign engine which can touch the Rolls engines of "Miss England."

"Miss America's" previous speed was 94 m.p.h. and in view of the comparative horse powers of the two crafts it seems unlikely that it will be able to approach "Miss England," as it is probable that she will exceed 108 m.p.h. However, it does not do to count one's chickens, and we can only hope that all will be well, and wish Kaye Don and his helpers the best of luck in their attempt.

High Revs. and Reliability.

Previous to the last two or three years there was current a fear of designing anything in the marine line to rev. at more than 1,500 or so, due of course to the fact that the engine of any boat spends most of its life at practically full throttle. Nowadays there are few automobile engines manufactured that you can burst by prolonged high speed, and naturally marine designers have been quick to make a more efficient type of engine now that no sacrifices need be made in reliability. The modern unit for inboard semi-displacement craft now has a maximum of about 4,000 revs. Yet a Du Wite runabout, piloted by two girls, successfully completed a no-trouble cruise from the St. Lawrence to New Orleans, and some very dirty weather was experienced down the Atlantic sea-board.

But while the designers of inboard engines have kept up-to-date with automobile practice, those responsible for the new outboard motors have had to break new ground on their own, owing to the importance of the power weight ratio.

Thus the main development has been in the two-stroke type of unit, in which all the reciprocating valve gear of the four-stroke is eliminated. The majority of outboard engines are multi-cylindered and rev. at something between 4,500 and the 5,000 mark, yet even such high efficiency motors as the 1000 c.c. job produced by the Outboard Motors Corporation and which develops about 55 b.h.p., never appears to tire on full throttle. From extensive experience with this type of unit on a speed dinghy it would appear that the only trouble which might occur would be due to the lubricant "cracking" when the engine reaches its maximum temperature, for two-strokes are exceedingly critical on lubri-

THE SPORT AFLOAT—continued.

cation, because any excess of oil in the crankcase will contaminate the fresh incoming charge, with consequent over-heating due to this new charge burning and not properly exploding, while on the other hand the results of under lubrication are painfully obvious and incidentally expensive.

But now, as it were, we come to the moral of the story. For while both inboard and outboard designers have successfully managed to combine reliability with an engine which produces an extraordinarily good b.h.p. for its size, the latter with but few exceptions, have had no regard for fuel consumption figures, and now we have a state of affairs in which a 150 b.h.p. inboard has the same petrol consumption as a 45 b.h.p. outboard, while the oil consumption of the latter is about twenty times that of the inboard. This state of affairs only refers to the high revving, high efficiency class of outboard motor, the purely utility job being ignored for the moment, and here in all fairness I think I should mention two outstanding examples from the general rule,—namely the Sharland and the Watermota. The Sharland is, of course, a horizontally opposed O.H.V. four-stroke, with dry sump lubrication, and thus conforming more closely to the ideas of car, or rather motor-cycle design, has compatible fuel consumption figures. On the other hand the Watermota is of the two-stroke class, but is a single cylinder, and chiefly owing to the skilful design of the ports, piston crown, and cylinder head (which factors prevent much of the fresh incoming charge escaping through the exhaust ports), and to the fact that the petroil system is not relied upon solely as a means of lubrication, there being three pressure feeds to the various bearings, the consumption of petrol and oil is kept within reasonable limits. These two engines are both within the B or 350 c.c. class, and so if one wants to indulge in the delights of going as fast as possible, one must pay to the tune of 2½ miles to a gallon of racing spirit and 10 miles to a gallon of oil. Admittedly, the majority of these engines were designed in America where the fuel prices are much lower than in this country, but people do not want to spend money needlessly be it ever so little, and to my mind if there is a market for the big outboard as it stands to-day, there is undoubtedly room for a high efficiency motor with good consumption figures. Might we not glean a few ideas from the aero engine designer's note-book? for the Rolls-Royce R type racing engine used in the successful Supermarine S6 seaplane had a power-weight ratio of 1½ lbs. per h.p. and there are only one or two outboards that approach this figure.—M.

PREPARING YOUR OUTBOARD.

SOME NOTES ON HULL TREATMENT.

With an outboard motorboat outfit, "tuning" the hull is every bit as important as tuning the motor, because the skin friction of the boat is the biggest absorption of power. The problem which presents itself is to obtain on the bottom of the boat the smoothest surface possible—but this is only half the story, for this surface, when obtained, must be durable against the constant washing away properties of the water, and again must be proof against the action of brine, for the boat may have to be used quite often in the sea, owing to this country's lack of suitable inland waterways.

All boats, unless otherwise specified, when received from the builders have a varnish finish, but nowadays this finish is recognised as inadequate unless it has been to a coach-builders and a real pukka coach finish put on. Those who remember Chas. Livesay's "Bucko" will have knowledge of a perfect example of a coach finish, as applied to hulls, but for the majority of outboardists the fact that as good a surface can be obtained much cheaper is of paramount importance, and further, the job can be accomplished by the owner himself with little expense of time or energy. The scheme is to apply one coat of varnish, allow it to reach the tacky stage, and to dust flaked graphite over the surface. The graphite should be applied generously and the surplus rubbed off when dry. Here you have a smooth, durable surface immediately, but it is worth while to give another coat of varnish and then some more graphite. The only point to watch is to make sure that a suitable varnish is used, such as Rylards, for many of the cheaper brands turn white and become rough under the influence of salt water.

The only disadvantage to this surface preparation is that it renders the handling of the hull a rather messy proceeding, and to avoid this many prefer to adopt one of the other methods. Perhaps the most durable is a surface prepared by rubbing down with pumice the bottom which has been painted with one of the well-known brands of grey filling paint. It will be found that cellulose gives a very useful surface while any ordinary paint or varnish surface can be vastly improved by the addition of a little beeswax.

F.M.

Canal Racing for Motor Boats?

At the end of last season we were at Rickmansworth for the purposes of testing an F class engine on a proposed record breaking hull. Having completed the test on the lake, someone noticed the Grand Junction Canal which flows alongside, and a run was suggested down the canal. Talking it over with the pilot he told us that doing between 45 and 50 m.p.h. down a straight half mile of the canal constituted his most thrilling trip in any motor-boat, and only the objections of a lock keeper prevented us from continuing until nightfall. From a spectator's point of view the sight was magnificent, and the possibilities of narrow waterway races being successful seems unquestionable.

HERE and THERE

By "Camshaft"

Triplex History.

HIDDEN away amongst the multitude of wordy clauses in the much-discussed Regulations concerning the Construction and Use of Motor Vehicles, issued in January, is one which makes safety-glass compulsory.

Motorists may be forgiven if they have not noticed the clause, because for several years now Triplex has been a commonplace on private cars and to-day the phrase "Triplex all round" is a *sine qua non* of even the cheapest motorcar specification.

The story behind this state of affairs is an exceptionally interesting one. It was in 1912 that Mr. Reginald Delpech introduced safety-glass to this country and founded the Triplex Safety Glass Company.

Then came the War, and the demand for Triplex for the Navy, Army, Air Force and even ammunition factories, was enormous. By 1918 the output had risen to an annual rate of approximately 120,000 square feet, but after the Armistice it naturally declined. The growth of the closed type of car augured well for the future, but recovery was confessedly slow. Then, on March 31st, 1927, Mr. Henry Ford had a motor accident. Mr. Delpech cabled him in hospital, as follows: "Regret to hear of your accident. Trust you have not been cut by broken glass. Fit Triplex and be safe."

Now, Mr. Henry Ford has never been slow to appreciate the possibilities of a new proposition. Seven months later he signed a contract for the standardisation of Triplex on all Ford cars in America. Within a few months it was obtainable as a standard extra on many of the more important British makes. The tide had turned.

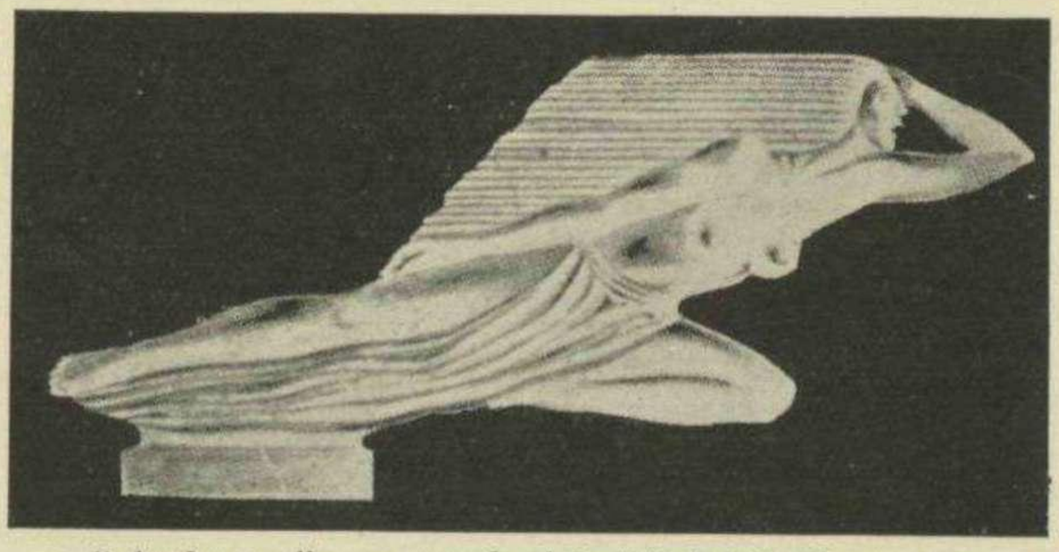
Other manufacturers followed suit, and the result was soon such a demand for Triplex that the old works at Willesden were unable to cope with it and great new works at King's Norton were purchased and equipped. To-day there is hardly a make of car on the market that has not "Triplex all round" in the standard specification. In 1930 the output was approximately 2,000,000 square feet.

Decorative Mascots.

The purpose of the mascot has changed since the days of the Pagan, when its sole value was to be found in its protective qualities against impending misfortune. Now, while some of us still fill our waistcoat pockets with beans, brass buttons and bones, the adornments which grace our radiator caps are there, not as a result of superstition, but to finish off the car's appearance.

This mascot business is on the increase, and it is the exception rather than the rule to find a car without some sort of decorative figure on the "rad."

Amongst those which seem to be extremely popular are the "Red-Ashay" mascots, which are moulded in specially hardened glass. I recently inspected a number of these, and I must say that here the art of the designer and the skill of the experienced glass worker have combined to produce an accessory of real attraction and distinction. This is added to by a system of internal illumination; and an elaboration of the idea has just



"Acceleration"—an example of the "Red-Ashay" mascots.

been introduced by the makers (Messrs. H. G. Ascher, Ltd., of 40-44, Holborn Viaduct, London, E.C.1.) in which the different coloured lights are changed constantly by the use of an airscrew which, when turning through the motion of the car, rotates a distributor. The effect at night is, of course, most striking.

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12-40 h.p. Voisin 1926 2-door Weymann Saloon, leather upholstery, Triplex glass, Dewandre brakes, numerous extra fittings, in exceptional condition throughout; £125 cash.—Lewisham Garage, West Bromwich.

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