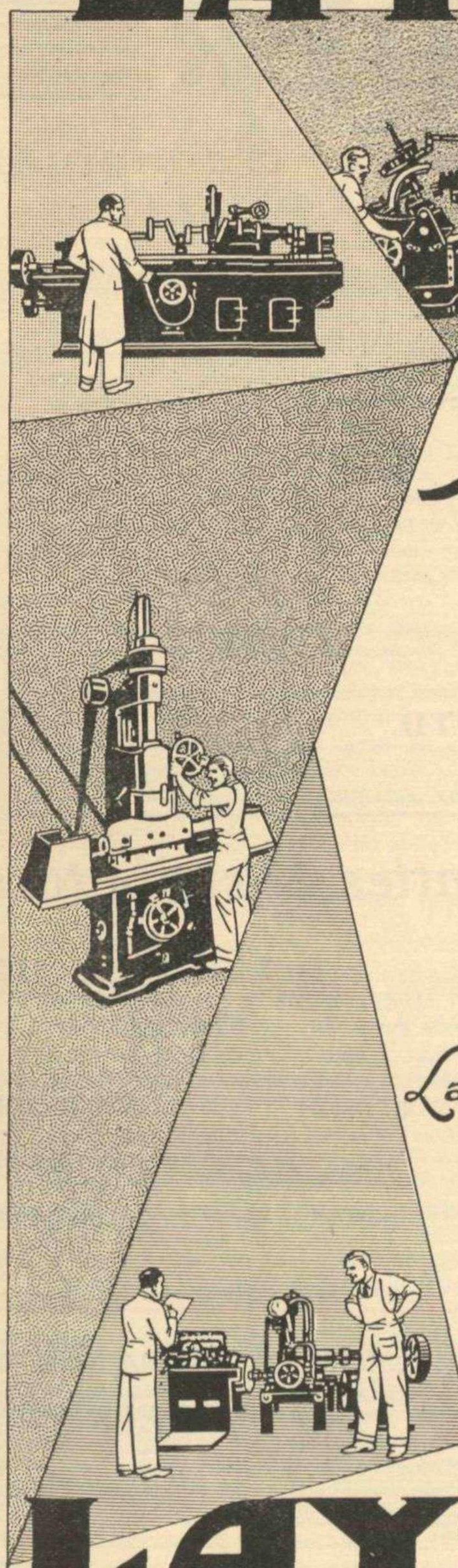
LAYSTALL



Men and Machines!

Every job entrusted to Laystall is carried out by highly skilled specialists using the most modern and diversified machinery. It is acknowlegded to be the best equipped Plant of its kind in Europe and its personnel are recognised as being the finest body of skilled men ever gathered together in one organisation.

These men and machines mean unfailing

QUALITY & ACCURACY in SPECIAL MOTOR REPAIRS

and have made the name Laystall famous for such in the Motoring World.

Laystall Departments ~

CYLINDER GRINDING AND DE LUXE LIGHTWEIGHT PISTONS.
CRANKSHAFT GRINDING.
NEW CRANKSHAFTS.
SCORED CYLINDER REPAIRS.
HELICAL BEVELS & GEARS.
CAMSHAFT GRINDING & NEW CAMSHAFTS.
COMPLETE ENGINE OVERHAULS.
WELDING.

Laystall Illustrated Booklet sent on request.

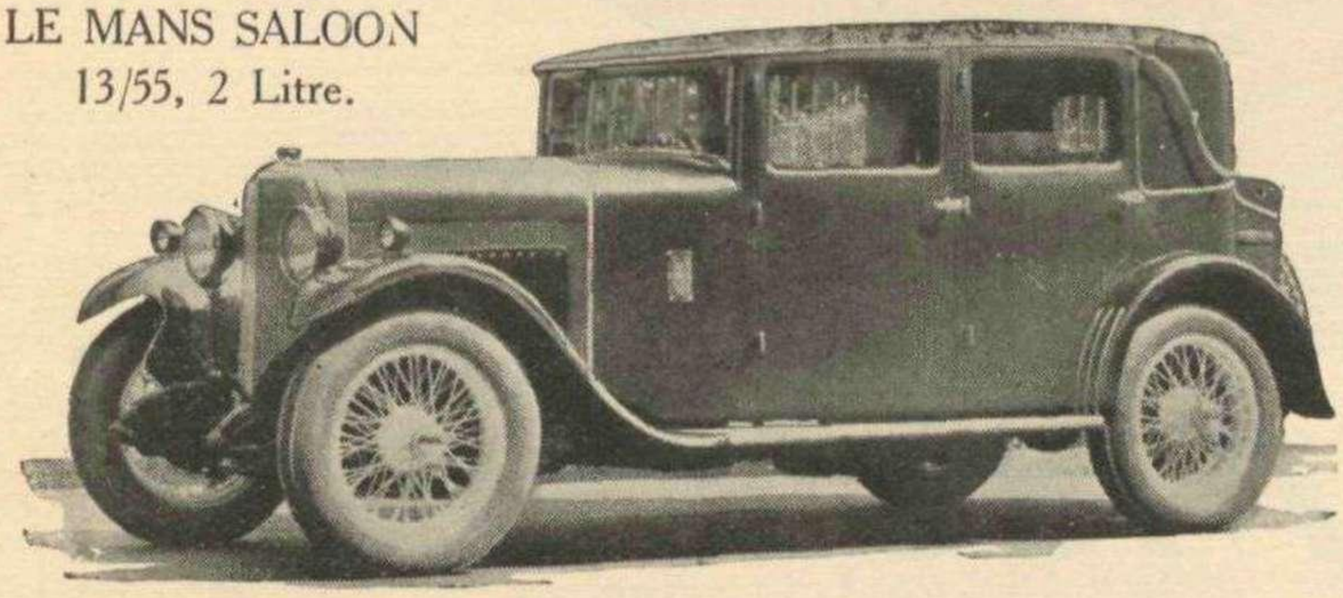
LAYSTALL

EWER STREET, LONDON, S.E.1. *Telephone:* HOP 6140 *(9 lines)*

and at 55, FONTENOY STREET, LIVERPOOL.

The SCHNEIDER

LE MANS SALOON
13/55, 2 Litre.



4-Seater **£535**
Saloon **£595**

Tax £13. Speed 75 to 80 m.p.h.

DEFERRED TERMS AND EXCHANGES

30 Cars

IN STOCK FOR IMMEDIATE DELIVERY

Be a Schneider Pilot!

An Owner-Driver writes:

"It may interest you to know that I made a run in my Schneider Saloon from Ardlui, Loch Lomond, to Bournemouth, and back to London, a distance of practically 700 miles, with no stops other than for meals and fuel.

"The car performed excellently, giving no trouble at all. This performance has held good for the last 8,000 miles and although I am rather hard on a car in that I use it for long trips with little or no attention, I consider this an excellent performance."

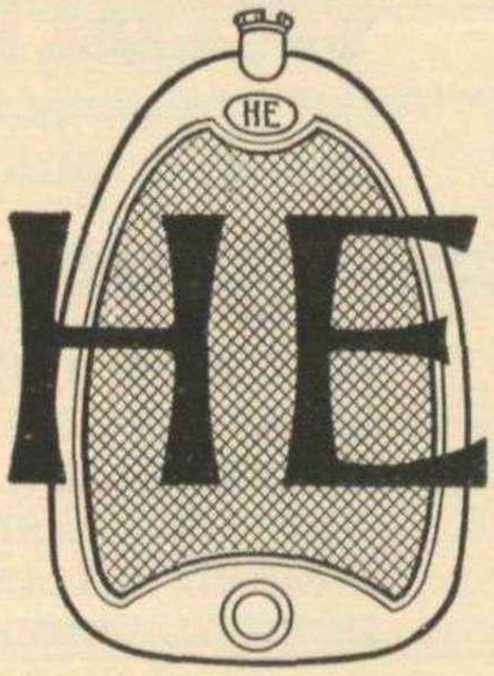
SCHNEIDER AUTOMOBILES (ENG.) LTD.
138, LONG ACRE, LONDON, W.C.2.

'Phone: TEMPLE BAR 3322.

H.E. *London & Home Counties Distributors*

SUPER SIX
16/60 Model
4 to 80 m.p.h.

Sports 4-Seater - - **£545**
Sports Saloon (Genuine Weymann) **£825**
Sports Coupe - - **£825**



11·7 SUPER SIX
Model

4 Seater - - **£435**
Saloon (Genuine Weymann) - **£475**
Sports Coupe - - **£475**

PART EXCHANGES and DEFERRED TERMS

5 years Guarantee.

TRIAL RUNS INVITED

COMPLETE RANGE of ALL MODELS IN STOCK

WELBECK AGENCY —— 138, Long Acre

'Phone: TEMPLE BAR 3322. 'Grams: "AUTOSCHNID, RAND."

Please mention MOTOR SPORT when corresponding with advertisers.

VOL. VI. No. 2. DECEMBER 1ST, 1929. PRICE ONE SHILLING
SUBSCRIPTION RATE
14/- PER ANN. POST PAID
Published 1st Month

MOTOR SPORT

INCORPORATING THE BROOKLANDS GAZETTE
EDITOR: W. S. BRAIDWOOD, B.A. (Mech. Sc.) Cantab.
Editorial, Publishing & Advertising Offices
34 DUKE STREET, ST. JAMES'S, S.W.1
Telephone: { REGENT 1937. / GERRARD 3436. *Cables:* AGREYNOL, LONDON. *Telegrams:* AGREYNOL, PICCY, LONDON.

The Way of Things

Thank You !

JUDGING by the large number of letters we have received from all parts of the world, the revival of MOTOR SPORT in its new form has been a very popular event. The number printed and circulated of our November issue was three times as great as ever before, but in spite of this we have heard of cases where readers had difficulty in obtaining their copies and we have had to print a greater number for this month. We hope the fare provided will come up to the required standard of interest and we invite criticism and suggestions on any point which may occur to you.

The Show.

The motorcycle has been, and in our opinion always will be, essentially a sporting vehicle. Motorcycle racing and competitions provide sport second to none to those who go in for them seriously ; and to those who crave more variety and new fields for exploration, they provide a stepping stone to the car or light plane. A very large proportion of the greatest names in motor racing to-day, started their career and learnt the tricks of the trade on two wheels, and it is safe to say that in many cases, had it not been for the motorcycle which first showed them the infinite scope of mechanical sport, many of those names would not now be known to us.

For those who regard motorcycling sport as the greatest of all sports, and they are legion, there is now a finer choice of machines for the purpose than there has ever been in the past. It is now possible for the private owner to purchase a machine which has, built into every component, the valuable experience gained by competing in the great races and reliability trials, and at a price lower than ever before. We therefore tender our heartiest congratulations to the motor cycling industry on its position of being the one industry in which Great Britain has established beyond question of doubt her superiority over every other nation, and trust that through the sporting side of the movement, it may maintain its place against anything that our foreign rivals can produce.

The R.A.C.T.T.

There has been a great deal of talk lately about the most suitable venue for this event in the future, and many courses have been suggested. It seems only natural that in these discussions the claims of the Isle of Man have been so strong as to warrant earnest consideration, and we are surprised that having once considered this as a suitable place there should be any doubt as to the course. The issue appears to be confused by the supposed necessity for keeping the lap extremely short, for the benefit of the spectators and for greater ease of handicapping.

Handicapping if necessary should be on a time basis and as for the spectators, it is only natural that a large crowd will collect to watch such an interesting event, but we venture to suggest that this is incidental. The event is a race first and a spectacle second, and as soon as we lose sight of this fact so soon will motor racing degenerate to the level of the gladiatorial combats of the Romans, and its greatest value, that of improving the breed, will be lost. A road race must reproduce road conditions, and there can be no course which does this better than that now used for the A.C.U. Tourist Trophy. It has been said that this would require widening in places to make it suitable, but as this has also been said of all the suggested courses in the island, it appears no disadvantage, and work on it is now being carried out. In the past, cars much larger and less controllable than those of the present did battle over it, through the blinding dust of the old narrow roads, and the spirit of the pioneers of motor-racing haunts every inch of the wonderful mountain course.

However we live in a practical world where sentiment is not taken as a valid argument, and in this case there is no need that it should be. The fact remains that this thirty-eight mile lap on the island in the Irish Sea, with its wonderful surface, its suitability for high speeds, its infinite variety of twists and turns, its gruelling climbs and swooping descents, is still the finest road circuit in the world.

CAPT. CAMPBELL on— The Future of the Speedway



(Capt. Malcolm Campbell is the holder of the World's Car Speed Records for 5 miles and 5 kilometres.)

New Track Need.

SOME weeks ago, when a certain newspaper announced that I was interested in the projected plans for the world's super-speedway, which it is hoped to construct on the marshlands of the Wash, a friend said to me, " Why on earth bother about a new speed-way ? There won't be any need for them in a few years' time. We have learnt all we can about the motor car, and now we had better confine our future experiments to the air."

This is a totally wrong point of view. It is perfectly true that we have probably reached something very near the pinnacle of economic perfection in motor cars, but that is no reason why the speed-way of the future is going to be unnecessary.

New speedways are, in fact, most necessary to-day. Tracks such as Brooklands are out of date for some purposes and will be even more antiquated in a few years to come. It is impossible to do much more than 140 miles an hour on Brooklands and this speed is becoming tame to the blasé young men who want to think in terms of 200 m.p.h. upwards.

The natural speedways, such as Daytona, Verneuk Pan and Pendine Sands all suffer from peculiar and, in most cases, irremediable efficiencies. Vast stretches of sand, such as one gets at Daytona are of course the ideal surface for motor racing, but they are only ideal so long as the sand surface remains in perfect condition. How can you maintain that level of perfection when the tide flows over your track twice a day ? Moreover, Daytona is the sort of place which can only be used for a few days during the whole year. Wind and tide are again to blame for this.

I have waited for days at Daytona hoping for an opportunity to use the track. Then, when at last wind, tide and light were just right, there was only an hour or so left in which the attempt could be made. The greater part of this time was taken up by inspecting the surface, planting the flags and making sure that the track was free of spectators. The result was that I was left with only a few minutes in which to do my run. The run out was accomplished quite easily, but on the return trip I found that the tide had flowed more quickly than was anticipated. I finished in the sea. This might very easily have had the most serious consequences and wrecked my car altogether ; this happened on 19th February, 1928, when I set up the then world's record for a mile of 206.95 m.p.h.

Another drawback to both Daytona and Pendine is that neither of these tracks is long enough. Daytona is only about 10½ miles long in the straight and Pendine is only 6. These stretches were all very well for the type of attempt one was making some years ago, but they are useless for the attempts on the new speed records which will inevitably be made during the next few years. Someone is going to do 300 miles an hour before long. I hope I may be the man. In any case whoever does it, it is my opinion that these high speed attempts should be made on a desert stretch.

Verneuk Pan.

The case with regard to Verneuk Pan is different. Verneuk Pan is 30 miles long and 10 miles wide, with a rise of one inch only. An oval track with a lap of 60 to 70 miles could be laid out here and the turn would be imperceptible. But there are many obstacles. In the first place, the heat is so terrific that a mid-day temperaature of 100° Fahr. is the usual thing in the summer months. The unusual thing is a fall of rain. There had been no rain for five years before I arrived there.

Then again, the altitude is so great and the atmospheric

"THE FUTURE OF THE SPEEDWAY"—continued.

conditions so abnormal that a very considerable percentage of one's engine power is lost. There is no doubt about it that a speed obtained with, say, a 1,000 horse-power engine on the Pan would be increased if the same car were run on sand at sea level.

The surface, too, is by no means ideal. It is composed of hard, sun-baked mud, criss-crossed by innumerable cracks, many of them so wide as definitely to affect one's speed. This mud reposes on an elastic bed of eighteen inches of spongy, crumbling shale, which acts like a cushion. The surface is littered with thousands of small cobbly ironstones. I had to employ hundreds of "boys" to sweep these stones off my track. Many of them were rolled into the mud by the rollers. They remained there while I made my attempt but next day they had been forced out of their springy bed and were lying about on the surface as usual. These circumstances all combine to rule out the Pan from becoming one of the great permanent all-weather speedways of the world in the future: unless ample funds were forthcoming to prepare this track, when it should prove an excellent course, but then it would not be a permanent one.

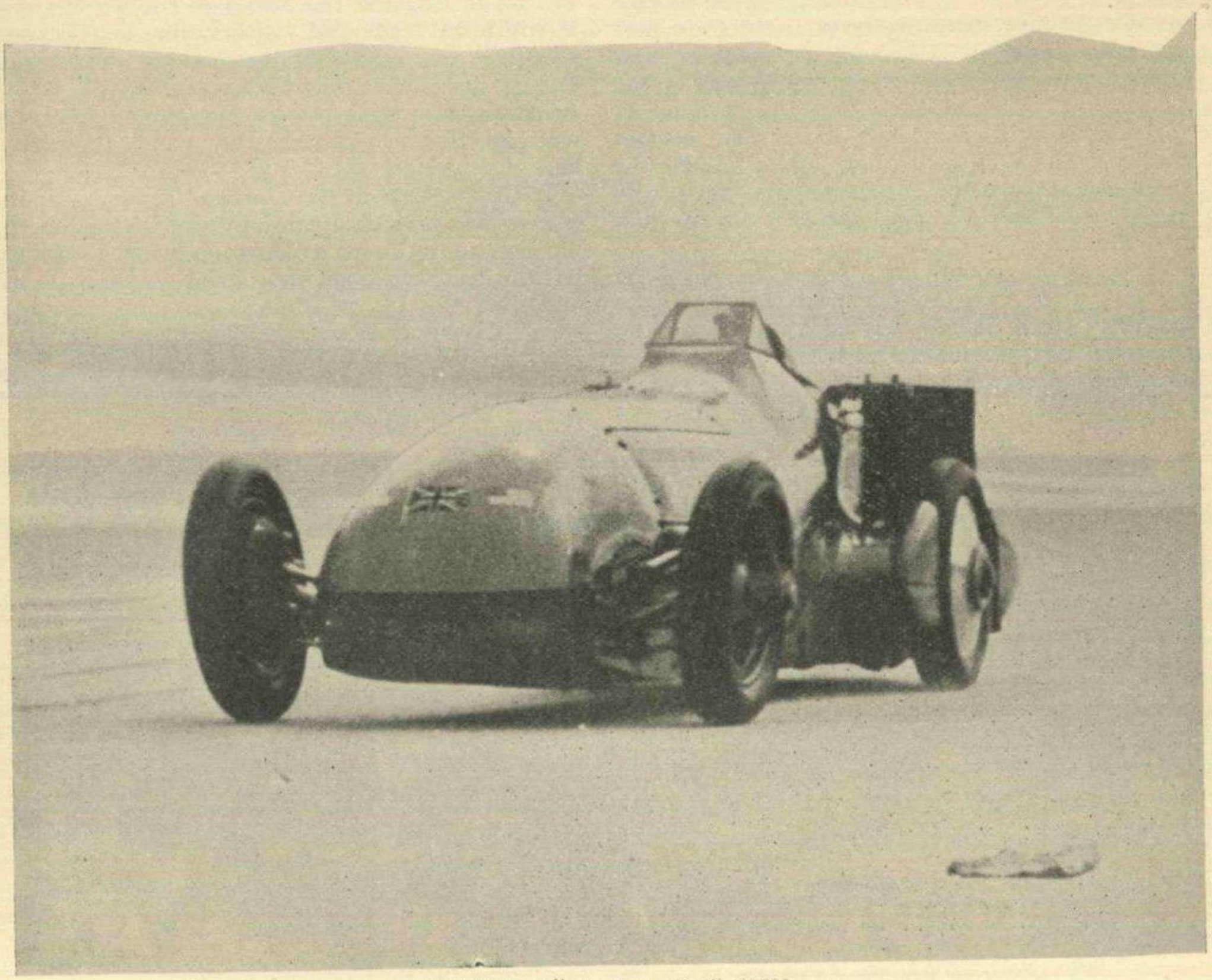
I would emphasise the phrase "permanent all-weather speedways" because those are the tracks which the motor industry and the public alike will demand in the future.

It is very possible, as I have said, that we have almost reached the pinnacle of economic perfection in the motor car to-day, but that only applies to the family car. A great deal of research has yet to be done and a great many improvements can yet be effected in commercial vehicles, sporting cars and engine design.

Speedways are necessary for the experiments which will lead to these improvements. Not only that but there is a growing public demand for speedways for the use of the private individual. The racing motorist is no longer their only customer.

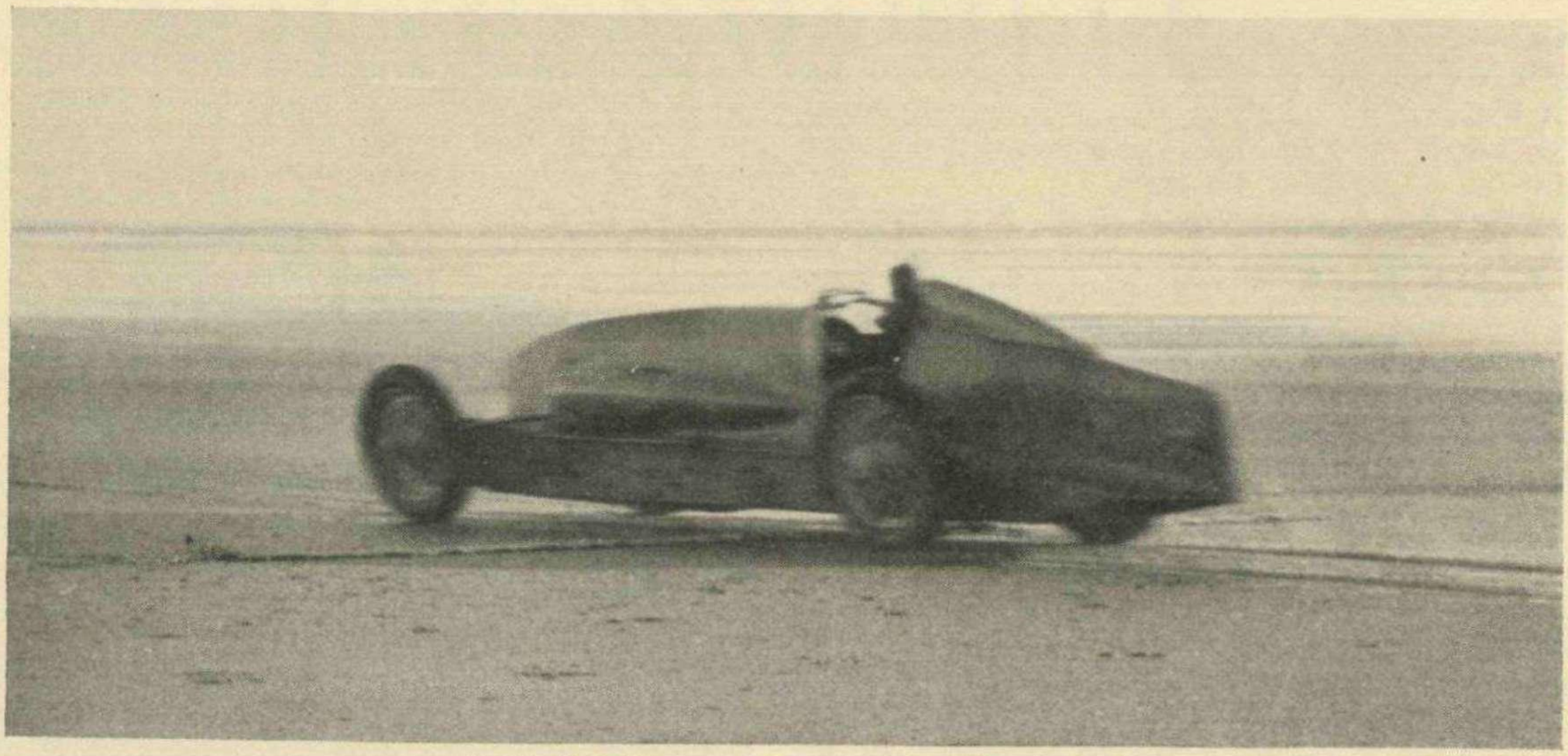
That is why I am inclined to think that the proposed new speedway on the Wash will fulfil the great and essential need.

The proposal briefly is, for the reclamation and embankment of a mile wide strip of saltings lying between Gibraltar Point, near Skegness and Clay Hole by the mouth of Boston Harbour. This area would provide a track 15 miles long in a straight line with a turn of a mile at either end. The area involved is the most easily reclamable land in Britain. It consists of hard, high dry saltings, so far above sea level that only the highest spring tides flow over it. There is no soft mud anywhere and the creeks and runnels which intercept it, can quite easily be filled in for the purposes of the track. There will, moreover, be little or no erosion by the sea, as the



"BLUEBIRD" IN ITS LATEST FORM.

"THE FUTURE OF THE SPEEDWAY"—continued.



CAPT. CAMPBELL ON THE SANDS AT PENDINE.

sea wall will still be protected by a fringe of saltings at considerable width. The ground to be embanked is practically dead level to an inch.

I do not propose to go into the finance of the scheme or its possible revenue, because those matters are best left to the promoters, but from a racing point of view I do say that a track of this description is one of the greatest needs of the present day. It will be permanent, usable for practically nine months of the year, central for Britain and the Continent alike, and available for any purpose from the testing of private cars over a mile to attempts on the world's speed record over any distance up to ten miles.

Private car-owners would, for a small fee, have the thrill of trying their cars on the finest surface in the world, and they could, if they wished, compete for the "Certificate of Merit" which the authorities of the track will grant. The race governing authority, let it be added, will be composed of representatives of all the principal motoring organizations and, in its way, will be as supreme in authority and prestige as the Jockey Club.

This track, if properly constructed and properly run, will make England the Mecca of the world's motorists. It will bring trade and visitors alike to this country, it will give our manufacturers unique opportunities for testing and improving their cars, it will provide the British public with a new playground, and finally it will give British motorists that which they have never had—the perfect speedway.

If I may seem to have penned a panegyric in praise of this new project, I can only say that as one who has finished up in the sea at Daytona, when I least expected it, who has seen good sportsmen go through the fence and over the top at Brooklands, and who has spent weary days and nights, searching the world from Denmark to the Sahara for the perfect track, it may be allowed, perhaps, that I speak without prejudice and with some experience.

CONTENTS OF THIS ISSUE.

	PAGE
The Way of Things	3
LAND—	
The Future of the Speedway, by CAPT. MALCOLM CAMPBELL	4
The 4½ Invicta on Test	7
The Supercharged Triumph Seven	9
Behind the Scenes	13
That Extra Ten Miles, by F. T. BERSEY, M.I.A.E. ...	17
1929 in Retrospect, by E. K. H. KARSLAKE	21
Club News	25
500 Miles Race Results	29
Letters from Readers	37
"Oh! For a Beaker Full of the Warm South," by Mrs. VICTOR BRUCE ...	38
Motoring in Colombia	40
The 172 c.c. Francis-Barnett	42
The Supercharged B.M.W....	44
AIR—	
Winter Week-Ends in the Air, by F. H. SEARL	30
Light Plane Power Plants	32
Slipstreams, by "Rudder-Bar"	34
Gliders and Sail-Planes	35
WATER—	
A Water Brooklands	48
Speed Boat Design, by R. R. POOLE	49



Sporting Cars on the Road

THE 4½ LITRE INVICTA.

BY THE EDITOR.

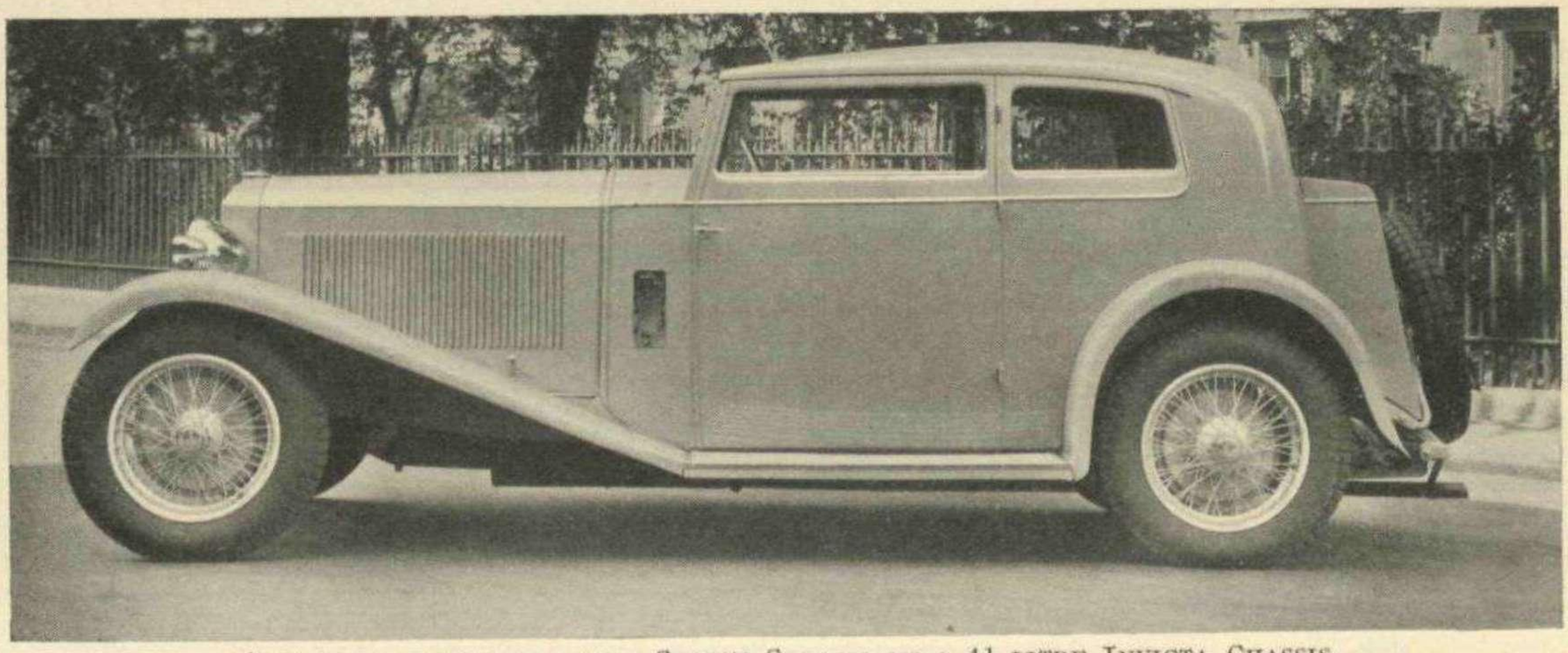
THERE is always a special interest in a run on a car which has some particular performance to its credit, and we were therefore very glad to have the opportunity of trying out the actual car on which Miss Violet Cordery recently completed 30,000 miles in less than the same number of minutes, thereby gaining the coveted Dewar Trophy.

The only points in which this car differed from standard was in the fact that the top gear ratio was 3.6 to 1 instead of 3.9 as in the open 4-seater Invicta, and that it had slightly larger wheels.

One of the great points that the makers claim for this car is its ability to go everywhere in top gear in a perfectly smooth manner, as well as to behave like a sports car should, when the gear box is used. They appeared to be apprehensive lest the high gear ratio on the car we tried would detract from this property and so give us a wrong impression. We can only say that if anyone is not satisfied with the top gear performance of this car they will never be satisfied with anything, and it is hard to believe that the standard job can be better, though we are assured that it is. This model is a definite proof that in a car of this class it is possible to combine the qualities of a lively "live in the gear box" type of exhilarating sports chassis with those of a smooth and quiet town carriage. By really careful chassis design involving the use of special alloys throughout, it has been possible to keep a most remarkable power-weight ratio without turning the engine to a point where it becomes rough to drive. This is certainly a much more desirable state of affairs than producing the type of engine which is great fun while it lasts, but is continually requiring attention to keep it at concert pitch.

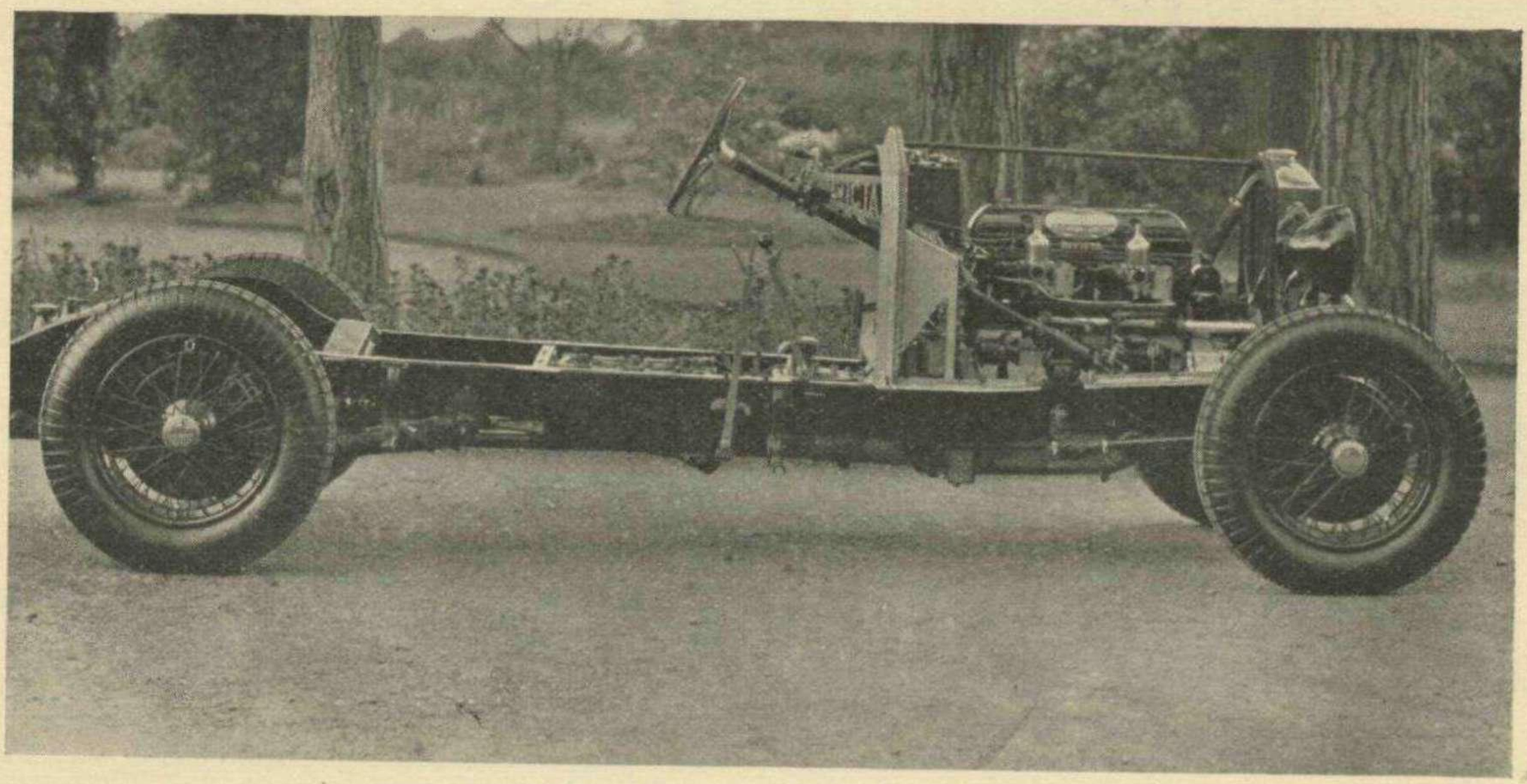
The only work which had been done on the engine since its remarkable run on Brooklands, at about 70 m.p.h. the whole time, was decarbonising, which most engines require much oftener than 30,000 miles, even at touring speeds. No chassis replacements of any kind had been carried out, yet the whole car was absolutely silent mechanically and felt like a new car when driving it.

The run out to the north of London from Albemarle Street demonstrated very adequately how pleasant it is



A VERY FINE EXAMPLE OF A SPORTS SALOON ON A 4½ LITRE INVICTA CHASSIS.

SPORTING CARS ON THE ROAD—continued.



THE STURDY CHASSIS OF THE "4½."

to be able to remain in top gear, and the getaway on this gear was so good that for ordinary traffic work the extra acceleration provided by the use of a lower ratio is not required. Standing starts can be made quite comfortably in top, a line of action not usually recommended on a sports model. By taking a particularly devious route out of town we tried several of the formidable gradients in the Hampstead district, and whatever method of driving was adopted, whether fast or slow, it was never necessary to drop from top gear, even when pulling hard at a little over walking pace, and there was never a sign of complaint from the engine.

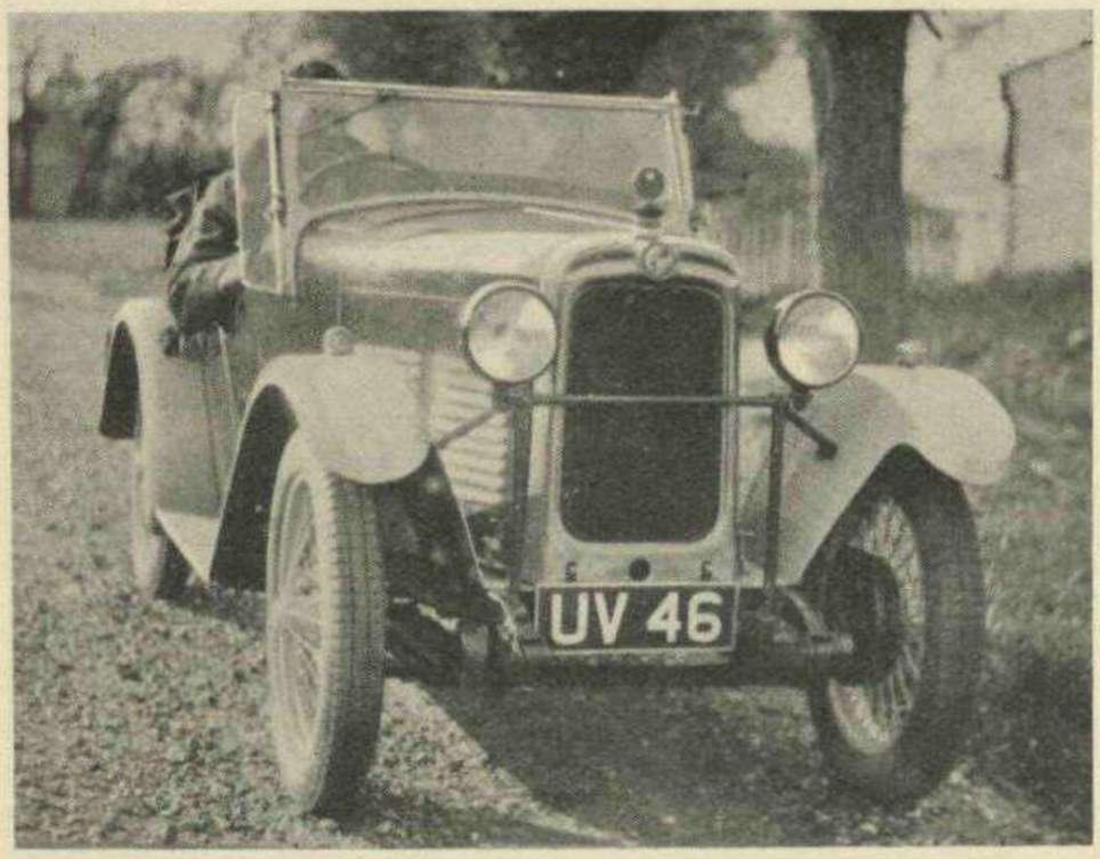
Once out in the open country we began to see the other personality of the Invicta, and found that it was not made to go about in top gear because its performance was not sufficient on the other ratios, but rather in spite of it. The gear change was very light to handle and extremely easy, though owing to the fact that Miss Cordery and the writer differ somewhat in point of size, we did not find there was much room to drive.

Although the shock absorbers had been left rather slack, to increase the comfort at low speeds, there was no necessity to tighten them up at all for faster travelling.

The acceleration, with or without the gears, was remarkable, and a 70 m.p.h. cruising speed could be reached in a few seconds and maintained on a very small thottle opening, this being a very pleasant speed, and gave the feeling that it would never tire of it, which fact, of course, has been already proved on the track. However, the acceleration after this speed was not quite so good, and although we attained a genuine 85 m.p.h. on several occasions without difficulty, there seems little doubt that, except for a special case like a long distance record, the standard 3.9 to 1 top gear would be a considerable improvement, as it would remove the over-geared feeling at high speeds, which was slightly apparent in this case. The Marles steering was very light and positive, and the road-holding at all speeds of which the car was capable left nothing to be desired. The brakes on this car had, unfortunately, been adjusted in rather a hurry, so that the rear brakes came on more than the front and thus spoiled the full braking effect. The larger wheels also decreased the braking leverage available, and it was therefore necessary to apply fairly considerable pressure to the pedal to produce the desired effect. As, however, this was due to the fact that the car was not standard in this respect, it would hardly be fair to class this as a fault, and from what we have heard from various Invicta owners, the brakes are, as a rule, an exceptionally bright feature of the car.

We have come across various people who, whenever they find a car with a particularly good power-weight ratio, invariably accuse the said model of being too light and therefore liable to fall to pieces. If anyone should be inclined to think that this applies to the Invicta, we can only advise them to go and examine the chassis in the showrooms at 11, Albemarle Street, when they will have to admit that it is a very massive, and extremely cleverly thought out job of work. Many features, such as the reserve petrol and oil tanks, would certainly be an extra on most cars, and would as extras be impossible to fit so neatly as has been done in this case.

Anyone considering paying in the region of £1,000 for a car naturally expects a good deal for his money, but the 4½ litre Invicta has proved its prowess without doubt, and seems to us to provide excellent value.



The Supercharged Triumph Seven

A fascinating little car with an astonishing performance.

AS a general rule cars of the "baby" variety leave the writer in a bad temper after a run, owing to the fact that most manufacturers seem to forget that small cars are not always driven by small people. It was therefore a very pleasant surprise to get into the Triumph which was kindly lent us for a week end by Morgan Hastings, Ltd., and find that we had plenty of room. The body of this attractive little car is not designed for appearance only—good though that certainly is—but the comfort is an outstanding feature. Gone are the days when a sports car meant an uncomfortable car. In these times of pneumatic upholstery and spring steering wheels, the driver is well catered for, and in the Triumph no opportunity is lost in making the car one which we cannot help wanting to "keep on driving."

On taking over the car we were informed that the supercharger (a Cozette) was a little noisier than usual, but we must say that it was a great deal quieter than we expected. True, when ticking over there was a slight rattle from the blower drive but once under way at ordinary cruising speeds of about 50 m.p.h., one would hardly have been reminded that the car had a blower at all. At or near full revs, however, the familiar whine which gladdens the heart of the enthusiast becomes manifest, and the Triumph is a glutton for revs. of which more anon.

The car we took over had had a shave taken off the cylinder head, by way of experiment, but we think this rather savours of "guilding the lily" when a blower is fitted, and a fair proportion of pure benzol had to be used to avoid pinking at high speeds. The temptation to "hot up" such a promising little engine must be great, but perhaps this is one of those occasions where the makers know best.

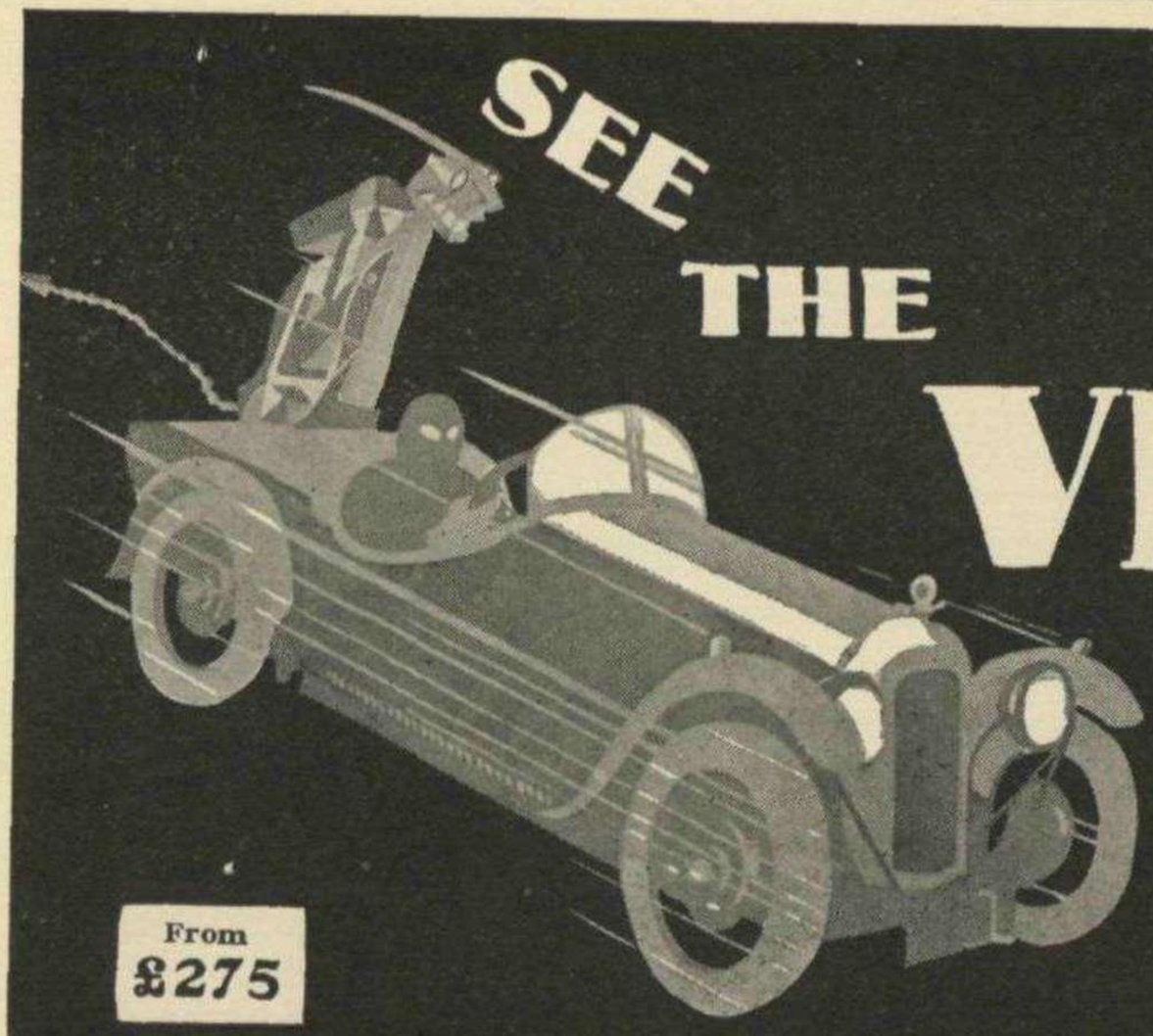
After a day of short runs using the Triumph more or less as a hack, we found the driving of it so fascinating that we decided to take it over a really twisty and hilly route and see what we could do with it. It proved to have a pleasant cruising speed on about half throttle of 55-60 m.p.h. and so smooth was the engine and so good the road holding and cornering, that we feared another case of an optimistic speedometer. However this suspicion was soon dispelled when we covered eight miles of fairly twisting road in nine and a half minutes, without ever using full throttle on the level. Not a bad effort for 847 c.c., and all perfectly safe touring at that.

A factor which contributes to the remarkable averages possible without effort on this car, is the amazing power of the brakes, and at the *end* of our test we found that from 40 m.p.h. the car could be brought to rest in a perfectly straight line in 18 yards.

Really high revs.

Quite early we got some idea of the revving capabilities of the engine when indulging in a scrap with two supposedly fast saloons which were also racing each other in rather a clumsy manner. Thinking we should be safer in front we changed down on approaching a slight rise and keeping the loud pedal firmly on the floor, slipped by comfortably, and noticed on changing up that we had achieved 53 m.p.h. in second gear. Later we repeated this performance several times and once reached 55 m.p.h. on this gear of 8.4 to 1, giving an engine speed of 6 300 r.p.m. On second thoughts r.p.m. should read R.P.M. in this case! Throughout the whole range of engine speed there is not a tremor of any kind, and no doubt the sturdy 3-bearing crankshaft has a lot to do with this. There is power with the revs, too, for hills of the 1 in 10 or steeper variety can be taken at 45 m.p.h. in second, and when in a hurry this is quite a good speed at which to change up, and here we come to the one feature in which the Triumph fails.

The ratios are wide and the clutch member rather heavy for the size of car, thus changing up means "waiting for it," unless one crashes in the gears, and the whole of the rest of the car exudes such an atmosphere of refinement that this treatment seems criminal. What a joy it would be with a 4-speed box! However, stranger things have happened and let us hope that Triumphs will do something about it. As it is with its terrific revs, the gears can be used to advantage all the time, but there is just that feeling that there ought to be another between second and top. The steering is delightful, winding roads become a joy to negotiate, and although the car may not look particularly low it can be "slid" perfectly steadily on dry tarmac without appreciably rolling, and this with the shock absorbers fairly slack.



AND

TRIUMPH
SPORTS-SUPERCHARGED

AT

MORGAN HASTINGS LTD

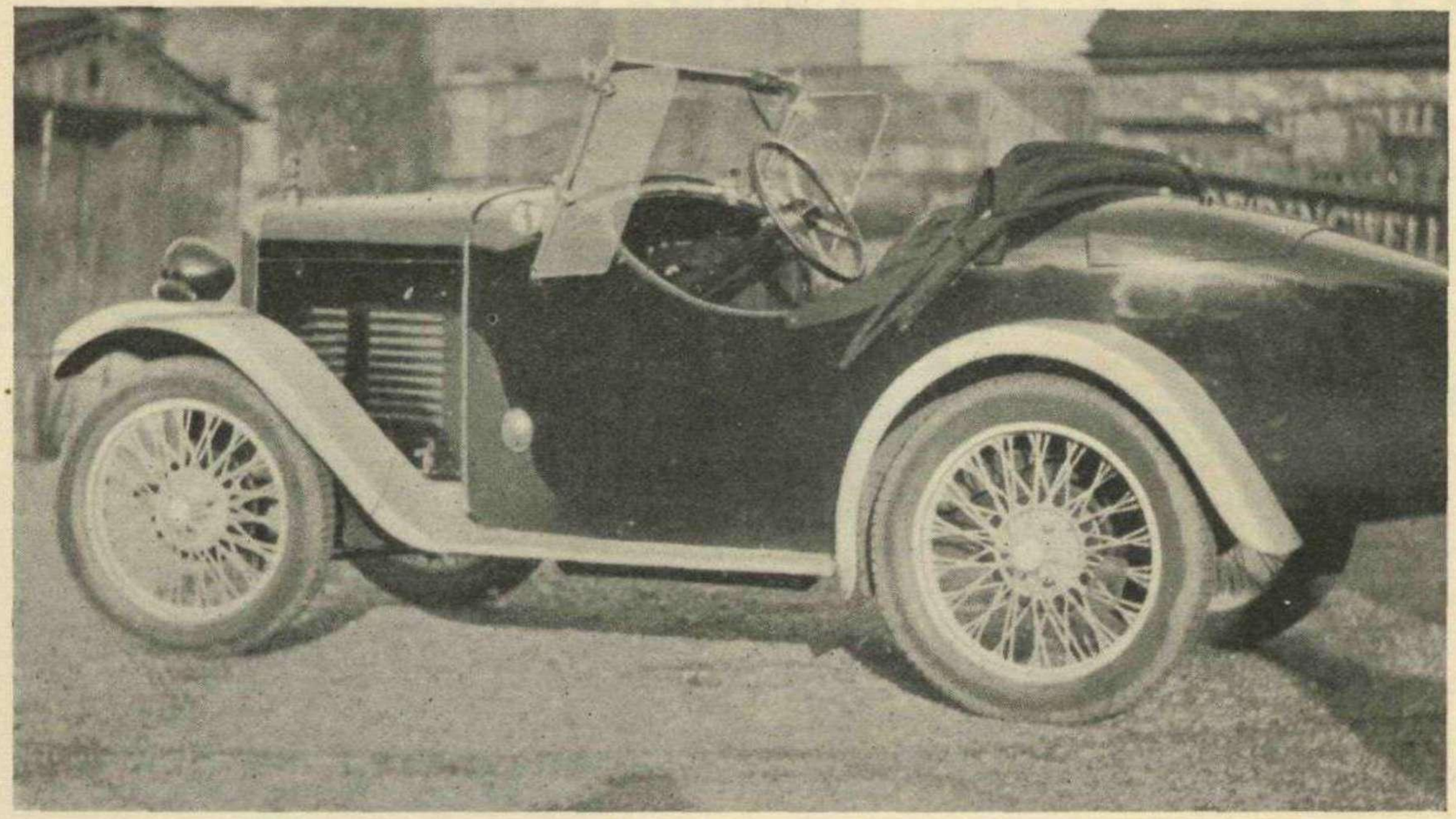
17 BERKELEY STREET, LONDON, W1

Telephone Mayfair 5323

TWO OF THE WORLD'S GREATEST SPORTS CARS

Please mention MOTOR SPORT when corresponding with Advertisers.

SUPERCHARGED TRIUMPH SEVEN—continued.



SPORTING LINES ARE ATTAINED WITHOUT SACRIFICING WEATHER PROTECTION.

The highest speed actually attained during the test was 75 m.p.h. under slightly favourable conditions and this is really excellent with such a small engine, and with such complete equipment. The mudguards are absolutely full, not "cycle-type," and these and a flat windscreen make a tremendous difference to a car of this type. Completely stripped the car should certainly be capable of well over 80 m.p.h. and from the way it kept going mile after mile without complaint, it should be perfectly reliable. The lubrication of the blower is attended to by a Best and Lloyd pump mounted on the end and drawing its supply from a small tank by the petrol tank. The pipe line has a tap interconnected with the throttle so that the supply is turned on as the throttle is opened, avoiding excess at low speeds.

It is however, very strongly recommended that a fairly liberal supply of oil be mixed with the petrol as the Cozette is of the type in which the fan blades make actual contact with the periphery of the casing and cannot get fully lubricated otherwise than by a petrol mixture.

Every detail of the car's equipment and finish is of the highest quality, and there has obviously been no attempt at price-cutting. In spite of this the car in supercharged form with full equipment sells at £250, and for any one wanting a really fascinating little car with a red-hot performance and low running costs, this Triumph Seven would take a lot of beating.

TO BUY OR NOT TO BUY

THE question of transport has now come to such a state that a motor car of some sort is practically a necessity. Moreover to those of our readers who have just returned from serving abroad, for a few months leave, the one thing important is to find a means of getting round to see the greatest number of old friends and familiar places with the least possible waste of time.

At first thought the answer is obvious—buy a car. On second thoughts the question is, how can one afford to buy a car for a few months and risk a heavy loss on re-sale, and it is to those that a scheme that has been brought to our notice should be of the greatest value.

The scheme is briefly this. The firm of Auto-Auctions, Ltd., which is managed incidentally by ex-officers, will undertake to buy a car back again from the purchaser for a sum decided on when the car is bought. Thus at the end of the agreed time the car is handed over and the cost is confined to the depreciation which, from the terms we have seen, is by no means as heavy as the usual amount in selling a car in the open market. This method is of course far cheaper than hiring a car for the period, and there are many attendant advantages such as the fact that the firm will undertake that if the car fetches more than its agreed repurchase price when offered again for re-sale, the previous owner receives the benefit thereof, and we know of several cases where this has happened to the pleasant surprise of the first client.

The idea strikes us as a particularly good one from the point of view of overseas readers, and though it is by no means new, having been in operation for over eight years, it deserves to be more widely known. Anyone who cares to write to Auto-Auctions Corner, Burlington Gardens, Bond Street, W.1., will receive full particulars of the scheme in the form of an attractive little book.

THE MOTOR SPORTSMAN'S DIARY 1930

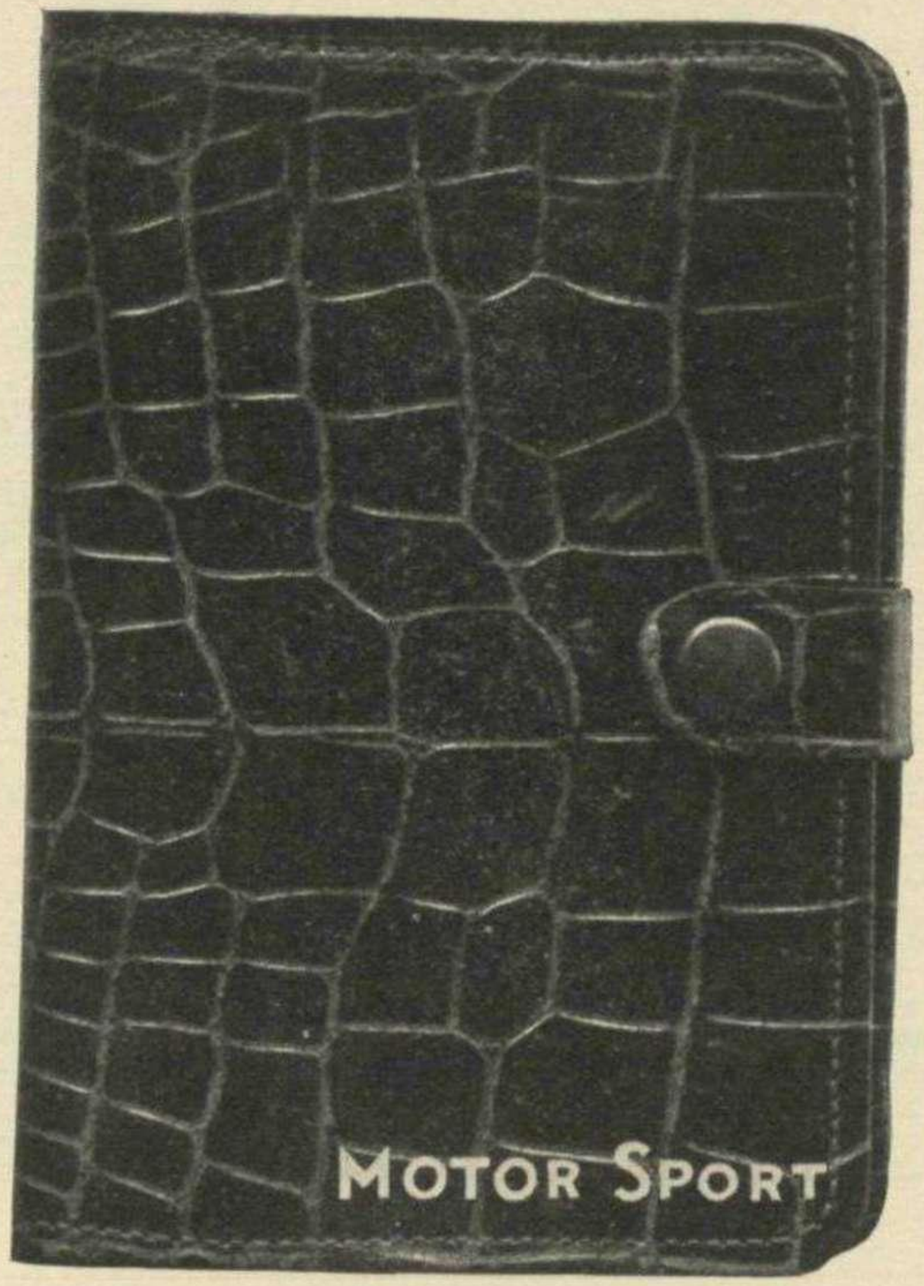
Bound in polished Crocodile Leather, with pockets and pencil inside, 76 pages of sportsman's matter, including Land, Water and Air records, and other information useful to the Sporting Motorist.

AS ILLUSTRATED

3/6

Specification as above but without pockets, pencil and button fastener

2/=



ACTUAL SIZE

Published by

MOTOR SPORT (1929) LTD.

34 DUKE STREET, St. JAMES'S, S.W.1.

DON'T MISS THIS—Be sure to visit our Stand —

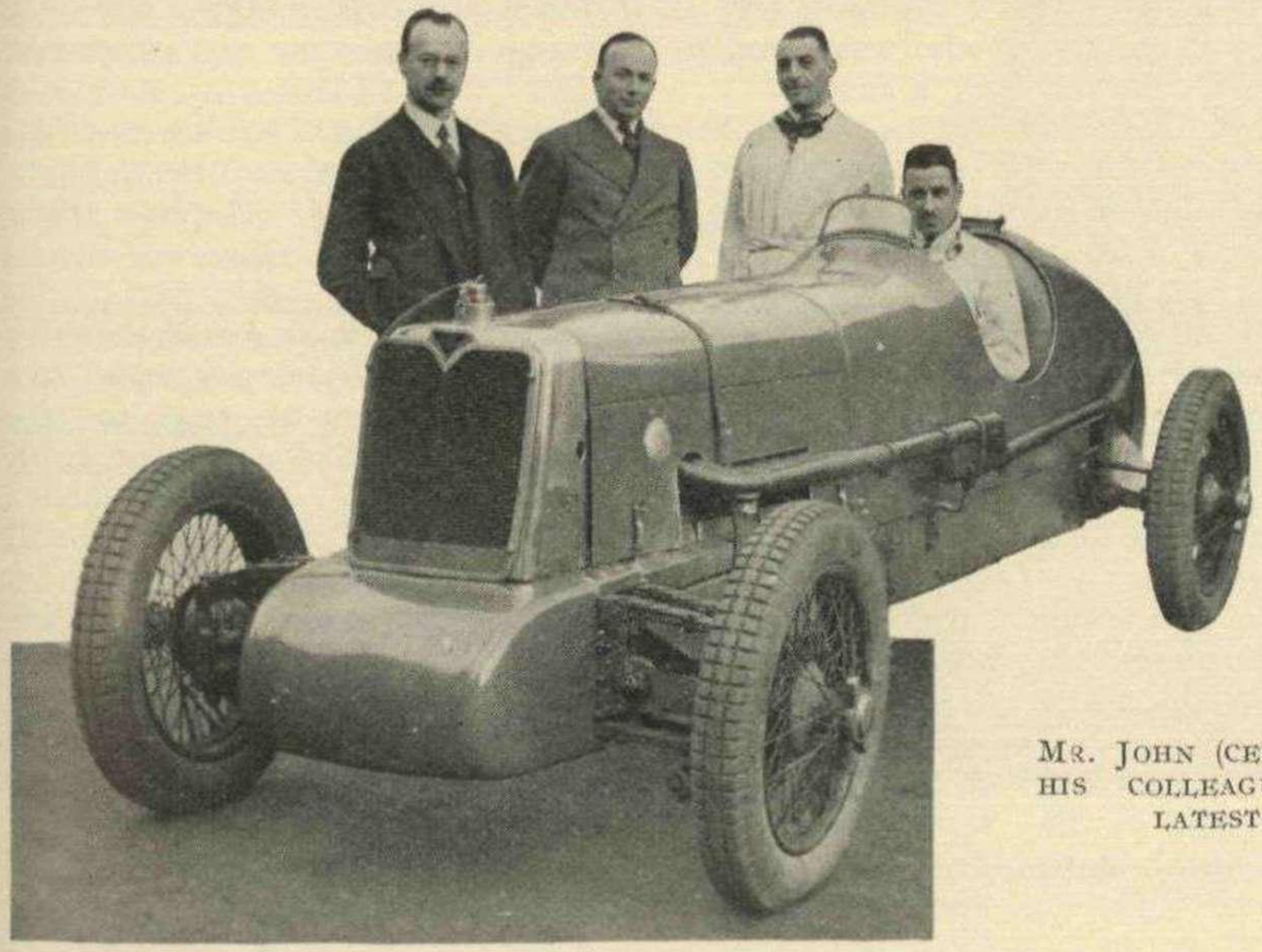
No. 97, at OLYMPIA,

NOVEMBER 30th — DECEMBER 8th, and inquire how you may obtain a **FREE COPY** of our **MOTOR SPORTSMAN'S DIARY** as above.

This offer is open for the Motor Cycle Show only.

BEHIND THE SCENES

An interview with Mr. T. G. John, Managing Director of the Alvis Company.



MR. JOHN (CENTRE) WITH SOME OF HIS COLLEAGUES BESIDE THEIR LATEST PRODUCTION.

AS the Alvis concern have, since the war, been so much to the fore in the development of the really fast light car in this country, it was with special interest that we called on Mr. T. G. John recently to obtain his views on things in general, and sports cars in particular.

Mr. John, who founded the Alvis Company, and is their managing director, did not enter the motor industry until comparatively recently. In fact he received his early training in the Navy, and the high efficiency and dogged persistence of the firm he now controls, is doubtless due in no small measure to the influence of the Senior Service. At the beginning of the War, he was with Armstrong's in charge of aero engine development, and this made him even further qualified to produce a fast car, and with this in mind he founded the Alvis concern in 1919. We felt, continued Mr. John, that there was a definite market for a really high performance light car, and decided to cater for it. At the time this class of vehicle was not made in this country, so we experimented and put the first Alvis on the market. This was a 10 h.p. two seater and had a 4-speed gearbox which was a novel feature on a car of this type. It was not a cheap car as it was priced at about £750 but it was really fast, and we entered it right away for competitions, and as in those days there was a hill climb or speed trial nearly every week in the season, we did pretty well and cleared up quite a few events.

We had intended to stick to the 2-seater body, which was what we called the Zephyr body, built with a steel tube frame, covered with aluminium panels and strengthened with bracing wires after aeroplane practice. This was extremely light, but had the disadvantage that it magnified noises more than a wooden frame, and as later customers demanded bigger bodies to carry four people in reasonable comfort we dropped this type. Those who found they liked going fast also found they wanted to have a similar performance with more like touring comfort, and we increased the size and strength of the chassis.

We did not make any special racing cars and all our competition work was done on hotted up standard jobs. Our first big success was the winning of the 200 mile race of 1923 with an ordinary unsupercharged car at over 93 m.p.h. and we then felt we had really shown that the Alvis could go fast. In 1924 the famous Talbot trio came home 1, 2, 3, and due to Ware's accident in his Morgan, there was some confusion in the lap-scoring. However it was eventually sorted out and it turned out that we were 4th, 5th and 8th and we were pretty satisfied. Next year we increased our engine size to 11.9 h.p. and about this time we had a good day out after records, and did 700 miles in under 8 hours, getting 39 records. We also did well at Shelsey-Walsh hill climb, as the President's cup for touring cars was won by Alvis 3 years in succession. However you don't want to hear a list of things we have won, anyone can get those from the catalogue, though one performance we were specially pleased with was the 1500 c.c. standing start records, for the mile and kilometre, at 80.84 m.p.h. and 72.27 respectively.

We continued to enter standard cars for as many events as possible and though we naturally did not always win, we learnt a lot and we nearly always managed to finish. In the 1925 George Boillot cup race at Boulogne both the Alvis cars finished, and were the only British cars to do so, and we were still rather alone in this class against foreign competition.

With regard to racing expenses you wanted to know if our shareholders grumble about what we spend on racing. Well for one thing we don't spend a great deal as all the cars we race are built from standard material so they cost no more than any others, and for another we find racing successes are a great help to business.

BEHIND THE SCENES—continued.

Of course if we did as some firms have done in the past, and built special "freak" cars, it would not cut much ice when they won, and the expense would be terrific, but a good deal of our racing is done for us by private owners, on standard cars.

Then you were asking about front wheel drive. Of course everyone wants to know about that, and some people have suggested we have given up selling F.W.D. cars. This is not so at all, and we have some in production at the moment, but although it is one of our standard models, it is a special type for a special purpose, and we don't wish people to buy them who do not really want them. We had a case the other day of a clergyman who had been sold a front wheel drive supecharged saloon to use for visiting in his parish! That is an example of what may happen if a car which is at present intended for a special type of work, i.e., really fast road work, is "pushed" as the type for everyone.

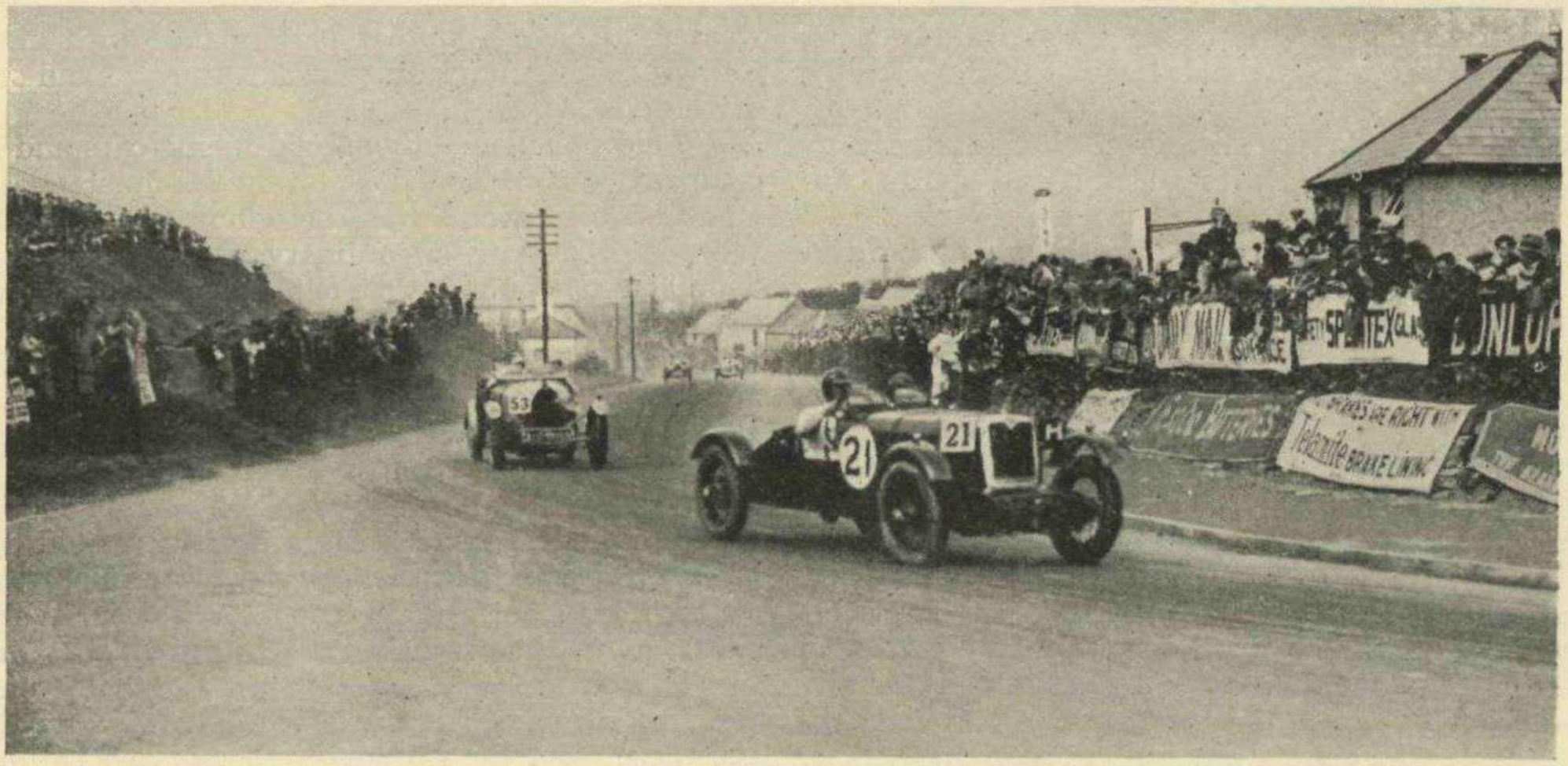
Cases like that do much harm to the development of a new idea. Front wheel drive will come, as it is theoretically correct and has been shown to have many advantages in practice. The tractive effort is always in the direction you want to go and not straight ahead as in the present type.

However the present type is now more suited for general use and when the new type is recognised as generally desirable we shall be in a very nice position. Not only have we had valuable experience but we have developed a considerable number of patents which will put us in a good position. Any new idea takes time to mature and become approved by the public but it is the people who get ahead and work on it instead of waiting till it is asked for who are the ones who will reap the benefit. I have personally avoided one or two serious accidents in my own front wheel drive car by executing the most violent swerves which in an ordinary car would have most certainly inverted it.

There has been a lot of talk about whether a front wheel drive car is difficult or dangerous to drive, and I can only give an instance of a driver taking one over who was completely strange to the type and driving it in a race.

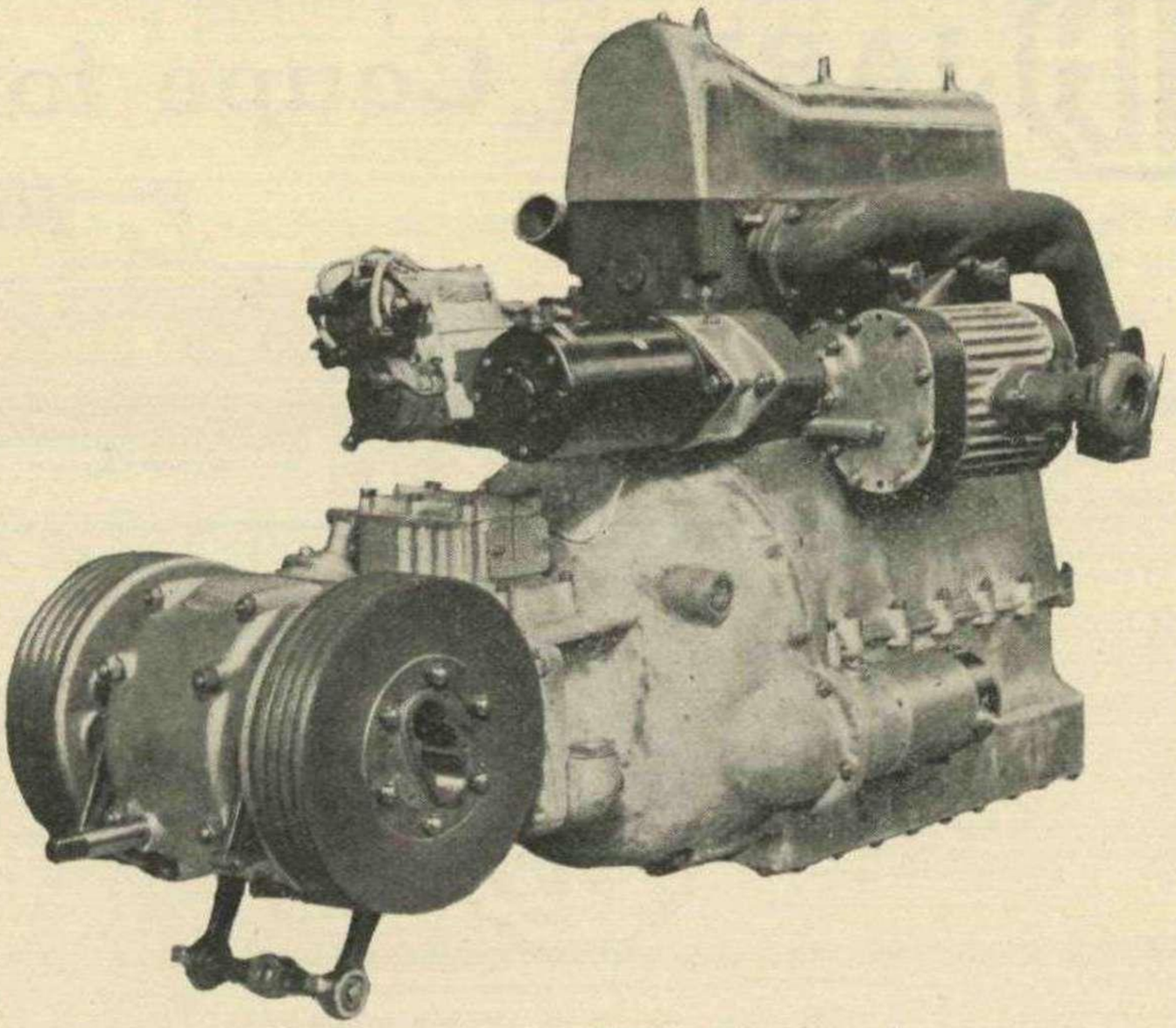
One J.C.C. 200 miles race George Duller was to drive one of our cars, and they duly arrived at Brooklands a few days before the event for practice. The first thing we found with Duller's car, was that there was no oil pressure, and this meant stripping the lower part of the engine to fit a new oil pump. The work was eventually completed but not in time to give George Duller any chance to try the car. We said it was too risky to take over a car of a new type which he had never driven in his life, but he was not worried. He said "Cottenham has sent me a wire telling me how to drive it, so that will be all right!" The instructions amounted to the words, "When in doubt step on it, and steer." This applies to all F.W.D. jobs and is where people get into difficulties. When you are taking a corner too fast the one thing which will pull you round is the engine if the drive is in the direction you want to go which in front-drive cars it is. Well, Duller started in that race, and led to the first bend, and went into it much too fast to be pleasant, and got into a terrific skid. But he remembered his injunctions and put his foot down hard and he just came out of it and went round, and was well up in the race till the engine had some more oiling trouble. Of course Duller, we know, is a first class driver, but no one on earth could drive a strange car in a race at over 100 m.p.h. and get away with it if there was anything radically wrong with the idea, and we claim it to be radically right. We have had engine trouble of course, everyone who races has some, but we have never had any bother with the front wheel drive.

A good example of the luck of racing is to be had from our recent 1,000 miles record. We sent down a car to see if it was all in order for the record; after all one of the first essentials is that the car should be capable of



ALVIS CARS HAVE FIGURED IN ALL THE CHIEF POST-WAR EVENTS.

BEHIND THE SCENES—continued.

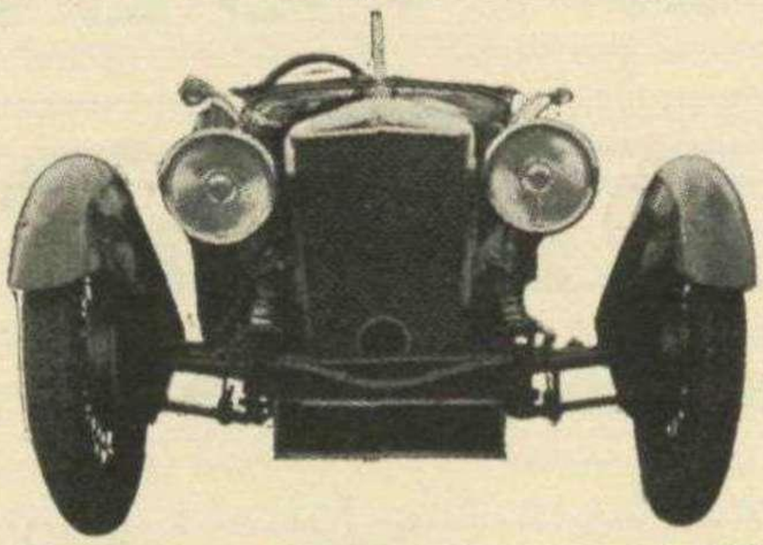


THE SUPERCHARGED F.W.D. POWER UNIT.

the necessary speed as well as being able to last! This engine proved quite up to expectations, so much so that they thought they would improve matters a bit, and see if it could be made fast enough for the hour record. It was doing well over the 100 mark without being too much hotted up but they then put on a larger blower and started in to "make it go." It soon came up to near the speed they were after, and was doing about 116 m.p.h. on the lap. The car had a very high third and it was sometimes done to change into third to go on to the members banking. They decided that it liked third and was a bit overgeared in top, so they tried a complete lap all out in third! Result —a wire to the works that they had "thrown a con-rod," and please they would like another motor. Of course racing engines are not built in a day, and we had not got one specially tuned to this pitch. Still we wanted that record, and there was nothing for it but to take an engine out of production and send it down. They got it, ran it a bit to get everything right, and got the 1,000 miles and several other records! And owing to a stop on the way which put them behind schedule, they had to lap at 107 m.p.h. for some time to pick up again. Oh yes, it's a great game building a high efficiency car, but you have to keep very much awake to avoid getting left behind, and there is no doubt that without competitions and racing it would have taken another ten years for us to get as far as we have now.

CRUISE AT SIXTY

ON A



FRAZER NASH

80 m.p.h. SUPER SPORTS 3 SEATER COMPLETELY EQUIPPED £398

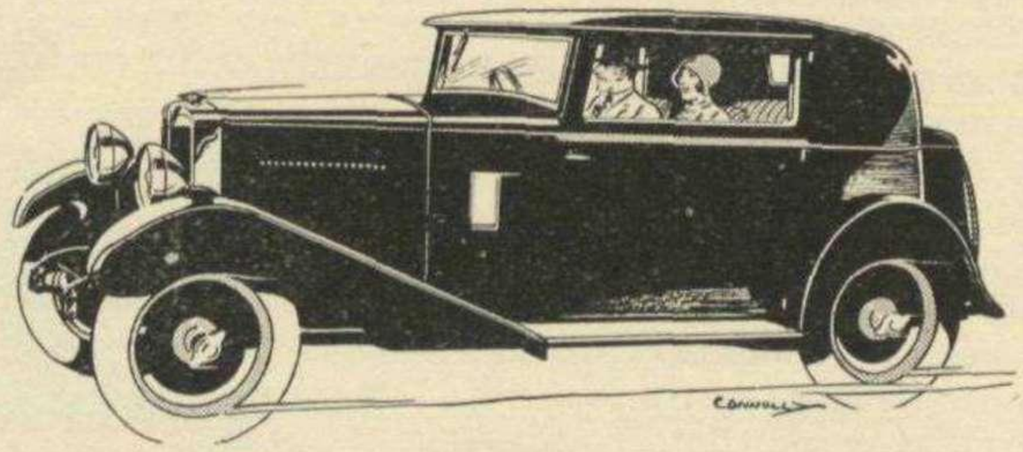
NEW LOW CHASSIS O.H.V. 3 SEATER COMPLETELY EQUIPPED £425

Trial runs and Catalogues from the manufacturers

A.F.N. LTD., LONDON RD. WORKS, KINGSTON-ON-THAMES

The MG JARVIS Coupe for 1930

COMFORT and Beauty of the Sportsman's Coupe type of body combined with the fascinating 80 m.p.h. performance of the M.G. Six. Weymann-type Construction. Comfortable rear seats and exceptional luggage accommodation. Spare wheel at rear. Tools in special locker. Wide choice of finish. £585



JOINT LONDON DISTRIBUTORS

EARLIEST DELIVERIES FOR MG CARS *EXPERT SERVICE*

MAIN SHOWROOMS:
VICTORIA CRESCENT, WIMBLEDON.
(Opposite Wimbledon Station).
'Phone - - Wimbledon 2526
Telegrams: "Jarvis, Wimbledon."

JARVIS OF WIMBLEDON

M.G. SERVICE DEPOT:
GROVE WORKS, SOUTH WIMBLEDON.
(Opposite South Wimbledon Station).
'Phone - - Wimbledon 2881
(2 Lines).

We have a limited number of

BOUND VOLUMES
of
MOTOR SPORT
Vols. I, II, III and IV,

which we have acquired from the former proprietors of this journal.

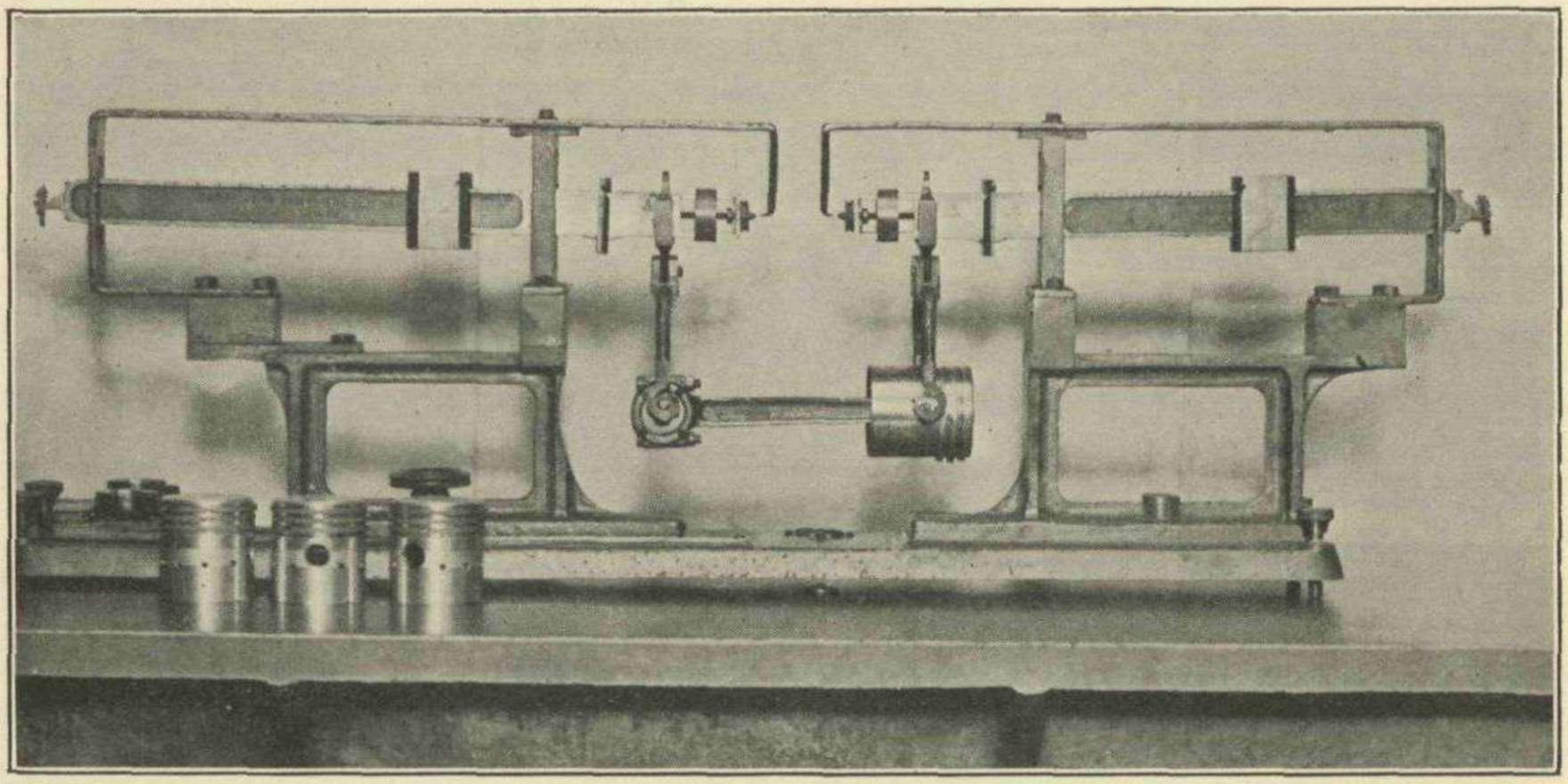
These are obtainable, price **21/-** each, from

MOTOR SPORT (1929) LTD.
34 Duke Street, St. James's
or Stand 97 Olympia.

That Extra Ten Miles

By F. T. BERSEY, M.I.A.E.

(Mr. F. T. Bersey is the governing director of the Laystall Works).



APPARATUS FOR BALANCING CONNECTING RODS AND PISTONS.

EXCELLENT though the performance of the average modern engine undoubtedly is, there is always the enthusiastic owner who aspires to go one better than his neighbour and who hankers after something a little above the ordinary—a very praiseworthy spirit.

One might wonder why such people do not invest in a sports model and have done with it, but it must be admitted that there is a peculiar fascination in secreting a few extra "horses" beneath the bonnet of an outwardly standard model. At any rate, the fact remains that there is an increasing tendency amongst owners of standard mass production cars to have certain radical alterations carried out to their engines in order to obtain a super-performance.

In this short chat I do not propose to deal with ordinary methods of tuning, with which most readers of MOTOR SPORT will be more or less familiar, but to go a step further and discuss some of the measures commonly employed in "hotting-up" engines. The term "hotting-up" may best be defined as the process of increasing the power output by suitably modifying existing parts or by replacing certain of them by non-standard components. This is, of course, a far more involved proposition than mere tuning, which is mainly a matter of adjusting existing parts and lies within the scope of the average owner driver. "Hotting-up," on the other hand, is essentially a job for the specialist, demanding as it does not only advanced technical knowledge coupled with extensive experience but also a very fully equipped motor engineering works to cope with the diversified operations entailed.

The results obtainable naturally depend upon the amount of money one is prepared to lay out, but very often the difference in performance of an engine after judicious "treatment" is such that it must be experienced to be believed.

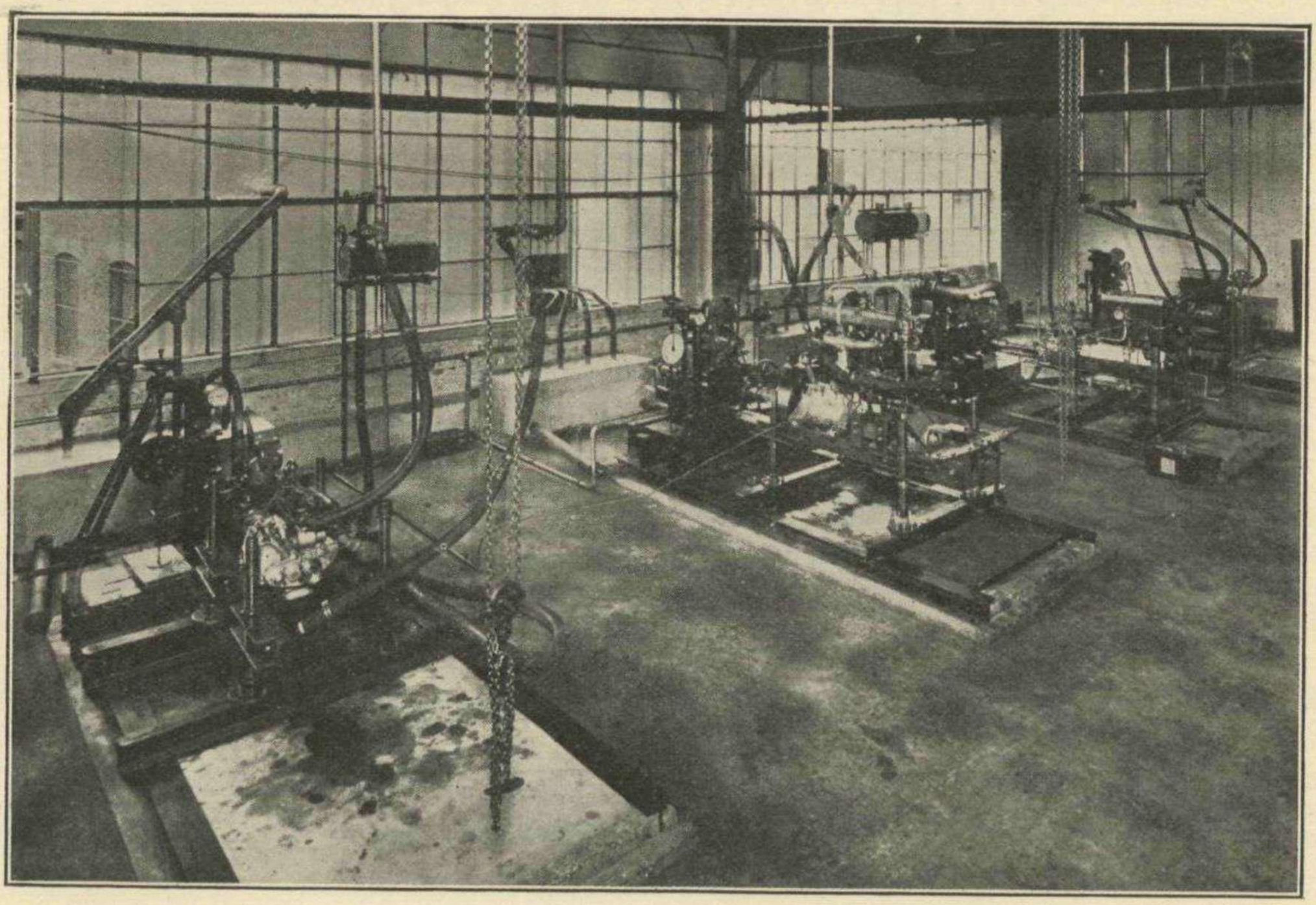
In favourable cases "that extra ten miles" may easily become an extra fifteen or even twenty miles per hour, with acceleration and hill-climbing in proportion. In the Laystall Works, where we have a special department devoted to this class of work, it is by no means unusual to add as much as 45% or 50% to the power output of a standard engine—and this without resorting to supercharging. I do not want my remarks to savour too much of "shop," but it will be readily understood that what I write is based largely on Laystall's practice.

Before "hotting-up" operations are commenced it is essential that the engine should be in first-class mechanical condition, as obviously the best results cannot be obtained if power is being lost through worn bearings or badly fitting pistons. For this reason such work is usually undertaken in conjunction with a thorough overhaul unless, of course, the engine is a brand new one as is often the case.

The first step is to carry out a preliminary brake test during which the performance of the engine is closely observed throughout its speed range, particular attention being paid to its behaviour just beyond the peak of the power curve. The data thus provided form the basis of subsequent operations.

One of the first requirements is to discover what particular factors are limiting the power output; as a

THAT EXTRA TEN MILES—continued.



PART OF THE LAYSTALL TEST SHOP SHOWING THE HEENAN AND FROUDE DYNAMOMETERS.

simple example, it may be ascertained that at a certain speed the B.H.P. is being restricted by valve bounce, in which event an immediate increase can be obtained by fitting stronger, or double valve springs. Or again, it may be found that the compression ratio is too low to permit of the very rapid ignition necessary for extra power: this being so the compression can be raised by machining a small amount off the face of the cylinder head or block, or possibly by taking a little off each.

Other obstacles to a greater output are such factors as restricted valve ports, induction pipe or carburetter, offering undue resistance to the flow of the gases, and lack of turbulence due to roughly cast or badly designed cylinder heads. Slightly enlarging and polishing the valve ports, also polishing the cylinder heads is usually well worth the trouble, while a larger induction pipe and carburetter—or possibly two carburetters—may often be fitted with considerable advantage.

In some cases the mechanical efficiency of the engine may be so low as to oppose any increase in power owing to friction set up by inertia and lack of balance of the rotating and reciprocating parts. Such engines do not lend themselves to "hotting-up."

Balance is an important point. It may not be generally realised that, apart from the vibration set up, an unbalanced engine means a definite loss of power and it is therefore necessary to ensure that the crankshaft, flywheel, connecting rods and pistons are properly balanced. Of these, the crankshaft is perhaps the most important, as the flywheel is unlikely to be much out if accurately machined. One has only to remember, however, the rate at which the pistons reciprocate, for instance, to realise that even a fraction of an ounce variation in their weight must produce a large unbalanced force, which increases as the square of the engine speed. The crankshaft and flywheel must be rotary balanced, i.e., they must be in correct balance at running speeds. Mere static balance on knife edges is not good enough.

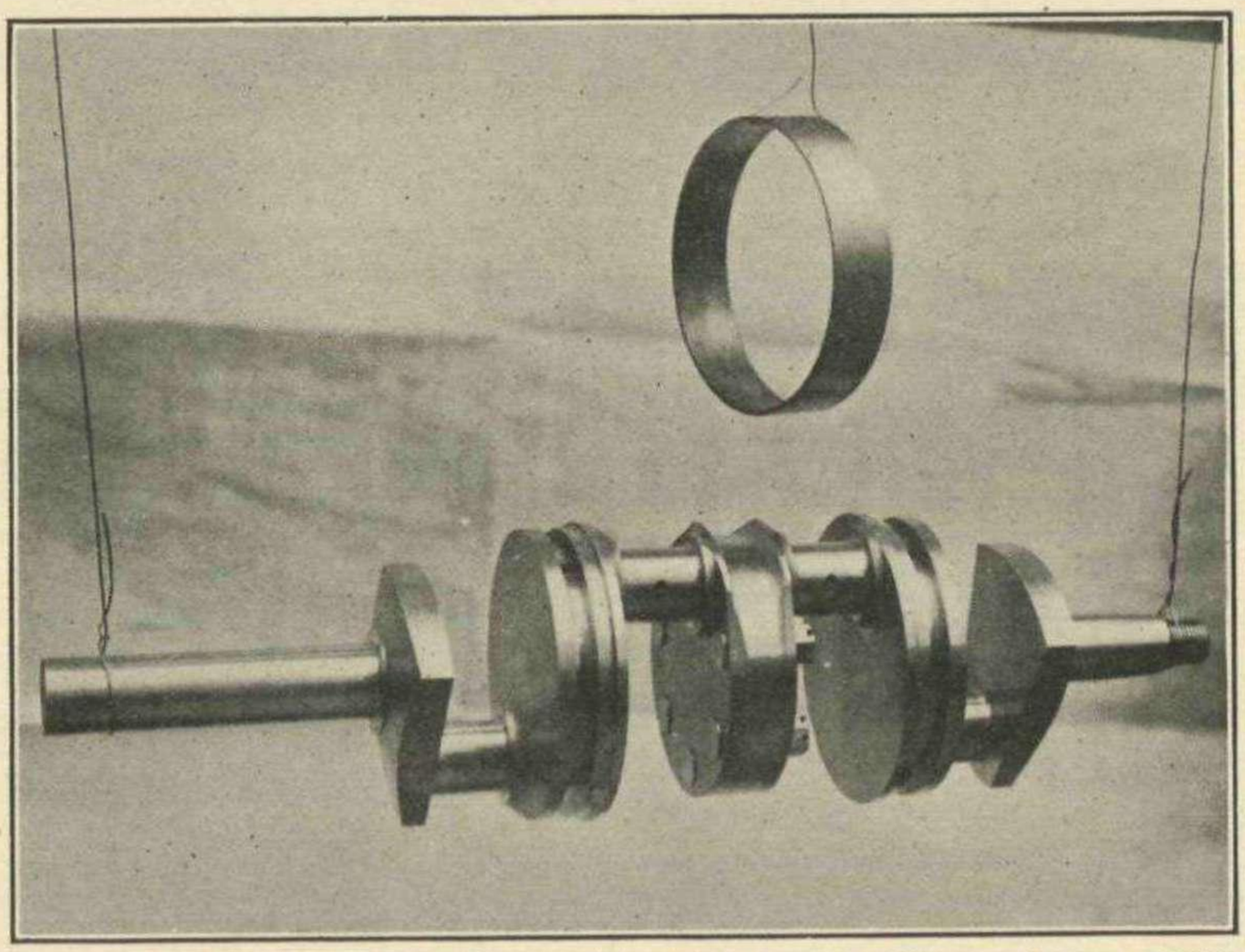
Lightness of the rotating and reciprocating parts is, of course, one of the chief considerations in a "hotting-up" job. It is not always possible, however, to lighten existing parts, especially in view of the greater loads they will be called upon to carry. Several pounds can usually be machined off the flywheel, resulting in a definite improvement in acceleration, but it is seldom that any attempt is made to lighten the crankshaft.

In fact, in certain types of engine where the standard crankshaft is already of flimsy design and perhaps prone to whip, the practice of the Laystall Works is to make and fit a special crankshaft of more robust design, possibly with larger journals and either having extended webs to minimise whip or being of circular web construction which is extremely rigid. Such a shaft is necessarily somewhat heavier than the standard component, but the greater rigidity makes for a much sweeter-running engine and the extra weight can be compensated by further reducing that of the flywheel.

THAT EXTRA TEN MILES—continued.

Every ounce by which the reciprocating weight of the engine can be reduced means more power at the road wheels. Pistons, if of cast-iron, should be replaced with aluminium alloy pistons of the lightest possible design consistent with strength, or if aluminium pistons are already standard it may be possible either to lighten them somewhat or to fit a lighter type. An appreciable saving can even be effected in the weight of the gudgeon pins by fitting a new set made from a high-tensile steel such as nickel-chrome instead of the conventional carbon steel. Connecting rods may or may not stand lightening, but if these are of steel a big advantage will be gained by replacing them with a set of duralumin rods. This is rather an expensive item, however, as the latter would have to be made specially.

One of the most common expedients employed with excellent effect in the quest for extra "horses" is to put in a special camshaft designed for maximum performance at speeds over say 40 m.p.h., giving overlap timing and possibly a greater valve lift than standard. Here there is, of course, great scope for the designer who, however, must not lose sight of the fact that the car may sometimes be required to run at speeds under 40 m.p.h.!



SPECIAL CRANKSHAFT FOR AUSTIN 7, BUILT UP IN TWO HALVES. RING REMOVED TO SHOW OIL-WAYS ROUND CRANK WEBS.

Another measure frequently adopted and which secures a direct increase of power is to bore out the cylinders to as large a diameter as safety permits. Cylinder castings vary a good deal as regards wall thickness, but it is often possible to take out as much as two or three millimetres. This entails very little extra expense if the cylinders are already being reground on account of wear, but if the car is used for competition purposes the increase in cubic capacity must be borne in mind.

Adequate lubricating of a "hotted-up" engine, particularly the crankshaft bearings, is a subject which has to receive attention, as it does not follow that the existing system will rise to the occasion with the heavier bearing loads and higher revs. In most engines to-day the main bearings are pressure fed, but where this system does not extend to the big ends it is sometimes necessary to drill the crankshaft so as to feed the big ends from the main bearings. In this case suitable oilways must be provided in the bearings and it may be necessary to increase the capacity of the oil pump.

If the combustion temperature is raised appreciably the standard exhaust valves may not stand up to their job, this depending on their material. The remedy is to replace them with valves made from a special heat-resisting alloy, which incidentally may permit a slight saving in weight and thus reduce the load on the camshaft. Whilst speaking of valves—in some engines it is possible to bore out the valve ports in the vicinity of the seatings, increasing the diameter by perhaps three or four millimetres and allowing correspondingly larger valves to be fitted.

The concluding stage of the work is the final tuning and testing on the bench, which is only carried out after the engine has been thoroughly run in and all signs of stiffness have disappeared. Various combinations of carburetter jets and chokes are tried; tests are made with alternative valve timings; different types of sparking plugs are tried to see which is most satisfactory under the new conditions and valve clearances, ignition setting, etc., are adjusted to the best advantage as indicated by that infallible criterion—actual B.H.P. developed. Petrol consumption is read at sight from a flow-meter, a direct-reading instrument which registers pints per hour. From the readings obtained the power curve can then be plotted over the speed range and at last, by direct comparison with the original curve of the standard engine, the number of extra "horses" can be counted.

Readers of MOTOR SPORT will not be under the delusion that all this extra power can be conjured up for the asking, so to speak. The makers, bearing in mind that their cars will not always be driven by experts, have designed the engine to give the best possible all-round performance having regard to reliability, economy, flexibility and length of service, which after all meets the requirements of ninety-nine people out of a hundred. If therefore an engine is tampered with and made to give say 10 m.p.h., more than it was designed for, one cannot expect quite the same efficiency at the lower speeds, nor perhaps quite the same length of life.

The points I have mentioned—and many others—are considered in "hotting-up" an engine, but it must be remembered that every make and type is a separate study and has to be dealt with individually. Of necessity, the process is largely experimental, the various stages being closely bound up one with another and although I have by no means exhausted the subject I think I have said enough to convey, at any rate, some idea of its scope, embracing as it does practically the re-designing and re-building of the whole power unit.

BEST PERFORMANCE OF THE YEAR

30,000 Miles in 30,000 Minutes

achieved on

The New "BP"

The same as YOU use.

The Royal Automobile Club has awarded the Dewar Trophy for the most meritorious motoring achievement of 1929 to the Misses Cordery, who in August last covered 30,000 miles at Brooklands on their 4½-litre Invicta car in less than 30,000 minutes.

The run was made throughout on the new "BP," the same as you can buy from any "BP" pump with the shield-shaped globe.

The New "BP"

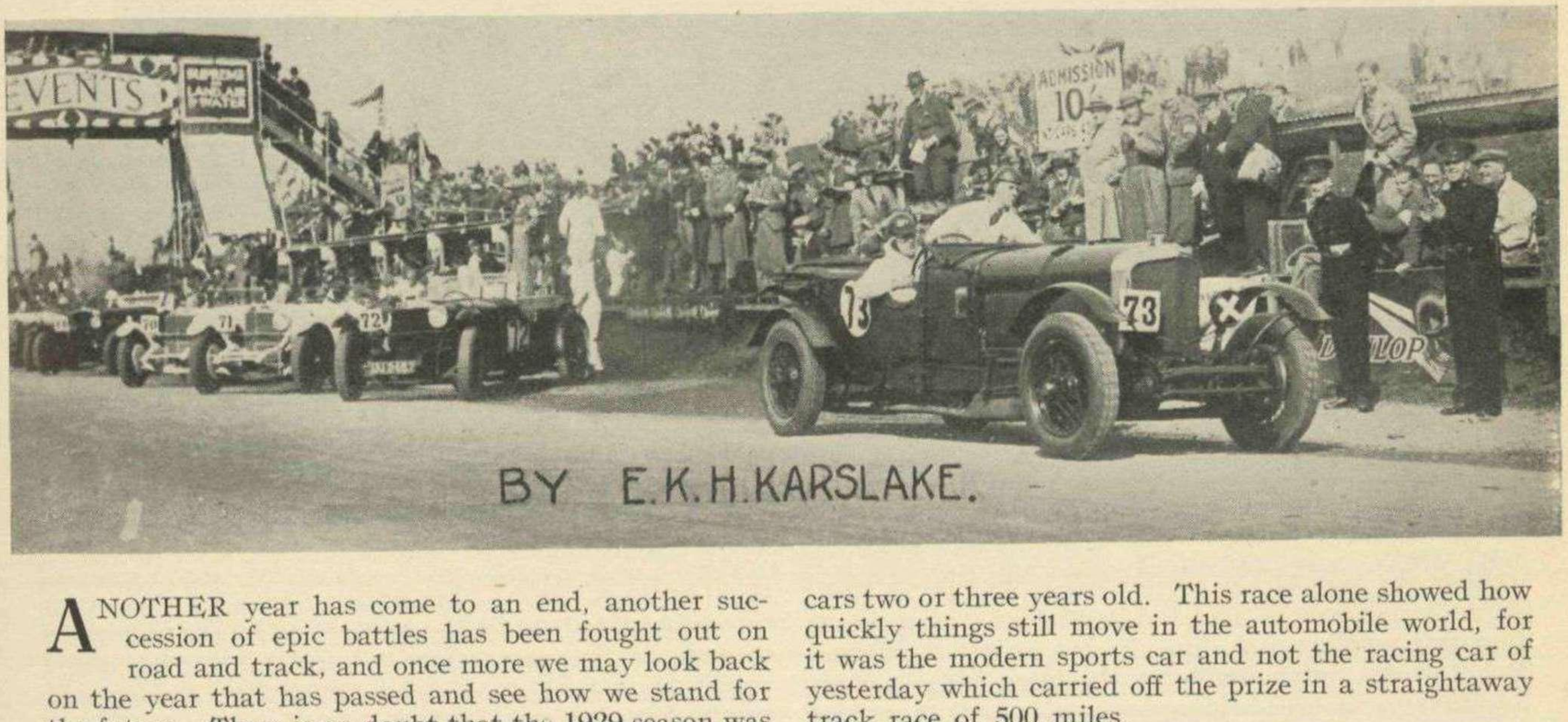
The Better Petrol

ANGLO-PERSIAN OIL CO. LTD

British Petroleum Co. Ltd., Britannic House, Moorgate, E.C.2

Distributing Organization

1929 IN RETROSPECT



BY E.K.H.KARSLAKE.

ANOTHER year has come to an end, another succession of epic battles has been fought out on road and track, and once more we may look back on the year that has passed and see how we stand for the future. There is no doubt that the 1929 season was eminently sucessful ; we must see to it that the future is equally well filled with scope for the racing enthusiast.

In the first place the point which stands out is that the race for standard cars has swept everything before it. Starting as almost a local affair in 1923, the Le Mans race has now become the cardinal event of the year. We have got our own Tourist Trophy on an assured footing. Ireland has started her own race, and the Italians in typical fashion have set the seal on their own idea of reviving almost the town-to-town races of the young years of the century. On the other hand, races for real racing cars have practically vanished from the calendar. The French Grand Prix has become an affair of very little importance, and the 200 Miles Race has faded.

There is no doubt that the new type of racing has provided excellent sport. Entry lists are very much better filled than they were in the latter days of the Grands Prix, while the public are definitely more interested in comparing the performances of various cars which they can buy than they were in noting the success or failure of some novelty in design. The fact, however, remains that as a result of this situation, no special racing cars at all are now being built.

In Italy alone have any successful races of the old type been run—the Targa Florio and the Grand Prix at Monza. Neither of these events, however, occasioned the building of new and special cars. The Targa Florio became a battle between the standard type Bugatti and the equally standard Alfa-Romeo ; while the Monza race united a collection of sports models and old racing cars. Finally the Brooklands 500 Mile Race organised by the British Racing Drivers' Club witnessed a battle between modern production models and special racing cars two or three years old. This race alone showed how quickly things still move in the automobile world, for it was the modern sports car and not the racing car of yesterday which carried off the prize in a straightaway track race of 500 miles.

This situation, however, is one that must give us pause. There is, without doubt, no better way of finding the weak points in a production model than in racing it against its rivals. No one can deny that the sports car race is an excellent idea, and ought never to be abandoned. On the other hand, one may ask how well we are going to get on without any races of the old type. What is going to be the effect of running no races for special cars ?

Take the outstandingly successful cars of this year—the 4½-litre Bentley, the big Mercédès, and the Alfa-Romeo. The last-named especially may be taken as a good example of how we are using the lessons of the post-war Grands Prix. Would Alfa-Romeo now be building a car with a supercharged multi-cylinder double overhead camshaft engine, had it not been for the firm's experience in the Grand Prix races of 1924 and 1925 ?

During those years the most advanced type of engine in the modern sports car was tried out, its weak points eliminated and the whole design brought to perfection. But this development of the modern engine could never have taken place with the same rapidity, had it not been for the special racing car. When Fiat appeared at Tours in 1923 with a supercharged engine of this type, would this or any other firm have dared first to sell 50 such cars to the public and then try out the design in racing ? One hopes not, for at Tours the Fiats all fell victims to their superchargers, and it was not until the next year that the device was really perfected. The lessons learnt at Tours in 1923 and at Lyons in 1924 are directly embodied in the Alfa-Romeo of 1929 : but what advances in design are to be learnt to-day and incorporated in the sports cars of 1934 ?

1929 IN RETROSPECT—continued.



TWO SUPERCHARGED BENTLEYS IN THE ULSTER T.T.

When the Mercédès won the Tourist Trophy at Newtounards this year, it achieved its victory over a course by nature winding and difficult and over wet roads—both features unfavourable to the large car. It won, however, on its road-holding because in fact its makers had so embodied their experience with special racing cars in the standard production, that they were able to make a giant car more easy to handle under difficult conditions than smaller machines developed only on the experience of their manufacturers in touring car races.

The value of races of the old type is obvious to anyone who has given any attention to the matter, and examples from the past can be multiplied. How long would we have had to go on changing the tyres in the old-fashioned way whenever we had a puncture—and I know just what that means having scoured the continent from San Sebastian to Vienna at excessive speed in the days when the roads really were bad in an undertyred light car and the grilling heat of mid-summer—if Renault had not realised that he could win the 1906 Grand Prix by using detachable rims, and thus set going the rapid advance of quick tyre changing, perfected by Georges Boillot when he evolved the integral flange type Rudge Whitworth hub-cap? How long, too, would it have been until we got four-wheel brakes, if the same driver had not insisted on them for his 1914 Grand Prix Peugeot, and had left them to be developed on the standard cars built by Argyll? Would we now have the super-charger fitted to so many standard sports models if Fiat had not used the device at Tours, and had left it to be evolved by Mercédès in the days when that firm was debarred from all the classic races?

If design is to go on advancing, we still need races for special cars, and the only objection to their revival would seem to be the reluctance of manufacturers to take part in them. I feel, however, that the solution to this problem lies in the reorganization of the Grand Prix. Why not revive the Gordon Bennett Cup idea, that is to say, make the contest one between nations rather than between firms? Limit the entries to three cars for each nation, and let the race be run by the victorious country of the year before. I feel that under these conditions entries would soon materialise, and the old spirit of racing would return.

With regard to a formula governing entries for the race, this has caused considerable difficulty in the past. The capacity limit has apparently outlived its usefulness, and the only alternative that I have seen put forward so far, is the fuel consumption race. This limit, as the only test of real efficiency, is obviously ideal in theory, but is very far from it in practice, as it spoils all the driver's fun if he has to close his throttle in the middle of a real good "dog-fight" because his fuel gauge does not look too healthy. What we are really aiming at, however, in the air even more than on land or water, is a good power-weight ratio, and I should suggest that the limit for our new Grand Prix race, should be one of engine weight. The engines would only have to be weighed some time before the race, and sealed by the examiners, and otherwise the designer would be given a free hand.

However we can leave the actual regulations to be fought out by the real experts, and I will content myself by saying that I should like to see a race between Sunbeam, Miller, Delage, Bugatti, Fiat, Alfa-Romeo, Mercédès, Austro-Daimler and Minerva, using cars with supercharged twin-eight engines with the crankshafts geared together, working on the 2-stroke cycle, and each employing a different valve principle: these engines driving propeller shafts passing forwards through the crankcase between the crankshafts and driving all four independently, sprung wheels through de Lavaud-type infinitely variable gears. That should develop quite an interesting sports car for 1935!

However, I seem to have wandered rather far from my original subject of a review of motor racing in 1929; and surely this subject has sufficient interest in it. From a national point of view, any one who was lucky enough

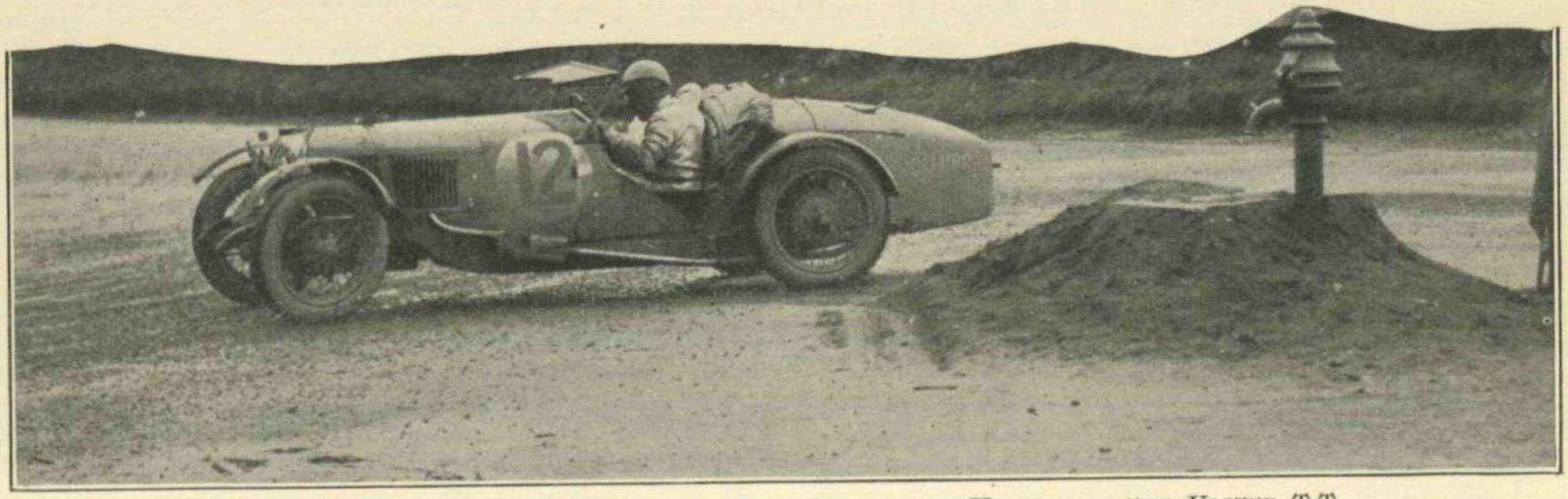
1929 IN RETROSPECT—continued.

to be at Le Mans for the 34-hours race this year cannot complain of England's performance. The Grand Prix d'Endurance is now the blue riband of the racing calendar, and in this event the big 6-cylinder Bentley driven by Birkin and Barnato showed its prowess by contemptuously holding the lead throughout and finally winning the race at the record speed of 73.6 m.p.h. One might well feel proud when one remembers that it is not so long ago that we all gasped at the Lorraine-Dietrich for winning this same race at 100 kilometres per hour. Nor was this all, for contemptuous to all other comers, if respectful to their big brother, the three "4½-litres" steamed in in line ahead formation behind the 6-cylinder. Bentley, always our great protagonist at Le Mans, set the seal for ever on the prestige of the British sports car on the continent.

Italy, too, may well feel proud of her Alfa-Romeo. When the marque swept the board in the Italian 1,000 miles race, we began to look forward to a good season for the Milanese firm, and it was not long before the "Alfa-R's" had gained for themselves a reputation for invincibility in their class almost equal to that of the Darracqs some years ago. The Brescia-Rome-Brescia race was followed by the T.C.C. "double-twelve," when for two long days Ramponi with his 1500 c.c. Alfa-Romeo fought with the big Bentley, and just won on handicap at 76 m.p.h. in one of the closest races that has ever been run. The greatest triumph of the year, however, was undoubtedly the Dublin Grand Prix. In the light car section of this event Ivanouski on the Alfa fought with the Lea-Francis and came home a winner at 75 m.p.h.; but not content with this, the same driver decided that he must give the 2-litre model a chance to win its spurs. This time it was the Bentleys that he had to contend with, but once more he proved victorious and put up his average to 76.4 m.p.h. The Alfa-Romeo has certainly had its share of victories, and well it deserves them. It is perhaps the most modern sports car built to-day, and the most efficient for its size. Something of the spirit of the great Ascari must live on in those magnificent little cars.

Finally the great races of the season were brought to a climax by the Tourist Trophy. Some of us, impressed perhaps by the huge chain-driven veterans of the past, always suspected that Mercédès still made the world's supreme sports car. We were impressed with the 33-180 h.p.; when the "220" appeared we rubbed our hands with glee, but when the 250 h.p. S.S.K. followed we just gasped and murmured "what next?" And when Rudolf Caracciola brought his car home a winner of the 1929 T.T. at 72.82 m.p.h. over a course which was altogether unfavourable to his car, we realised that all our eulogies had been too faint. I may be wrong but I fancy that there has been a slight inclination in the British press to pass over the merits of the Mercédès' victory, and I do think that Caracciola's performance in the T.T. should live for ever as one of the greatest achievements in motor racing history. Some of us, at least will raise our tankards and cry "Hoch die Mercédès!"

England, Italy and Germany may well feel then that their cars have acquitted themselves well this season. But what of France, one time the leader in all matters automobile? France to-day seems definitely to have retired from the field of motor racing. This course may seem on the face of it to be very "pratique," but I think that it is a most short-sighted policy. Bugatti it is true won the Targo Florio, and when Albert Divo brought his car home at 46.27 m.p.h. he had achieved a magnificent performance, and that of Minoia on a similar car who finished second was also remarkable; but then we can count on Ettore Bugatti never quite to let us down. Otherwise France has this year hidden her light under a bushel. At the Le Mans race the Bentleys scored a clean sweep, and their most dangerous rivals were not French cars, but American. In none of the other great races of the year has France made so much as a showing. All this seems to me to be terribly bad publicity. Time was, shortly after the war, when we used to gaze at the Hispano at Olympia and murmur "is not this perfection?" Do we do this to any French car now? France by refusing to race is losing ground in the even keener race for automobile prestige. At Le Mans where were the Bugattis, the Boulogne Hispanos, the 3-litre Delages, the Peugeots, the big Renaults, the Voisins and the rest? At present, as is always the case in the winter, rumour is busy with the French cars that are going to compete next year. Let us hope that they materialise, for whatever happens, good a season as we have seen in 1929, 1930 must show us a better!



A RILEY NEARLY HITS THE VILLAGE PUMP AT DUNDONALD HAIRPIN IN THE ULSTER T.T.



AUSTIN "7" OWNERS!
If you want Greatly Increased Power Without Roughness, Fit a RICARDO HEAD to day.
PRICE £5

REJUVENATE YOUR CAR by fitting the RICARDO HEAD

EB

WILL GIVE NEW LIFE TO YOUR OLD CAR

The fitting of a Ricardo Head to your engine will improve your hill-climbing and acceleration beyond belief. It will also effect an appreciable saving of petrol, reduce carbonization, double the life of exhaust valves and can be fitted in an hour. It more than pays for itself in the petrol saved and the increased enjoyment you get from your motoring. Why not have one fitted this week end?

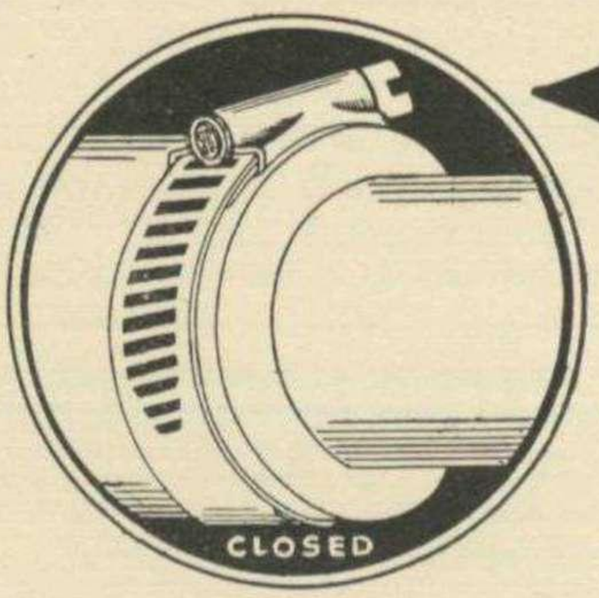
IT IS A REVELATION IN POWER, SPEED, ACCELERATION AND ECONOMY.

In Aluminium:
11·9 h.p. Morris-Cowley.. £7 : 15
14/28 h.p. Morris-Oxford £7 : 15
15·9 h.p. Morris-Oxford .. £8 : 15
10/15 & 12 h.p. Fiat .. £6 : 15
12 h.p. Austin .. .. £7 : 15

In Cast Iron:
11·9 h.p. Morris-Cowley .. } £6
14/28 h.p. Morris-Oxford .. }
15·9 h.p. Morris-Oxford £7

14 Days Trial given, and if not satisfied your money refunded.

Licensee:—SIDNEY W. LEWIS,
Kingsway House, KINGSWAY, W.C.2. 'Phone: Holborn 3302.



Tight with equal pressure all round

THIS JUBILEE WORM-DRIVE CLIP

Will always stop the leak or drip

MAKE SURE YOU HAVE THEM ON YOUR RADIATOR JOINTS, LEATHER COVERS ON UNIVERSAL JOINTS, AIR, OIL AND WATER HOSE JOINTS, AND FOR ALL OTHER PURPOSES WHERE CLIPS OR WIRE ARE REQUIRED

ALL IN ONE PIECE NO PARTS TO LOSE
EASY TO FIT GUARANTEED NEVER TO LEAK

A KEEN MOTORIST WRITES: "*I cannot understand anyone using any other pattern, as yours are the last word in satisfaction and efficiency.*"

STOCKED BY ALL GARAGES & ACCESSORY DEALERS, OR L. ROBINSON & Co., 2, London Chambers, GILLINGHAM, KENT.

SEND FOR A FREE SAMPLE CLIP FOR TEST.

CLUB NEWS

The "London-Exeter."

THE prospectus of the Motor Cycling Club's 15th London to Exeter trial has now been issued, and the date of this year's trial is December 27th and 28th. The start will be as before from the Slough Trading Estate, the first motorcyclist leaving at 8 o'clock on the night of December 27th. The trial is open to motorcycles, three-wheeled cyclecars and cars of any capacity. An interesting addition to this year's course will be the inclusion of a new hill just before the finish. There will be five non-stop sections—Middledown Hill, a hill near Farway, Higher Rill, Harcombe and the new hill near the finish at Shaftesbury. There will also be the stop and restart test on Batcombe Hill. Entries close on Monday, December 9th, and must be sent to Mr. F. T. Bidlake, 10, Park Way, London, N.W.11. Applications from prospective members for election to the club in time to compete in the event must reach Mr. J. A. Masters, 22, Norland Square, London, W.11., by December 2nd.

Sunbeam Club.

The third annual Yeovil trial was held aby the Sunbeam Motor Cycle Club on November 3rd, and there were 15 car entries—nine of which were light cars—and four Morgans. There were five observed hills and a combined acceleration and brake test was held on Bellevue Hill (Westcot of last year's "Exeter"). Breakfast was taken at the Dolphin Hotel, Honiton, and the start was from Loscombe Corner at 8 a.m. The course—about 45 miles long—was inclined to be "sticky" and wheel-spin was the order of the day. Hampton Hill was the most difficult in the whole course and something like 80 per cent. of the whole entry—including some 120 motorcycles—failed here.

Of the Morgans, G. E. Swift gained a first-class award, G. C. Harris a second-class, W. F. Mead no award, and F. J. D. Dickins retired. Among the light car entrants first class awards were won by M. B. Buckwell (Austin Seven) and V. H. Tusen (Fiat Nine), second-class awards by A. D. Taylor (Austin Seven), D. W. Biddle (Singer Junior), and Mrs. C. L. Clayton (Amilcar), and a third-class award was won by B. Cox (Austin Seven). C. S. Mitchell (Austin Seven) and C. J. Platt (Austin Seven retired.

Norwood M.C.

The club wishes to notify club secretaries that its title has now been shortened and will henceforth be known as "The Norwood Motor Club."

Builth Wells and D. M.C.

The course for the Bancroft Cup Trial held recently was a comparatively easy one of 61 miles, the lanes and by-roads being fairly dry after the first observed hill, namely, Secretary's Secret. Indeed, competitors could scarcely lose marks provided everything went well. All the riders completed the course, and the awards were:—Best Performance: A. Colcombe (246 New Imperial); 2, W. A. Davies (990 Matchless); 3, W. Ashton (347 Matchless).

Forest Gate and D. M.C.

On Sunday, November 3rd, this club held its first trial. Twenty-one entries were received; there were no non-starters and the fact that the weather conditions were almost ideal contributed in a very encouraging manner to the success of the event. Results were:—Best Performance: G. Stimson (Indian s.c.). Solo; J. Scott (Norton). Sidecar: W. Boardman (P. and M. Panther). A special consolation prize was awarded to G. C. N. Chaplin.

North Wilts M.C. and L.C.C.

Recent activities of this club resulted as under:—Rimes Cup: Individual and team trial held on October 13th. Winner: D. R. Winslow (B.S.A.). Winning team: G. Morris (Radco), A. Day (Sunbeam), and — Gray (Rudge). Rough Riding Scramble along Winslow Wonder held on October 20th: 1, L. W. Wood (Sunbeam), 2 mins. 25 secs.; 2, L. C. Newman (Brindlay), 2 mins. 30 secs.; 3, D. R. Winslow (B.S.A.), 2 mins. 40 secs. Beale Cup Trial L: 1, G. Morris (A.J.S.), Beale Cup and Replica; 2, C. Thompson (Ariel), Silver Medal. Bronze medals were awarded to N. Barratt, A. J. Day and J. Edmonds. The trial, which attracted an entry of 17, was run as a test for novices, experts being heavily handicapped.

Malden and D. Mc.C.

The following results are announced:—Dorchester Cup Trial: Best performance, B. C. Shepperd (490 Triumph). No silver medals were gained, but bronze. medals were awarded to F. Gravitt (348 Cotton), Mrs. M. Vaughan (Standard 9), and H. E. Reading (Raleigh).

Half-day Sporting Trial: This event was a really sporting affair, the course consisting of cart tracks, mud tracks, water tracks and goat tracks. Bronze medals were gained by — Stockton (493 B.S.A.) and G. H. Goldfinch (Rudge-Whitworth s.c.). The gold and silver medals were not awarded.

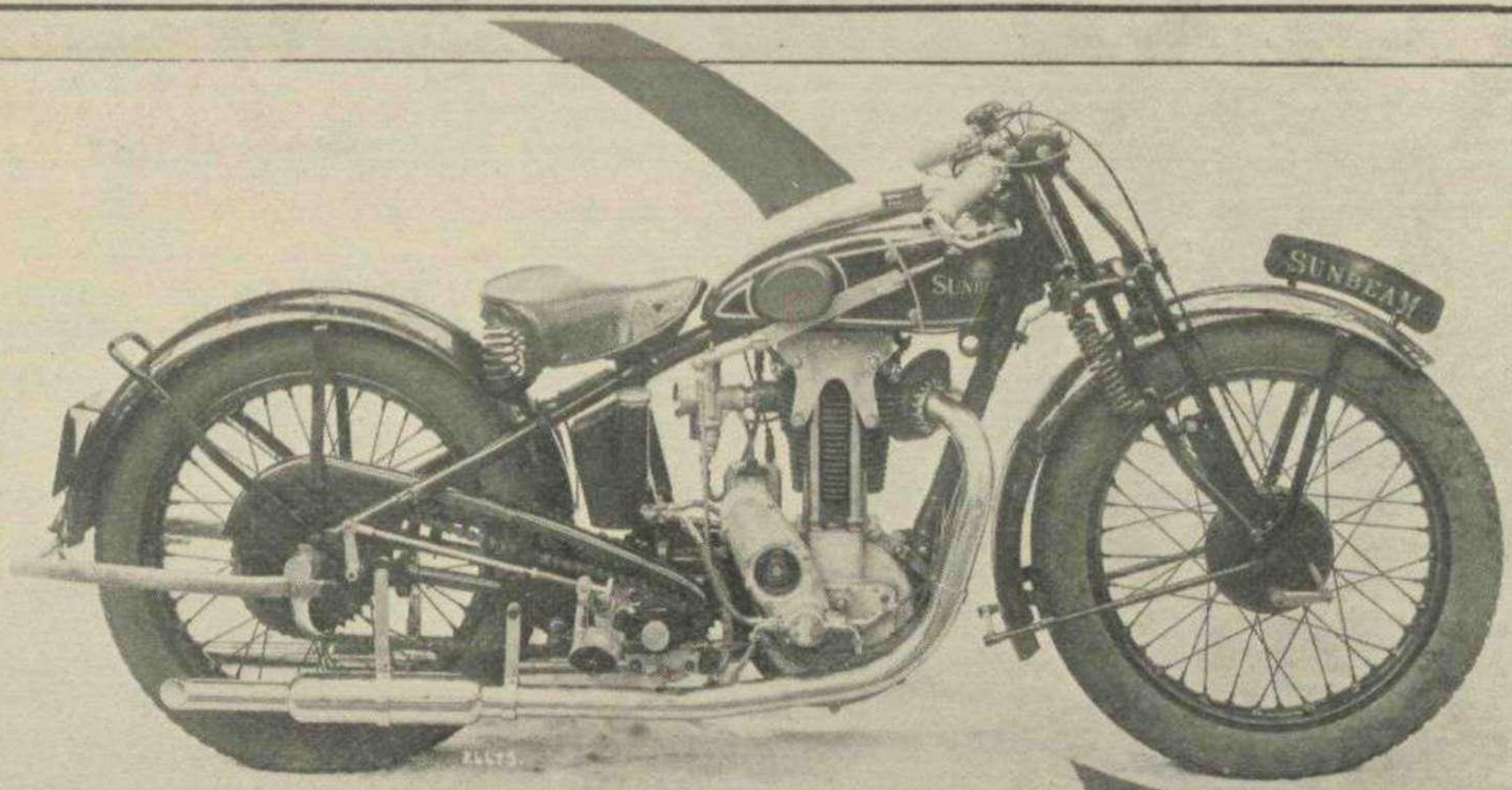
Club plaques may now be obtained from the hon. secretary, Mr. L. S. Cornock, 32, Hoppingwood Avenue, or from Mr. A. V. Smith, 145, Elm Road, New Malden.

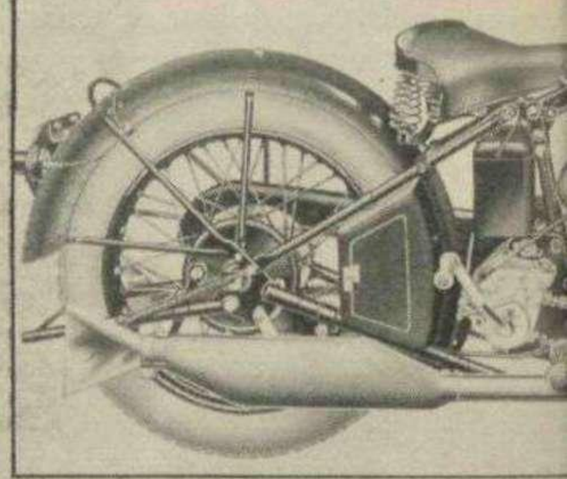
Watford Auto Club.

The annual dinner is to be held at Bucks Restaurant, High Street, Watford, on December 11th, and tickets will shortly be available at 7s. 6d. Make a special effort to be present at the club's chief function of the year.

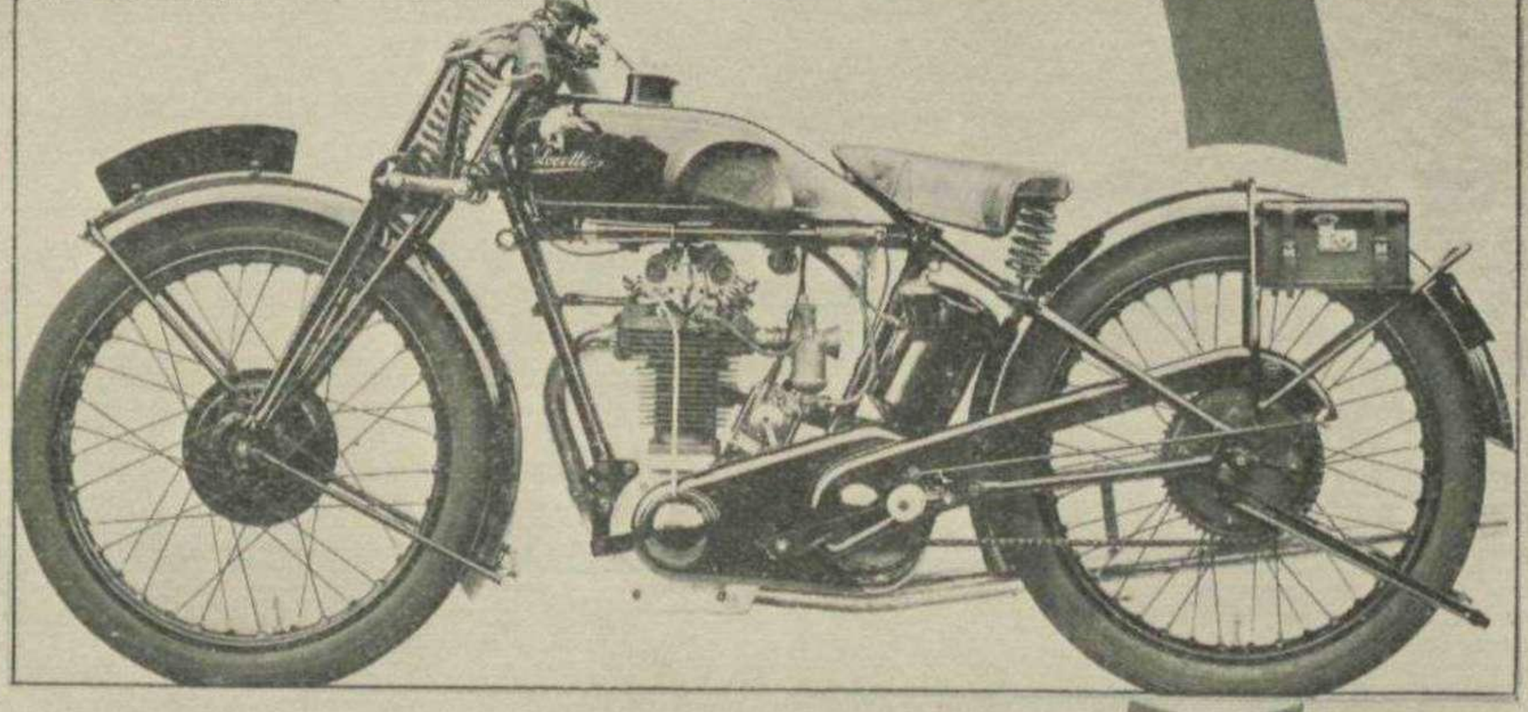
The "R.R. Revenge" Trial will definitely be staged and executed on December 8th. All those willing to assist the chief executioner (Mr. Tom Wilks) as observers or marshals are asked to send in their names. Turn out on this auspicious occasion and observe for yourself the art of trial-riding as it should be done. For the benefit of new members it should be explained that a "Revenge Trial" is one that the members organize whereby the committeemen are able to become claimants on their personal accident policies, particularly in the case of the hon. trial organizer, whose life-insurance policy is carefully scrutinized the day before the trial and all arrears paid up toute-de-suite.

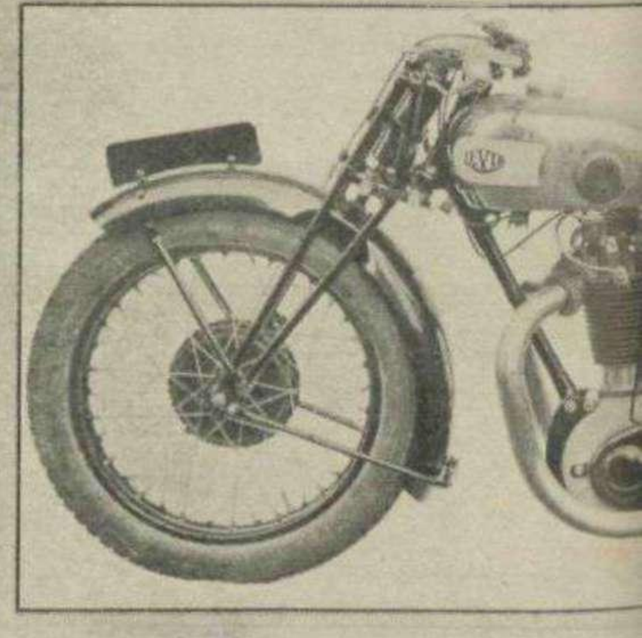
19



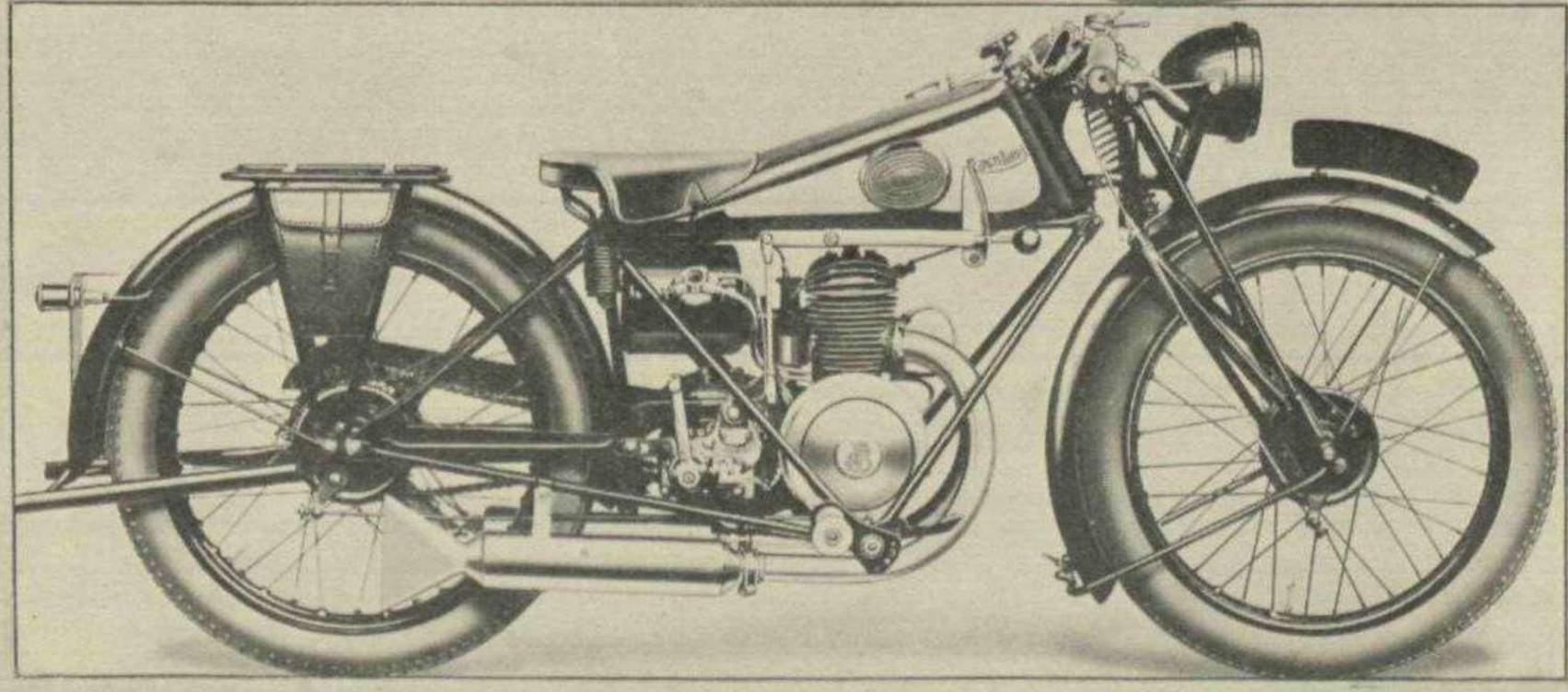


LEFT, THE T.T. REPLICA
CENTRE, THE 4.98 H.P.
LATEST ULSTE





LEFT, THE K.T.T. VELOC
STROKE O.H.V. (MODEL
NEW 4.98 H.

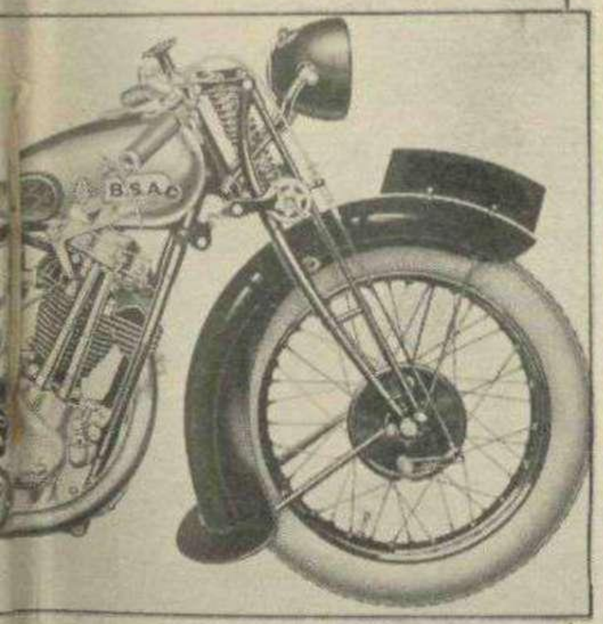


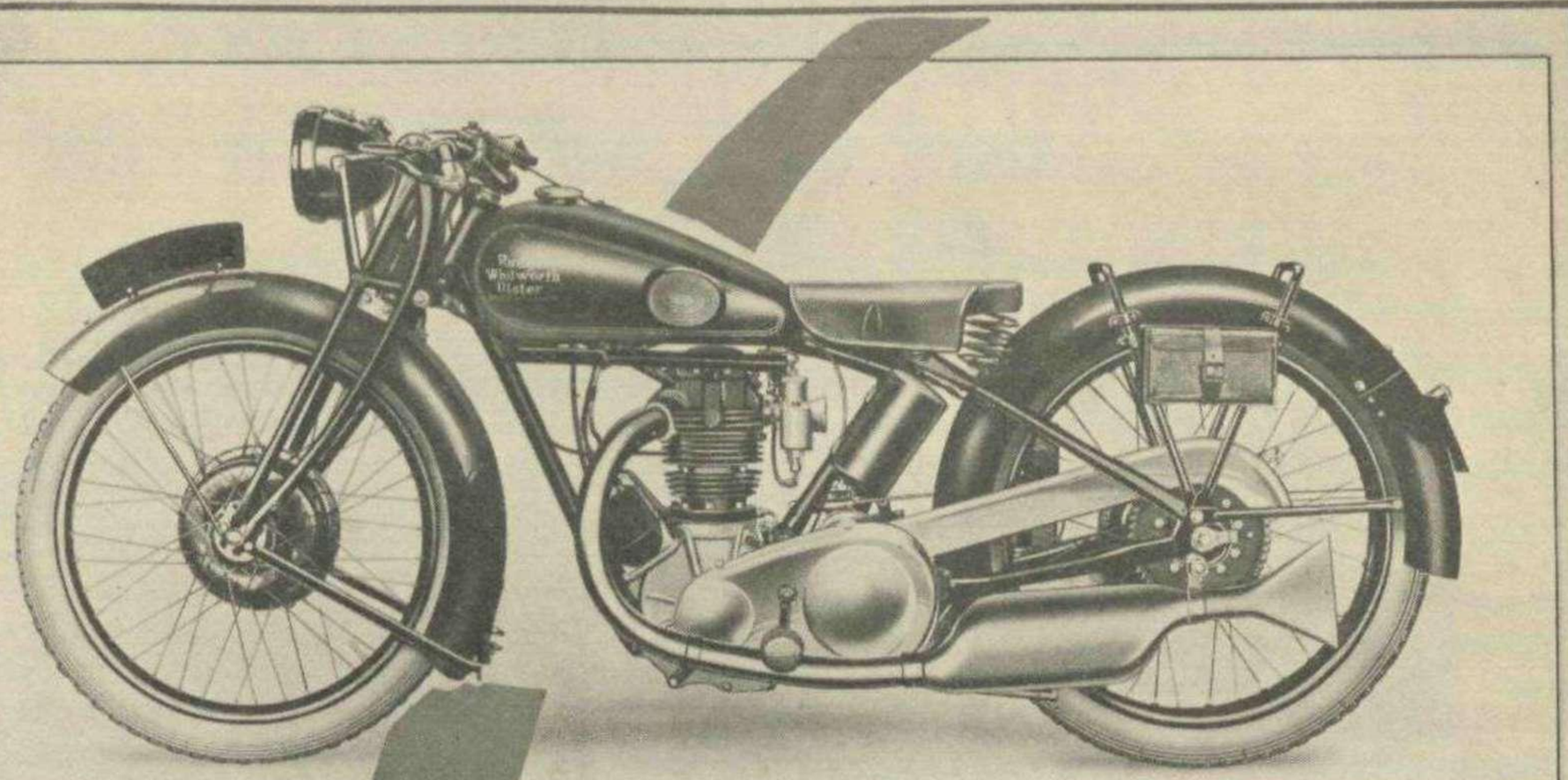
THE SUPER SPORTS 172 C.C. FRANCIS-BARNETT.

SPORT
MODEL

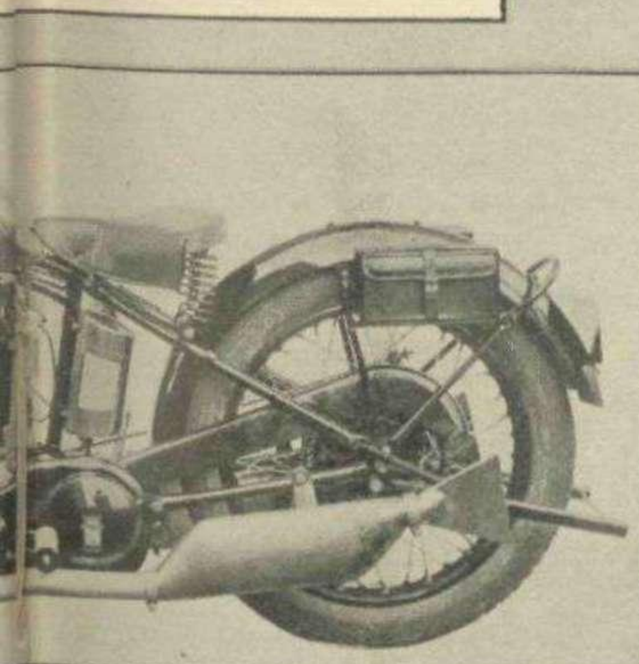
THE S

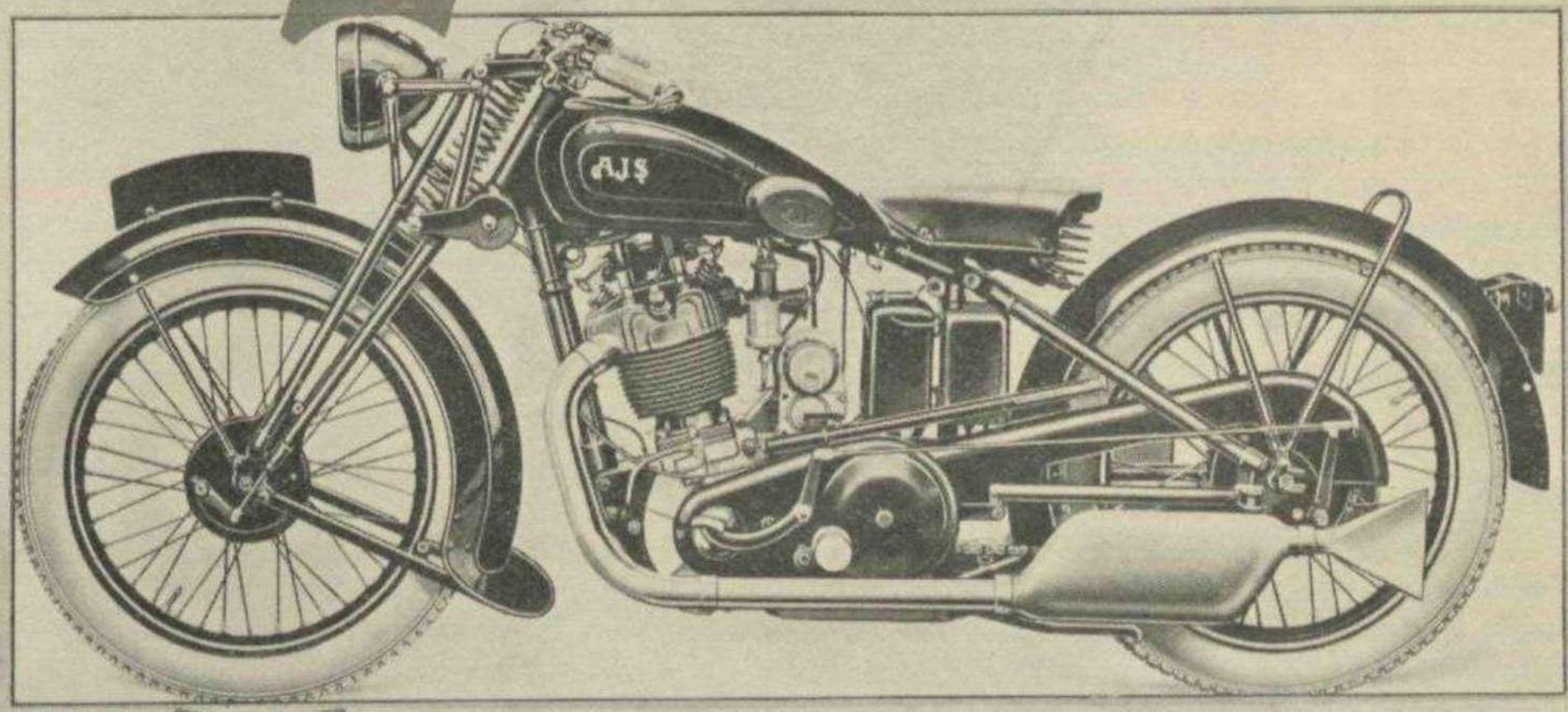
30





MODEL NO. 90) SUNBEAM; C.V. B.S.A.; RIGHT, THE MODEL RUDGE.



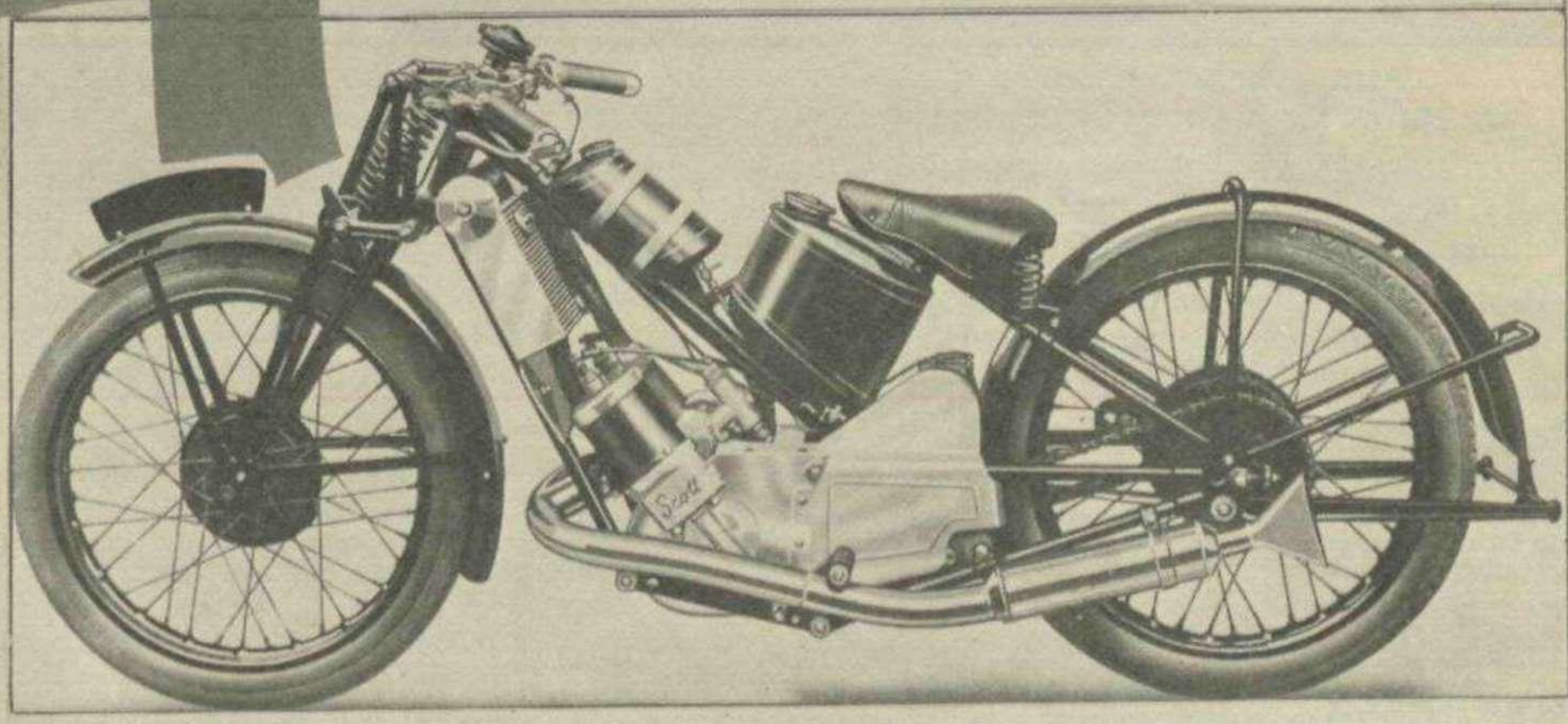


E; CENTRE, THE FOUR-LEVIS, AND RIGHT, THE H.V. A.J.S.

TS

ELS AT

HOW



THE SPRINT MODEL, SCOTT.

OLYMPIA

AND WHY WE GO THERE.

OF course one of the reasons is the fact that there are a lot of beautiful and sparkling new models, some of which we show on adjacent pages. These and many more famous names are gathered together to do battle for the good word and consequently the hard-earned cash of the great British public.

This is an excellent reason, and one without which the show could not be held, but it is hardly the reason for the presence in that overheated, underventilated, conglommeration of people and plating, of the sporting motorcyclist. No, he is not particularly interested in examining details of new models, as he probably knows them already, and is more interested in gossip and trade scandal, mostly fictitious, than in actual mechanisms.

Show week is the one occasion in the year when everyone meets everyone else in the game, and a week is all too short for the task of renewing acquaintances. For once we can meet, clothed and in our right mind, free from the atmosphere of castor oil and perpetual hurry which is the lot of the competition rider in the season. It is impossible to get more than a few yards without running into some familiar figure, last seen dirty and happy, partaking of refreshment after a race, or perhaps someone else whom we last saw at the roadside in Glen Helen with a "burst" motor, as we, more fortunate, roared by and nodded acknowledgement to his cheery wave. In another case the positions may have been reversed, and as we revive old memories others come to join in.

There is always, of course, the gentle recreation of leg pulling, and we shall long remember the case of a certain rider, famous for his consistent Brooklands achievements on a well-known "500." He passed a merry afternoon on the stand, when only a very green salesman was left in charge, innocently inquiring about the new models. "What was the guaranteed speed? would it always do it, could more be got out of it, and if so how? was it easy to hold?" and so on, while the wretched youth made valiant efforts to explain everything he was asked. How long he would have kept it up it is hard to imagine, but the little course of instruction was interrupted by the firm's competition manager strolling back on to the stand with a "Hullo old man, I should have thought you'd have seen enough of those models this year, let's go and have one!" As the salesman realised that the elegant young man whose order he had been hoping to book, could be seen any B.M.C.R.C. meeting, clipping the grass on the Byfleet banking at 100 m.p.h., or over, his expression was pathetic to behold.

Then there is the pastime of trying to find a certain designer whose products are much in demand by prospective T.T. riders, some few of whom may be found in the firm's office waiting to see the great man. Knowing that is the one place he is rarely to be found, we wander elsewhere to find him taking refuge on some rival's stand, whose product he is flippantly discussing with a rider from another firm entirely. Or perhaps we find him indulging in a game of penny-in-the-slot football in some far corner of the show. He is at Olympia under protest and anyone who wants him can look for him! Designers are remarkably frank people as a rule to whom the training of Great Portland Street is a thing unknown. Mention to a salesman, that something on your present model (of his make of course) is not what it might be and he will be up in arms at once, and you will be assured that your case must be unique and probably greatly exaggerated. How different from a case we remember when a rider complained to a famous designer whose machines had scores of successes to their credit, that his oil tank leaked continually. "Oh yes, that type wasn't too clever, I had four tanks on my own machine last year; but if you drop us a line we'll send you one of the new sort."

In past years there have usually been one or two exhibits which through some oversight on the part of their makers have attracted unwelcome attention. There was a certain *very* clever frame in which a portion of the loop round the back of the gear-box, just went round the back and the other end joined on where it started, thus supporting nothing but its own weight. Another source of amusement, when the ground floor has been exhausted, has been to find out how many of the beautiful engines (if any) in the gallery, have any insides fitted, not that this is in the least relevant, but it serves to pass the time.

There is a cheerful a mosphere about the motorcycle show which is lacking in all others held at Olympia and show week never fails to provide some amusement. We seem to remember rather a bright episode involving Stanley Woods and a fire extinguisher—however that was some years ago, and Stanley is a man of business these days. Perhaps the authorities had a definite purpose in fixing the date of this year's show well away from the fifth of November, for the result of the last time this date came in Show week may have been a bit too much of a strain on the nerves of Major Watling and company. However a little relaxation, provided it is reasonably discreet, tends to avoid stagnation, and the day when the Wright Brothers (no connection with the originators of the aeroplane) cease to be seen *and* heard in fierce altercation with all and sundry, and start discussing serious business, will mark the fall of the brightest show of all to the sordid onslaught of humdrum commercialism.

Business is business, we know, but to the man whose work or hobby is the gradual and sometimes painful collection of strange little pieces of metal "suitably inscribed" to commemorate many strenuous hours in the saddle, there is one week in the year when the serious side is forgotten, and the troubles of the past are drowned (not too literally we hope) in the joviality of the present.

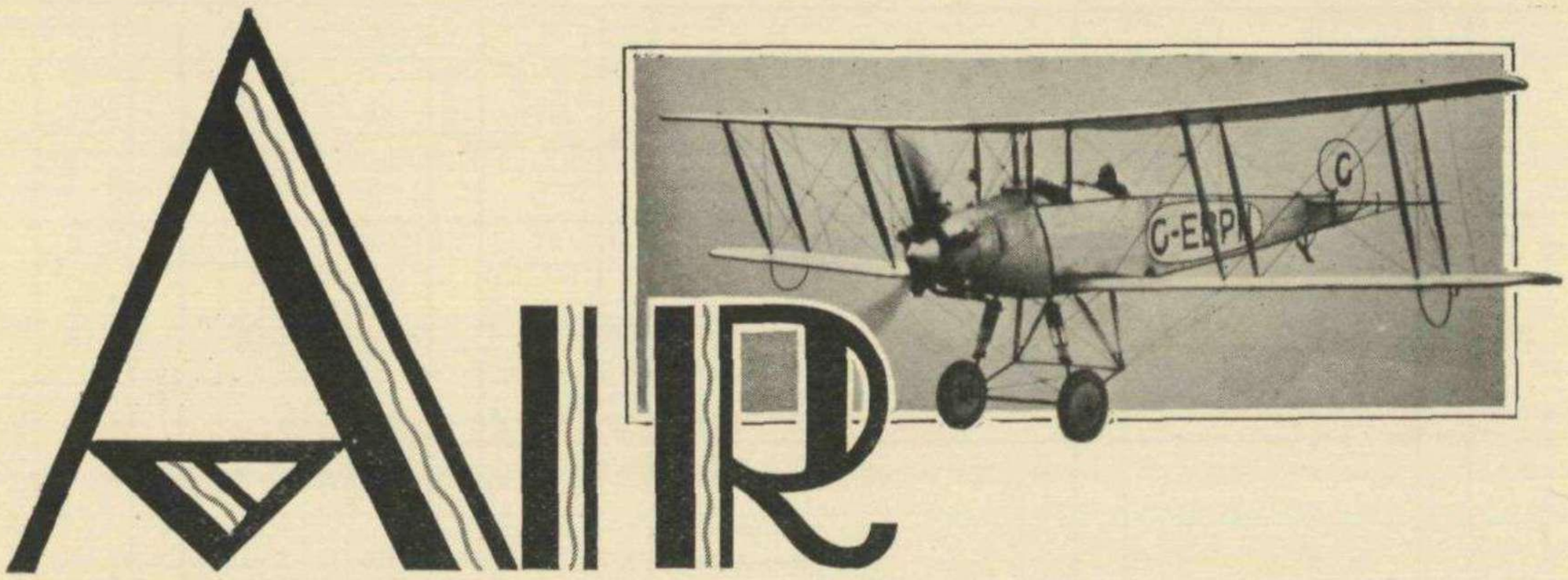
B.R.D.C.—500 MILES RACE.—FULL RESULTS.

No.	CAR.	DRIVER (1).	DRIVER (2).	C.C.		49.8 Miles **18** LAPS	99.6 Miles **36** LAPS.	149.4 Miles **54** LAPS.	199.2 Miles **72** LAPS.	249.00Miles **90** LAPS.	298.8 Miles **108** LAPS.	351.4 Miles **127** LAPS.	401.2 Miles **145** LAPS.	451.0 Miles **163** LAPS.	500.8 Miles **181** LAPS.	Order and Speed.
Class 1. (Not exceeding 1,100 c.c.).																
1	Austin ...	H. C. Spero	H. Spero	749	M.P.H.	78.56	74.97	69.62	64.91	Retired at	74 Laps—3	.8.30				
2	Austin (S) ...	Gunnar Poppe ...	S. H. Newsome ...	749	M.P.H.	81.45	82.40	83.01	76.82	76.41	77.33	77.12	76.57	Retired at	154 Laps—	5.37.38
3	Austin (S) ...	S. V. Holbrook ...	E. Poppe	749	M.P.H.	82.35	83.32	84.09	80.65	80.84	79.90	80.74	80.60	79.97	80.25	6th 80.25
4	Austin (S) ...	G. E. Caldicutt ...	J. T. Wheeler ...	749	M.P.H.	82.77	83.53	83.85	83.40	79.72	72.42	67.08	66.65	*152 Laps	—6.18.17	
5	Austin (S) ...	F. S. Barnes	J. D. Barnes ...	749	M.P.H.	79.57	Retired at	26 Laps	0.54.6							
7	Amilcar (S) ...	Vernon Balls	A. T. G. Gardner ...	1097	M.P.H.	94.91	94.54	94.05	86.25	85.81	Retired at	91 Laps—2	.55.56			
8	Riley ...	E. Martin	J. L. Stapleford ...	1089	M.P.H.	80.18	77.89	78.39	79.59	80.04	79.76	80.21	79.05	78.99	80.12	8th 80.12
Class 2. (Over 1.100 c.c. and under 1,500 c.c.).																
9	O.M. ...	A. V. Wilkinson ...	... ...	1477	M.P.H.	99.10	99.97	85.52	Retired at	55 Laps—2	.25.14					
10	Bugatti ...	J. A. Welch	R. C. Stewart ...	1496	M.P.H.	85.25	86.72	82.51	83.87	84.76	84.27	Retired at	117 Laps—	4.31.13		
11	Bugatti ...	C. Brackenbury ...	R. G. Maurice ...	1496	M.P.H.	80.46	Retired at	28 Laps—1	.33.47							
12	Bugatti ...	O. A. Saunders-Davies	T. E. Rose-Richards	1496	M.P.H.	92.27	65.64	72.53	76.92	79.36	78.69	79.61	80.05	79.80	*168 Laps	6.27.1
14	Frazer Nash (S)	A. Frazer Nash ...	... ...	1496	M.P.H.	84.68	Retired at	27 Laps—1	.31.10							
15	Delage ...	W. B. Scott	B. E. Lewis ...	1486	M.P.H.	99.99	99.66	98.97	Retired at	71 laps—3.	10.38					
17	Lea Francis (S)	Earl Howe	... ...	1496	M.P.H.	95.01	96.42	93.01	92.72	93.45	92.53	93.34	87.51	87.68	88.37	9th 88.37
18	Lea Francis (S)	W. H. Green	... ...	1496	M.P.H.	Retired at	12 Laps—0	.59.16								
19	Lea Francis (S)	R. H. B. Pellew ...	W. H. Green ...	1496	M.P.H.	95.06	96.45	97.02	93.67	89.82	89.89	87.52	88.78	88.31	89.19	7th 89.19
21	Thomas Special	E. M. Thomas ...	... ...	1492	M.P.H.	99.54	102.31	102.93	Retired at	54 Laps						
Class 3. (Over 1,500 c.c. and under 3,000 c.c.).																
23	Bugatti (S) ...	J. F. Field	... ...	2264	M.P.H.	95.51	98.19	99.28	93.78	92.47	90.75	91.82	89.54	89.54	90.14	*90.14
25	Alfa Romeo (S)	L. Headlam	L. G. Callingham ...	1752	M.P.H.	99.32	100.78	101.39	100.82	97.73	97.91	98.02	98.07	96.90	96.73	4th 96.73
27	Sunbeam (S)	G. E. T. Eyston ...	... ...	1988	M.P.H.	111.70	112.48	112.58	112.46	110.60	111.25	111.20	Retired at	134 Laps—	4.6.57	
Class 4. (Over 3,000 c.c. and under 5,000 c.c.).																
28	Sunbeam (S)	Kaye Don	Dudley Froy ...	3974	M.P.H.	116.95	118.04	118.48	Retired at	68 Laps—2	.35.15					
29	Sunbeam (S)	Cyril Paul	John Cobb ...	3974	M.P.H.	114.19	116.05	116.55	110.59	112.06	113.13	113.28	106.64	103.52	102.47	3rd 102.47
31	Bentley ...	Jack Barclay ...	F. C. Clement ...	4398	M.P.H.	112.82	105.13	104.00	105.48	106.60	105.25	106.04	106.60	107.13	107.32	1st 107.32
32	Bentley (S) ...	H. R. S. Birkin ...	B. Harcourt Wood	4398	M.P.H.	104.84	111.36	110.56	105.17	105.53	103.40	103.14	104.64	Retired at	153 Laps—	5.15.22
33	Bentley ...	C. Fiennes	... ...	4398	M.P.H.	99.65	95.70	98.71	96.90	98.29	99.33	97.62	97.43	98.20	98.80	5th 98.80
34	Bentley ...	J. Dunfee	George Field ...	4398	M.P.H.	109.65	110.78	111.39	111.51	Retired at	81 Laps—2	.56.10				
Class 5. (Over 5,000 c.c.).																
35	Bentley ...	C. Dunfee	S. C. H. Davis ...	6600	M.P.H.	117.87	110.75	108.93	111.12	108.55	107.41	108.97	109.40	108.93	109.40	2nd 109.40
36	Mercedes ...	John Noel	John Pole	16200	M.P.H.	97.81	98.46	95.35	96.22	96.60	95.00	95.27	95.71	92.75	*175 Laps	6.20.39

(S) Denotes supercharged.

* Termination of Race 6 hrs. 18 mins. 14 secs., these Cars were running when flagged at end of Race.

Records established during the Race (subject to confirmation):—Class H.: Austin No. 3, S. V. Holbrook and E. Poppe :—200 kilometres, 500 kilometres, 500 miles, 3 hours and 6 hours. Austin No. 4, G. E. Caldicutt and J. T. Wheeler :—100 kilometres, 200. miles. **Class G :** Amilcar No. 7, Vernon Balls :—200 kilometres, 200 miles. **Class F. :** Thomas No. 21, E. M. Thomas :—200 kilometres. **Class E. :** Alfa Romeo No. 25, L. Headlam and L. G. Callingham :—500 miles. 6 hours. Sunbeam No. 27, G. E. T. Eyston :—500 kilometres, 3 hours. **Class D. :** Bugatti No. 23, J. F. Field :—200 kilometres, 500 kilometres, 200 miles, 500 miles, 3 hours. **Class C. :** Sunbeam No. 29, Cyril Paul and John Cobb :—500 kilometres, 3 hours. Bentley No. 31, Jack Barclay and F. C. Clement :—500 miles. **Class B. :** Bentley No. 35, C. Dunfee and S. C. H. Davis :—200 kilometres, 100 miles, 200 miles. **Class A. :** Mercedes No. 36, John Noel and John Pole :—200 kilometres, 200 miles.



Winter Week-Ends in the Air.

Flying is no Seasonal Pastime but a Game for All the Year Round.

By F. L. H. SEARL.

LAST Saturday morning I got up and observed to the world in general :—" I *would* like to play golf at Bude today." And my wife said, " Lets," so we went, playing two rounds that day and one the next.

Naturally we flew ; no vehicle other than the aeroplane or Sir Henry Segrave's car could have got us there and back so satisfactorily within the scope of that short week-end.

In my pre-flying days, I infested the good roads of England in a species of explosive dustbin which got me about fairly rapidly, as cars go : its open body and " all-weather hood " (the makers' description), gathered in draughts and such rain as might be about in large quantities. A long journey merely provided food for thought as to the approaching return and left me a nerve-shattered wreck at the memory of narrow escapes from the gay-walker and the fool round the corner. And this luxury cost me about £150 a year to run, and probably more.

At the expense of the taxpayer I had flown for some years in the R.A.F., and as such I was inclined to think of all flying as expensive. Until one day I sat down and figured it out that I could cover just as much country in a light aeroplane for £100 per annum.

Within a week my sports car was in a Portland Street window, and I was the possessor of a second-hand aeroplane and a seven-horse power car as a tender to carry me to and from the aerodrome. The experiment has not yet worked a full year, but upon a completed six months basis I am definitely going to save.

A great deal has been said and written of the ubiquity of the modern light aeroplane, but there is still an inclination to regard it as prohibitively expensive : actually it costs about 3½d. per mile to run, to reduce the cost to a more readily understandable unit than so much per hour. The modern sports car which can put up even half as good an average speed will cost at least that figure.

The burden of ownership need not necessarily be assumed ; there are many excellent organisations which cater for the hirer, who can get as cheap flying as an owner—there are some who maintain that it is even cheaper.

For example, a machine may be hired from one such organisation at as low a rate as one guinea an hour : at 80 miles per hour cruising speed, this works out at just over 3d. per mile—and that is a figure which covers the cost or all fuel and full insurance. Incidentally for two persons it is a lower figure than third-class train travel, between any two points in England.

The simplicity of the whole affair should constitute the main appeal of aerial week-ending.

Once in the air the holiday spirit gets a very definite grip : the absence of speed traps and cross-roads has a doubly soothing and exhilarating effect.

Speeding to the west this last Saturday, one saw the arterial roads crammed with crawling traffic, steadily thinning as we put the miles behind. That sense of " getting away from things " alone makes air travel worth while.

Even at this season the west seems to bear some lingering traces of summer : there is no lack of interesting views, for the broader convolutions of the country are always visible from the air. The Roman country round Ilchester, for example, bears many traces of the civilising influence in roadways and earthworks. Here and there the country is straddled by prehistoric cart tracks.

Once arrived at Bude the problem of a landing place was solved by a field some half-mile from the sea ; and a well-disposed farmer soon solved the problem of housing for the night by lending us an empty barn, wherein the machine was rapidly stowed with folded wings.

Whatsoever one's open-air interests may be—hunting, golf, or merely a desire to blow away some of the atmosphere of a town, the light aeroplane brings within reach of a short two-hour flight the uncrowded spaces of England. One's week-end of golf might just as easily have been a day's hunting in the Shires, or a day's racing in the north.

The arm-chair aviators begin to speak in the autumn of " next season's flying " ; they thereby show them-

WINTER WEEK-ENDS IN THE AIR.—Continued.

selves to be on a level with the motorist who jacks up his car and stows it away early in October, for the light aeroplane is just as independent of seasons as is the modern saloon car.

In its warmth, comfort and freedom from draughts, indeed, the exhaust-heated coupé machine is a more comfortable proposition than the saloon car : and its speed dwarfs it out of all comparison.



The writer of the foregoing article, with his wife, and Captain Pennington, of the N.F.S., beside a " Moth."

A New Book About Flying.

" Into the Blue " : By Captain Norman Macmillan, M.C., A.F.C. ; Duckworth : 8*s.* 6*d.*

MANY of us, to whom the " Rumpety," the " One-and-Half Strutter," the "Sop. Pup " and " Sop. Camel " mean something more than mere names have waited, and waited a long time, for a book like *" Into the Blue."*

Quite a number of books about war-time flying have appeared during the past few years but none, one ventures to say, has had the real atmosphere of those days which, to quote the author of *" Into the Blue,"* were " a good and bad time rolled into one. . . . a great and glorious adventure."

Captain Macmillan, who is now test pilot for the Fairey Aviation Co., takes us through the whole of his career in the R.F.C. and R.A.F. from the time he transferred from the infantry in 1916 up to 1921. And the atmosphere is there. One reads of that abbreviated and hectic course at the ground school where one learned or tried to learn the intricacies of the rigging of the B.E.2.c., the theory of flight and a hundred and one other subjects ; one reads and remembers.

One reads of the author's first solo on a Farman Longhorn and his words echo the feelings of thousands . . . . " I flew around, unconscious of anything save the joy of flying, of controlling the live apparatus that bore me along on outstretched wings. . . . Suddenly I felt acutely alone. I wanted to get back to them (his friends on the ground), to feel the friendliness of their presence. . . ." Remember ?

Then comes the sterner work when he joined his squadron overseas (No. 45), where the hangars were of the Bessoneau portable type, the quarters, Nissen huts and the machines the Sopwith one-and-half strutters. New pilots in those days, he reminds us, were received " with interest and kindliness but without enthusiasm."

" Into the Blue " is a great book, full of realism but written with restraint, which every air-minded person should read.

G.

LIGHT PLANE POWER PLANTS.

The Air-Cooled Four-in-Line is the Pioneer of Post-War Low-Powered Engines with many Records to its Credit.

NO factor has contributed more to the successful evolution of the light 'plane than the reliability found in the aero engine of the present day. The accumulated experience and data which has so painstakingly been acquired during the past decade has enabled designers to produce machines which have none of the many vices of their prototypes so that flying is now a comparatively simple business, calling for no exceptional skill, or sense of touch, which was formerly required when machines had marked tendencies to swing violently, stall with little or no warning, develop spins on turns and so forth. But high as these aerodynamic qualities are, flying would still be a precarious mode of travel were it not for the splendid standard of dependability of the engine.

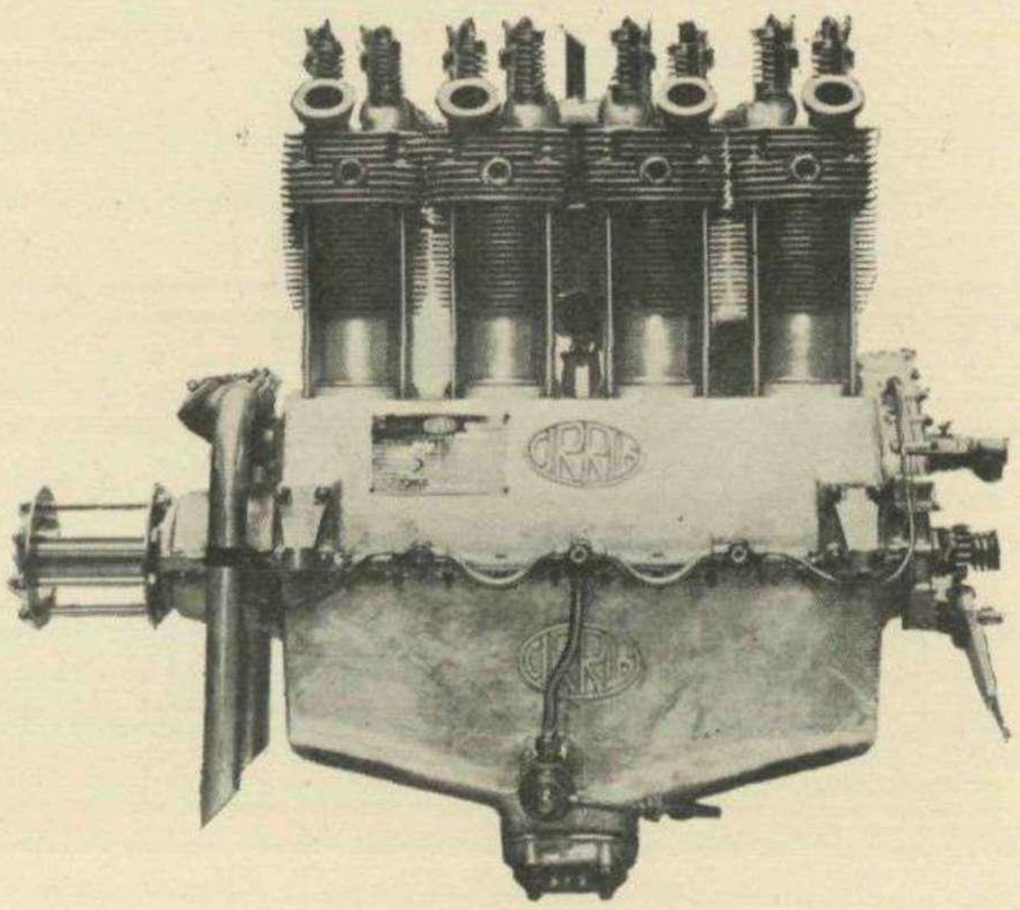
This dependability has been demonstrated in the most convincing manner and in a variety of ways—by the historic flights to India, Australia and Africa, for example, and by the excellent record of service of machines in daily use by flying clubs, schools and in commercial aviation in various quarters of the world.

The type of engine which has figured most prominently in this long list of achievements has been the air-cooled four-cylinder in line and it is interesting to find that until Major Halford designed the "Cirrus," specially for installation in the first D.H. "Moth," this type of power unit had never before been evolved or utilised for air work.

The original "Cirrus" was rated at 27-60 h.p. having a bore and stroke of 105 mm. and 130 mm., and a characteristic of the design was its robustness throughout. Cylinder barrels were of cast iron with detachable aluminium heads, the whole assembly being secured to the crankcase by long studs passing through lugs on the cylinder heads. Valves were overhead and push-rod operated and the pistons were of aluminium. The crankshaft was carried on five bearings and the camshaft on three. Ignition was by means of one B.T.H. magneto incorporating an impulse starter while the carburettor was an F.S. 42 type Zenith. The weight of the "Cirrus" without oil was 268 lbs. and fuel and oil consumption were 0.66 pints per h.p. hour and 0.013 pints per h.p. hour respectively. The "Cirrus" was by no means a high speed unit and gave of its normal h.p. at 1,800 r.p.m., a factor which in conjunction with its sturdy construction contributed to its reliability.

After the "Cirrus" had been turned out in considerable quantities, its manufacturers produced, in response to the demand for an engine of more power, which came with the transition of the light 'plane from the simple to the more elaborate type, a larger edition known as the Cirrus Mark II. As a result of the experience gained with the Mark I, new features were incorporated in the design which raised the power output to 80 h.p. and made both for an increase in reliability and a reduction in maintenance costs.

It was with an engine of this type that Mr. Bert Hinkler successfully carried out his great joruney in his Avro Avian to Australia—a distance of 12,000 miles in 15½ days. Throughout this flight no part required replacement and at the conclusion, when the engine was dismantled, everything was found to be in excellent condition.



THE ORIGINAL CIRRUS ENGINE, THE MARK I. WHICH WAS FIRST PRODUCED IN 1925. NOTE THE HAND-OPERATED STARTING DEVICE AT THE REAR END OF THE CRANKSHAFT.

Other types which have been added to the "Cirrus" range are the Mark III and the "Hermes." The former is of 85-95 h.p. rating, the dimensions of the bore and stroke being 110 mm. x 130 mm., giving a total swept volume of 4,939 c.c.

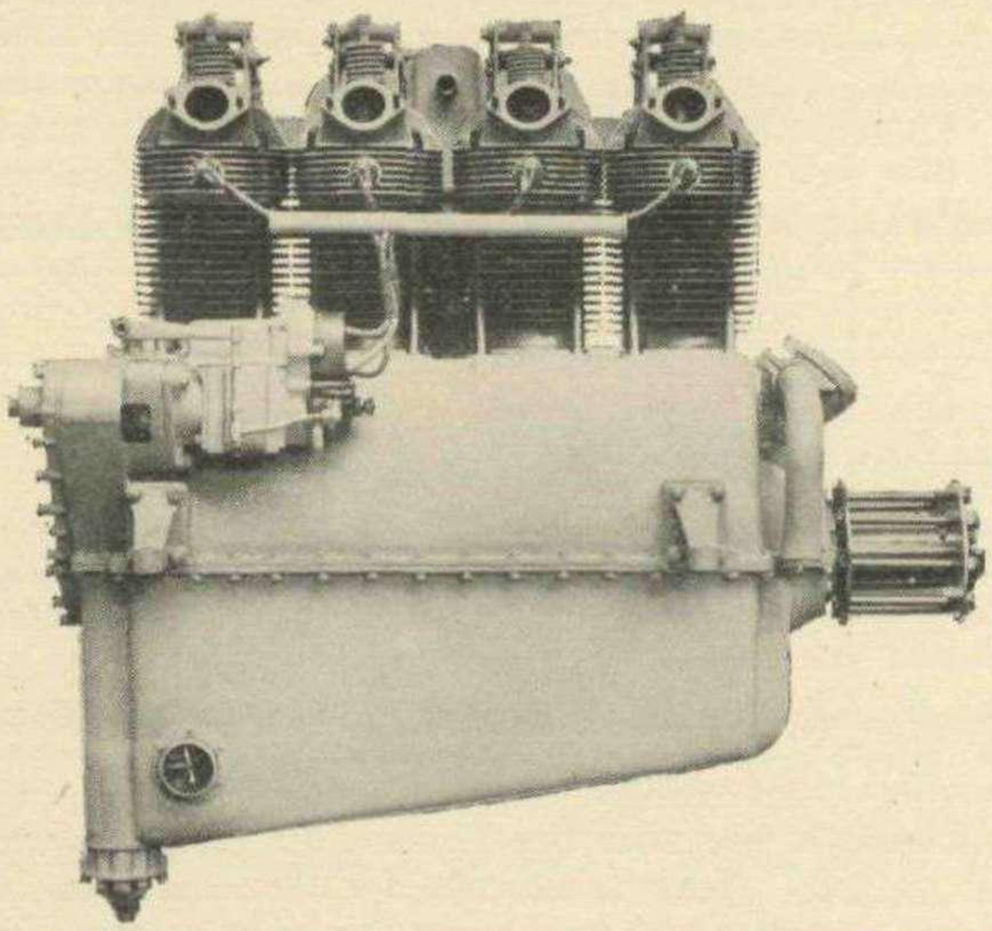
All the salient points of design found in the other types of "Cirrus" have been retained, and while the weight per h.p. has been lowered appreciably, the general robustness of construction remains.

The "Hermes", which was introduced in July of this year, represents, perhaps, the very latest in aero engine design and it is noteworthy that its power weight ratio is less than 3 lbs. per h.p. Of 105-115 h.p. rating, it has a cubic capacity of 5,717 c.c. (114 m.m. bore x 140 m.m. stroke), and there are many points incorporated in the general layout which indicate that considerable thought and ingenuity has been expended.

Normal requirements as regards aerobatics are, for example, allowed for by the provision of a special oil tray which raps the oil during the execution of "acute" manœuvres; provision is made too for the attachment of a starter gear and fuel pump drives without structural alteration. Particular care has been taken also, to reduce

LIGHT PLANE POWER PLANTS.—Continued.

the overall dimensions of the unit, so that the "Hermes" can be installed in machines designed for "Cirrus" engines, the bearer centres being identical. The two magnetos are both mounted at the rear of the engine in such a position as to allow of easy accessibility and adjustment of the distr butors and contact breakers



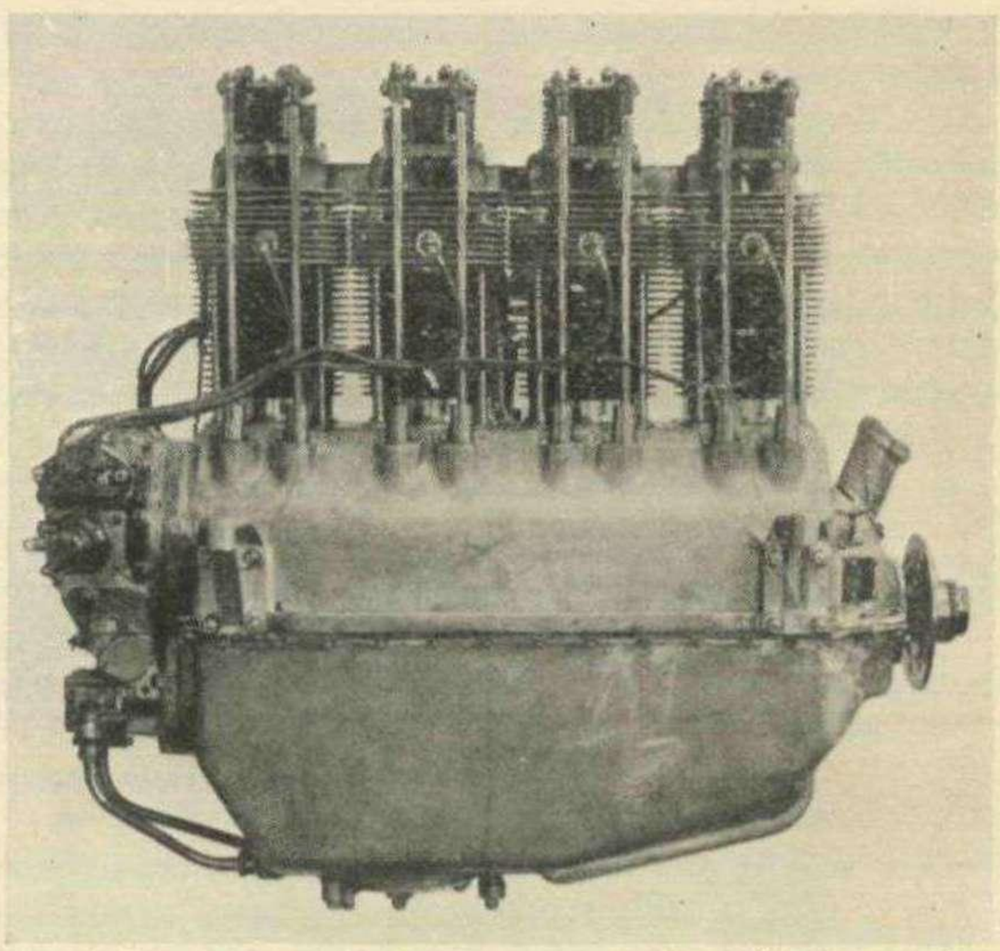
THE LATEST ADDITION TO THE CIRRUS RANGE—THE 105-115 H.P. HERMES WHICH IS NOW BEING USED IN TWENTY DIFFERENT MAKES OF LIGHT PLANES.

and the H.T. wires are of minimum length. The results of the Air Ministry 100 hours test (which the "Hermes" passed easily at first attempt) showed that with a compression ratio of 5.1 to 1, the petrol and oil consumption was .58 pints per h.p. hour and 1 pint per hour—very moderate figures for an engine developing 105 h.p.

Another 4-cylinder in-line engine which has quickly made a name for itself and which has recently completed one of the most remarkable tests of endurance to which any aero engine has ever been subjected is the 100 h.p. D.H. "Gypsy." This engine has a bore and stroke of 114 m.m. and 125 m.m., and its capacity is 5226 c.c. Designed jointly by Major Halford and Captain De Havilland it bears a strong resemblance to the "Cirrus" family. The cylinders are cast iron with detachable aluminium heads, each housing one inlet and one exhaust valve which operate on bronze seatings, screwed into the head. The crankshaft is of particularly robust section and is carried on five plain bearings. Lubrication is by gear type pump in conjunction with a "wet" sump which has a capacity of two gallons. The sump has cooling fins cast on its exterior surface so that the propeller slip stream, impinging on it at a high velocity, maintains a low oil temperature. The camshaft, like the crankshaft, is carried on five substantial plain bearings and the cams operate the valves through tappets and tubular duralimin push rods which have hardened steel ball joints at both ends. The camshaft is driven through the medium of spur wheels which incorporate a vernier device which permits a very fine adjustment in timing setting. An intermediate gear in the timing train incorporates a worm drive for the two magnetos which are mounted transversely on the engine. Carburation is through a single Zenith carburettor bolted to an orthodox type of induction pipe, so placed as to be conveniently jacketed and warmed by the exhaust manifold. The maximum r.p.m. of the "Gypsy" is 2,100 at which speed a full 100 h.p. is given off; its normal running is 1,900 r.p.m.

Reverting to the endurance test previously mentioned, this was begun in December of last year and continued for nine months, the project embarked upon being the compilation of a total of 600 hours in the air, without overhaul, repair or replacements; the "Moth" in which the "Gypsy" was installed, to cruise, as far as possible, at a constant speed of 85 m.p.h. This ambition was fully realised, and at the conclusion of the predetermined 600 hours the seals which were affixed to numerous parts of the engine, were still unbroken.

Facts and figures of the tour are as follows:—Flying time: 600 hours; total running time, including bench tests, taxying and running up: 661 hours, 5 minutes; total distance covered in the air: 51,000 miles; petrol consumption including bench tests, taxying and running



("*FLIGHT*" *Photograph*)

A VERY FAMOUS ENGINE, THE 100 H.P. GIPSY, MANUFACTURED BY THE DE HAVILLAND COMPANY.

up on occasion of each flight: 4½ gallons per hour, or 19½ miles per gallon; oil consumption: 0.45 pint per hour, or 1,400 miles per gallon. Bench tests: three bench tests were given on the Heenan and Froude brake: (1) When the engine was new, (2) after 500 flying hours and (3) after 600 flying hours.

Commenting on this remarkable achievement, Major Halford points out that comparing the performance with that of the average car engine, the mileage flown (51,000) represents about 5 years (at 10,000 miles per annum) of car mileage, incidentally, without failure, without overhaul and without even decarbonising.

SLIPSTREAMS

BY

"RUDDER-BAR."

The Caterpillar Club.

That very select body, the Caterpillar Club, was called to mind a few weeks ago when two Service pilots extricated themselves from a most terrific and perilous position, following a collision in mid-air, by leaping to safety with their parachutes. This unpremeditated act automatically made them eligible for membership to the Club which is undoubtedly one of the most unique and exclusive bodies in the world. Its founder is Mr. Leslie Irvin, the American inventor of the Irvin Air 'Chute, which has been for some years a standard part of the equipment of the R.A.F.

Membership to his club is made possible by only one means—by saving one's life by the use of a parachute and, once one has been elected, one remains a member for life. Those who qualify receive from Mr. Irvin a little insignia in the form of a gold caterpillar scarf-pin and amongst the names which figure in the list of memberships are those of Lindbergh and D'Arcy Grieg. The late "Tiny" Scholefield was, I believe, the first English pilot to be enrolled.

Mr. Irvin, by the way, besides being a pioneer of parachute construction, is also a pilot and an experienced parachutist. He owns a "Moth" and uses it extensively in connection with his business, the English headquarters of which are situated at Letchworth, Herts. He has made 'chute jumps on hundreds of occasions and made his first descent when scarcely in his 'teens.

The Noise Nuisance.

One of our most famous pilots, who is also a shrewd man of business, told a friend of mine recently, that one of the big problems which manufacturers of commercial aircraft have got to tackle is that of noise. And the solution is not an easy one: it is not so much a question of silencing engines as diminishing vibrations set up by airscrews and much of the discomfort experienced by passengers in cabin machines is due, I understand, to the latter. I was interested to hear, also, that airsickness is just as likely to be brought on by noise as by uneven movements of a 'plane in bumpy weather. With open cockpit machines the noise question is not so serious I think, for there is no drumming and resonance as there is inside a cabin. Some time ago Imperial Airways carried out some extensive research work on a number of their machines in connection with their attempts to lessen the noise nuisance, but I am unacquainted with the results obtained.

Flying by Instruments.

The lay press appear to have been greatly intrigued recently by the "hood" arrangement over the rear cockpit designed for instructing pupils in blind flying which has been fitted to a Hawker "Tom-Tit", and hailed it as the very latest innovation. Actually, of course, this system was utilised in the R.F.C. and R.A.F. as long ago as 1917, as many readers will remember. In a similar way, the daily press are always ready to express mild wonder at anyone completing a successful first solo flight after what is really a considerable number of hours of dual, and appear to be entirely ignorant of the fact that in the war years anything between 40 minutes and 4 hours was considered enough before sending a pupil solo.

The Motor Trade and Plane Sales.

An interesting development has become public regarding the well-known London motor concern of Henlys Ltd. This is that they have made arrangements to conduct sales of new and second-hand aircraft on what may be regarded as an extensive scale. Not only do they intend to utilise one of their London showrooms for the display of aeroplanes, but in addition they have purchased a site near the London air terminus which will be used as an aerodrome for demonstrating machines; hangars and workshops are to be erected there, where service work and garaging of customers' planes can be carried out in the most up-to-date style.

R.101 and R.100.

R.101 has passed an unpremeditated test in riding out the recent gale at her mooring mast at Cardington: the severity of the test has been sufficient to quell some of the doubters.

R.100, the sister-ship which has been built at Howden may have left on her preliminary trials before these words appear in print: there is a good deal of conjecture in flying circles as to the personnel.

It seems certain that Major Scott will be in command, and I hear on good authority that Flight-Lieutenant Major may be the navigator: the latter officer, it will be recollected, was to have been navigator to Squadron Leader Jones-Williams on his attempt to capture the world's distance record in the Fairey Napier monoplane.

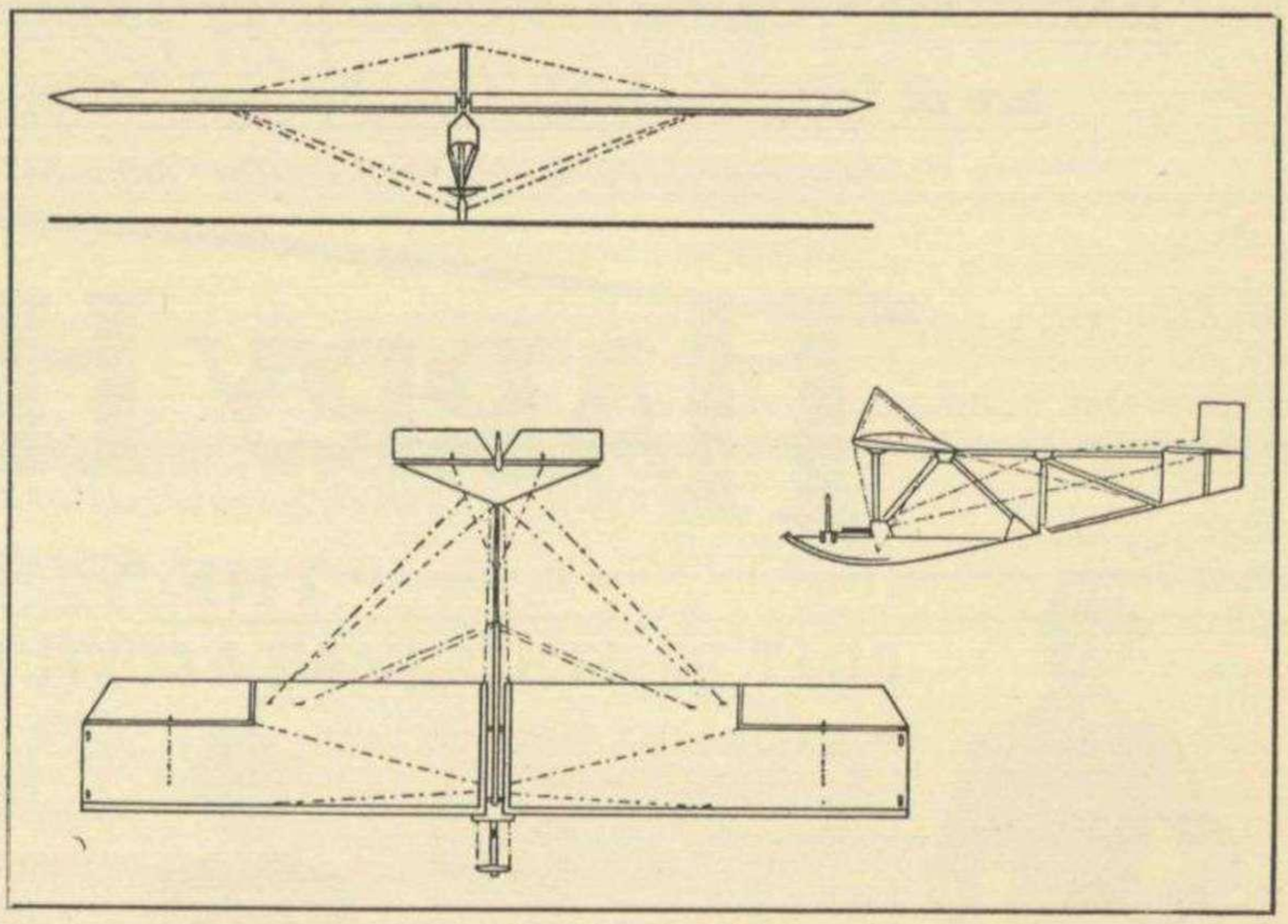
Record Attempts.

The machine in question is now at Cranwell awaiting suitable weather for a second attempt and Squadron Leader Jones-Williams tells me that he is confident of reaching Cape Town this time.

The subject of records is a sore one in flying circles at the moment following the Government announcement of withdrawal of official teams from the Schneider Trophy contests—a direct reversal of the Prime Minister's statements after this year's success.

Actually, the move is merely an economic one; the aircraft firms, participating in the events in future will bear the cost of production instead of the taxpayer. The Government is unlikely to make difficulties over lending suitable pilots however.

Gliders and Sail-Planes

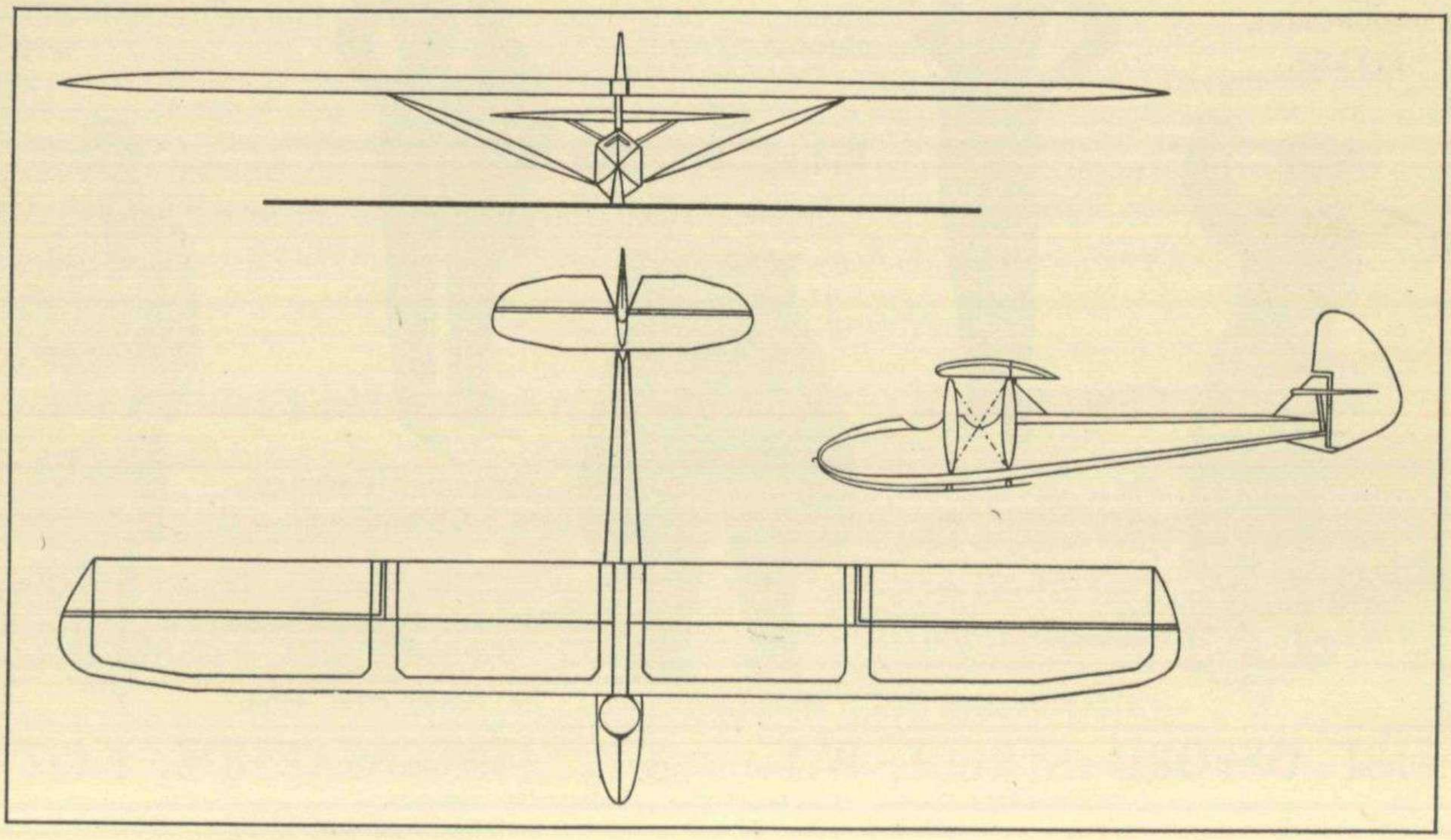


The Simple Glider.

ONE of the most striking features of aviation in Germany during recent years has been the advance made in motorless flight. Revived and fostered by a group of sportsmen, comprising ex-members of the German Air Service and university students, the movement has now developed to such an extent that it has become a national pastime and a new branch to the aircraft industry is springing up in the construction of gliders and "sail-planes."

The Germans draw a sharp distinction between these two types of craft: the former being the simple preliminary training machine with which only brief "coasts" a few feet above the ground are possible. The sail-plane, on the other hand, is the advanced type capable of remaining in the air for long periods.

One of the latest of these soaring craft is the Kegel K.F.K.3, which is illustrated below. As will be seen, it is a two-seater of the high-wing monoplane type, the span being about 53 feet. The wing is not of the cantilever type which is generally found on these machines, but strut-braced. All the controlling surfaces are of ample area and the covering throughout is of veneer. The fuselage is of semi-monocoque construction. The landing gear, following standard practice, consists of a broad-surfaced, shock-absorbing skid. Reports state that the K.F.K.3 handles exceptionally well, its gliding angle even with passenger being particularly good.



"HALLZONE" Clothes are Distinctively Tailored from Finest Quality Materials, are of Irreproachable Cut, Fit and Style, and of Unequalled Value.

Awarded 12 Gold Medals for Superlative Sartorial Service.

HARRY HALL LTD

GOVERNING DIRECTOR:- HARRY HALL



"THE"

COAT, BREECHES, HABIT & COSTUME SPECIALISTS



"HALLZONE" IDEAL
GOLD MEDAL PRODUCTIONS.

Lounge Suits from	£6	6	0
Overcoats ,,	£6	6	0
Raglans ,,	£6	6	0
Motor Ulster ;,	£8	8	0
Dress Suits ,,	£10	10	0
Dinner Suits ,,	£8	8	0
Plus 4 Suits ,,	£6	6	0

SPECIAL OFFER.

Jacket and Vest in Black or Grey from £5 5 0

Trousers in Solid Worsted from ... £2 2 0

An Ideal Suit for Business and Professional Wear.

Ladies' Salon

181 OXFORD STREET, W.1.

Astride Habits from	£10	10	0
Side Saddle ,,	£12	12	0
Riding Breeches ,,	£2	2	0
Ski-ing Suits ,,	£9	9	0
Costumes ,,	£6	6	0
Long Coats ,,	£5	5	0



UNEQUALLED VALUE.

DISTINCTIVE STYLES.

EXCLUSIVE MATERIALS.

PERFECT FIT.

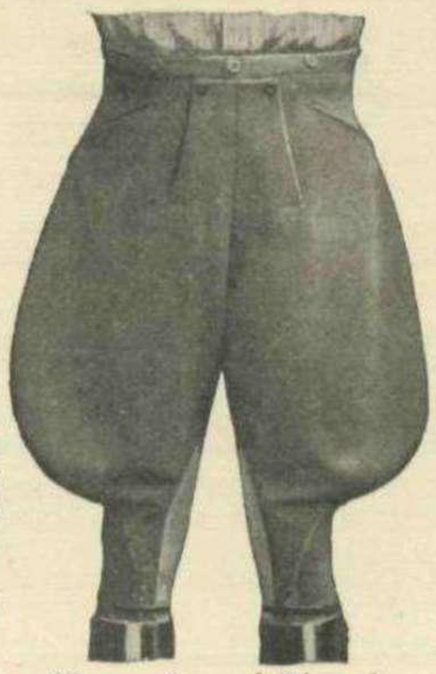


Only Maker of "Hallzone" Ideal Gold Medal

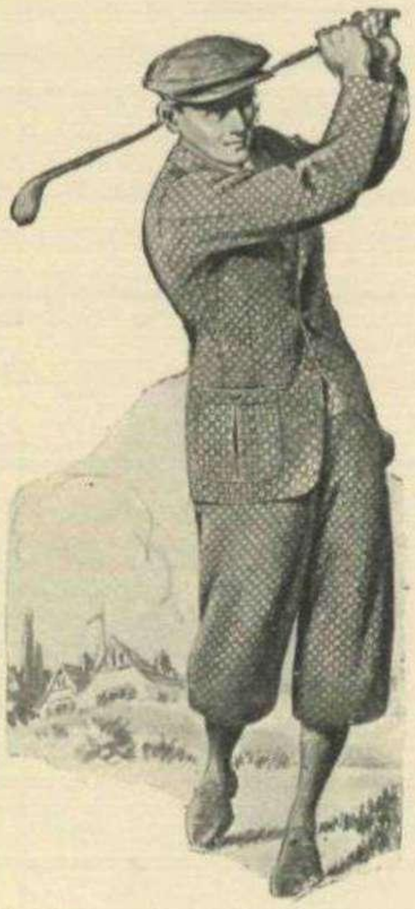
42/-

Riding Breeches

Best Value, Fit and Style Breeches obtainable







The *"Sunday Graphic"* Critic says:

Jasper Maskelyne appeared in the most IMMACULATE EVENING DRESS I have ever seen.
(*Made by Harry Hall Ltd.*)

PATTERNS POST FREE

(From Actual Photo)

AQUASHINE COVERALL.

The Ideal Weather-Resisting Rain and Dust Coat, Indispensable for Town and Country, Proofed Check Art Silk or Woollen Lining **63/-**

PATTERNS POST FREE.



181 OXFORD STREET, W.1 & 149 CHEAPSIDE, E.C.2

'Phones: REGENT 3024, 3025 and 7435. NATIONAL 8696-8697.

LETTERS FROM READERS.

Letters from readers on any subject are always welcome but they should be as brief as possible.

AN APPRECIATION.

HITHERTO, on the rare occasions when I have written to the Press, I have done so because I either wanted to know something or wanted to grumble. But I am writing to you to offer my praise for your very excellent journal, "MOTOR SPORT."

I am sure I am voicing the opinion of thousands of people, who like myself motor solely for fun, when I say that I have been waiting a long time for a publication such as yours.

B.L.L.

Bromley.

—AND ANOTHER.

AS a regular reader of the old "MOTOR SPORT" I am very pleased to find that it has been revived. In spite of the fact that these are now the days of hum-drum motoring, there are still a good many "100 per cent" spor.smen who are interested in the lighter side of the movement only, and your paper meets their needs where other journals fail.

R.R.

London, S.W.1.

THE 504 AVRO.

I notice in the interesting article by Captain Stack in this month's issue of "MOTOR SPORT" that mention is made of that old veteran, the 504 Avro machine. I venture to correct Captain Stack's statement, however, that the engine originally installed was the Monosoupape 100 h.p.

If my memory serves me right, the first 504's used in the Services (R.N.A.S. and R.F.C.) were powered with 80 h.p. Gnomes—the predecessors of the Monosoupape. In addition to the latter, the 130 h.p. Clerget, the 80 h.p. Le Rhone, and the 110 h.p. Le Rhone were also used.

B.D.

Surrey.

GLIDING.

IN the aviation notes of your paper, I see that the subject of gliders is touched upon, and as one who is deeply interested in this form of aircraft, I have sought, but without success, to discover where one may obtain a machine in this country.

It seems very odd, to me, that so fascinating a sport as "motorless flying" has been neglected here while the practicability of it has been demonstrated for many years in Germany.

E.H.

(We hope to make an announcement regarding an interesting development connected with gliding in this country in the near future.—ED.)

I observe in the November issue that there was no mention of dirt track racing, and as this is now admittedly a popular feature of sport "on wheels," I hope that you are not going to neglect it, as I am sure many other readers would also be interested.

I certainly feel that your paper is just what the enthusiasts want, as one gets rather tired of the stereotyped utility motor paper, and I take this opportunity of wishing you every success.

J.S.

Manchester.

I am extremely glad to see that "MOTOR SPORT" has been revived again, and am glad to see that it includes air and boating sections. I think most sportsmen are in.erested in this even if, like myself, they cannot yet afford to own a plane.

One of the features which I thought the most interesting in the old days of the paper was the series known as "Great Racing Marques," in which the history of famous makes in the early days is outlined, and as several makes have not been done, I hope they will appear later.

IMPECUNIOUS.

Chelmsford.

THE 500 c.c. HOUR RECORD.

G. E. NOTT and the Rudge set up new figures.

The Hour Record in the 500 c.c. class is undoubtedly the most coveted of all motorcycle records, and is being continually attacked. Since it was first established it has been raised from approximately 40 to over 100 miles an hour.

It has just fallen once again, the new holder being G. E. Nott. On the 19th November, riding an Ulster model Rudge-Whitworth at Montlhery, Nott succeeded in covering 106½ miles in one hour. At the same time he broke the 100 miles record. His machine was of the type which is sold to the public, with a speed guarantee of 100 m.p.h., for £85.

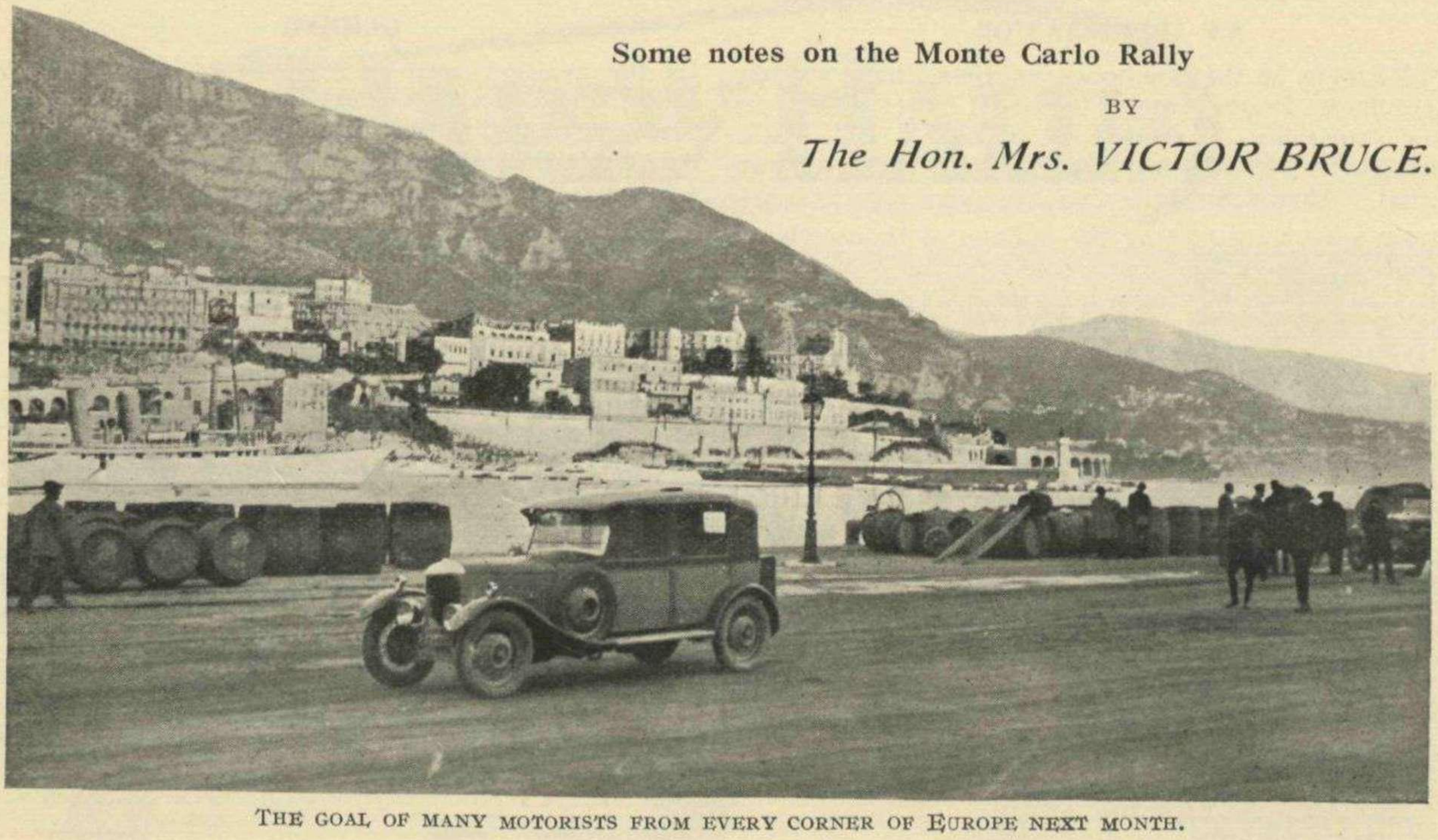
It will be remembered that Nott was the first man to cover 200 miles in 2 hours, which, on a similar machine, he did at Brooklands a year ago.

"Oh ! for a beaker full of the warm South."

Some notes on the Monte Carlo Rally

BY

The Hon. Mrs. VICTOR BRUCE.



THE GOAL OF MANY MOTORISTS FROM EVERY CORNER OF EUROPE NEXT MONTH.

APART from road races, the Monte Carlo Rally is undoubtedly the most important automobile competition of the season, alike in the large and internationally representative entry list which it attracts, and in providing a most strenuous test of the cars under touring conditions—super-strenuous, if you like, but still purely touring conditions.

It is a really sporting trial, and it is largely for this reason that the event has become so outstandingly popular. And the utter fairness of the regulations and their administration is a feature which appeals particularly to the British mind. Any weakness that there may have been in the rules, allowing advantage to be taken by the few who think it worth while, or involving unnecessary hardship or injustice, in any particular year is very promptly eliminated tor the succeeding season's event. As I say, this should appeal to the British sense of fairness ; and that it does do so is proved by the fact that the British contingent has steadily grown each year, until in January next a considerable party will start for Monte Carlo from John o'Groats and the far corners of Europe.

There is something romantic in the idea of hundreds of motorists of widely differing nationalities touring off to some out of the way part of the continent, taking from a week to a fortnight to do the journey which, in the actual Rally must be accomplished in three or four days and nights of continuous driving, and then converging from all points of the compass upon the tiny Principality in the South and the sunshine.

The romance may be a little hard to see while one is, possibly, digging the car out of a snowdrift in the rigours of an Arctic night ; but in retrospect it is there, in spite of the most exacting hardship. This will be the sixth Rally in which either my husband or myself, or both of us, have participated. Originally we chose John o' Groats as our starting point, and it was from there that he won the Rally in 1926. But competition became so keen, and the rules more and more stringent that for some years past we have gone farther afield for our point of departure. Each year the official map of alternative starting places is extended, and one rather wonders what will happen in, say, fifty years' time. We—or rather our descendants—will then probably be starting from the North or South Poles, using, maybe, a bypass to cut all the big capitals out of the route !

As at the time of writing my entry is not made for the 1930 Rally I had better not say what starting point I have chosen, but if I did it would seem nearly as far distant, to those who have not taken part in one of these events, as the Poles themselves. I will say that Lapland and the Arctic Circle will not be so very far away. Three sea passages will be made in the course of the journey, which will take us through six different countries ; and even though the dry cold of a Northern winter is a different matter from the rawness of an English January, I shall not be at all sorry to emerge eventually into the tempered atmosphere of the Riviera. Judging from the cold snap to which Monte Carlo treated us last year, however, the fur-lined flying coat which I shall wear

THE MONTE CARLO RALLY—continued.

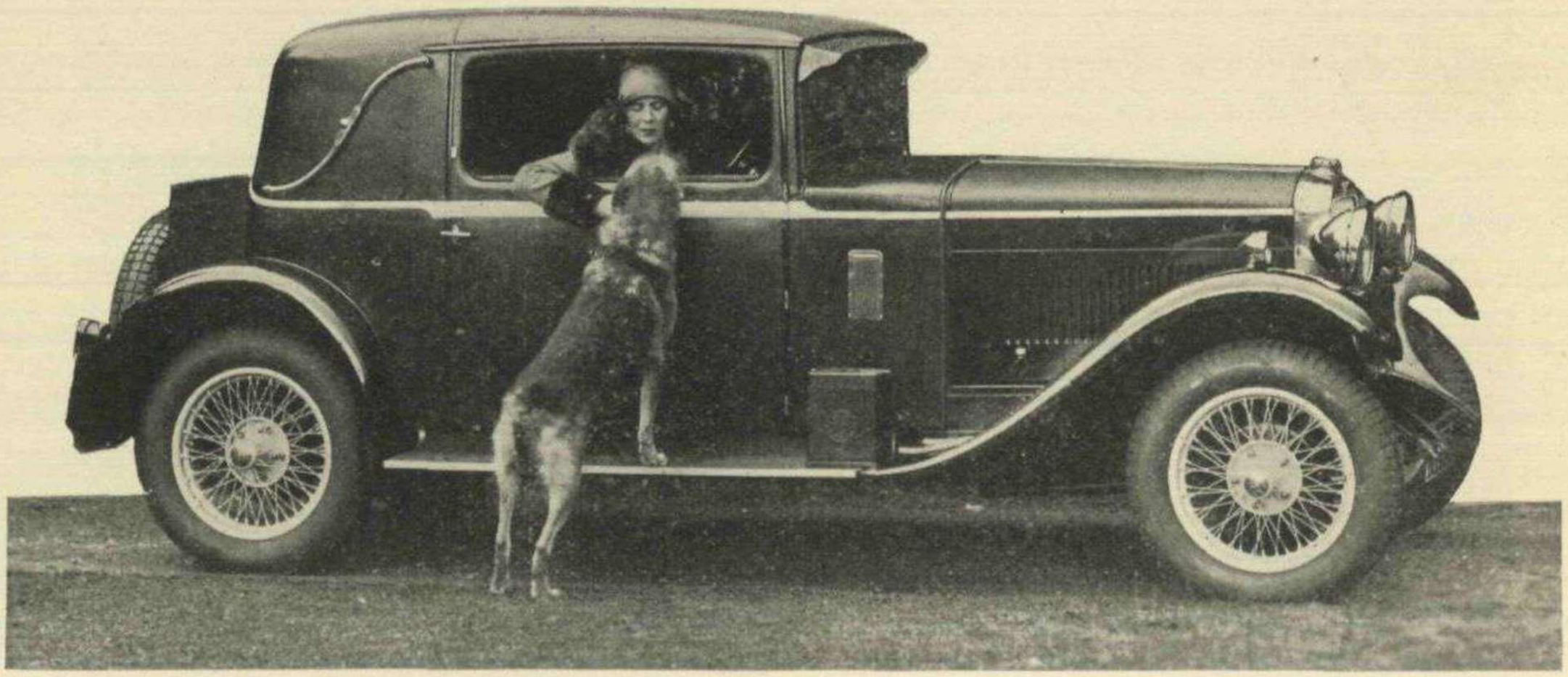


WINTRY CONDITIONS *en route* FOR THE SOUTH.

on the more Northerly portions of the run will not be altogether unacceptable farther South. And, as always, an important item of equipment will be the trusty Burndept portable wireless set which somehow we shall find room for on the Hillman Straight Eight. I have carried this set through several Rallies, and had it with me on various track record attempts, and I would not willingly be without it. Even on so strenuous a run there come periods when the monotony is hard to bear; and a tune from the nearest broadcasting station is the best thing I know to put new heart into one.

So far as the car is concerned, this will be the first time that this notable and essentially British vehicle has made a public appearance in this kind of event, and I am confident that the utmost rigours of the journey will prove well within its capabilities. With a wonderfully comfortable and cosy body, and with glycerine in the radiator, we need not fear the worst that King Frost can do; and with chains on the wheels I know from previous experience, that the snow covered roads, continuously ploughed, are not so bad a hindrance as might appear. As a matter of fact, conditions in those countries where the heavy snow lies for some months every winter are much better than in others—England, for instance—where such conditions are exceptional, and catch the road authorities napping.

In last year's Rally, however, we did have trouble with snow, since we chose to start from Riga, and the roads leading to that Baltic town were not so carefully tended. It will be remembered that Arctic conditions reigned over the whole of Europe; starving wolves were reported from several points which lay on our direct route—and eventually we became buried in a snow drift and had to accomplish 100 miles back towards German civilisation with the car towed behind relays of sleighs. Even those who start from John o'Groats may find that the whole of the journey—over 1,700 miles by this year's official route—is ice bound and so treacherous that a moment's inattention means a possibly fatal skid. However, we are all optimists who take part in the Monte Carlo Rally, and there is not one of us, I suppose, who does not think that he or she has a very good chance of winning the first prize of 40,000 francs!



MRS. BRUCE AND THE STRAIGHT 8 HILLMAN ON WHICH SHE WILL COMPETE IN THE FORTHCOMING RALLY.



COLOMBIA.

Where all motoring is in the nature of a sporting event.

IMAGINE a country with an area more than equal to that of Great Britain, Germany and France put together, as rugged as the Pyrenees or the Alps but on a grander scale; such is Colombia. It lies to the North and North West of South America. The obvious vehicle for centuries was the horse and the mule. However, motoring made an early appearance in the form of a Peugeot Voiturette imported by a private individual as far back as 1899, but it was not a success: the roads were too bad and the motor too weak.

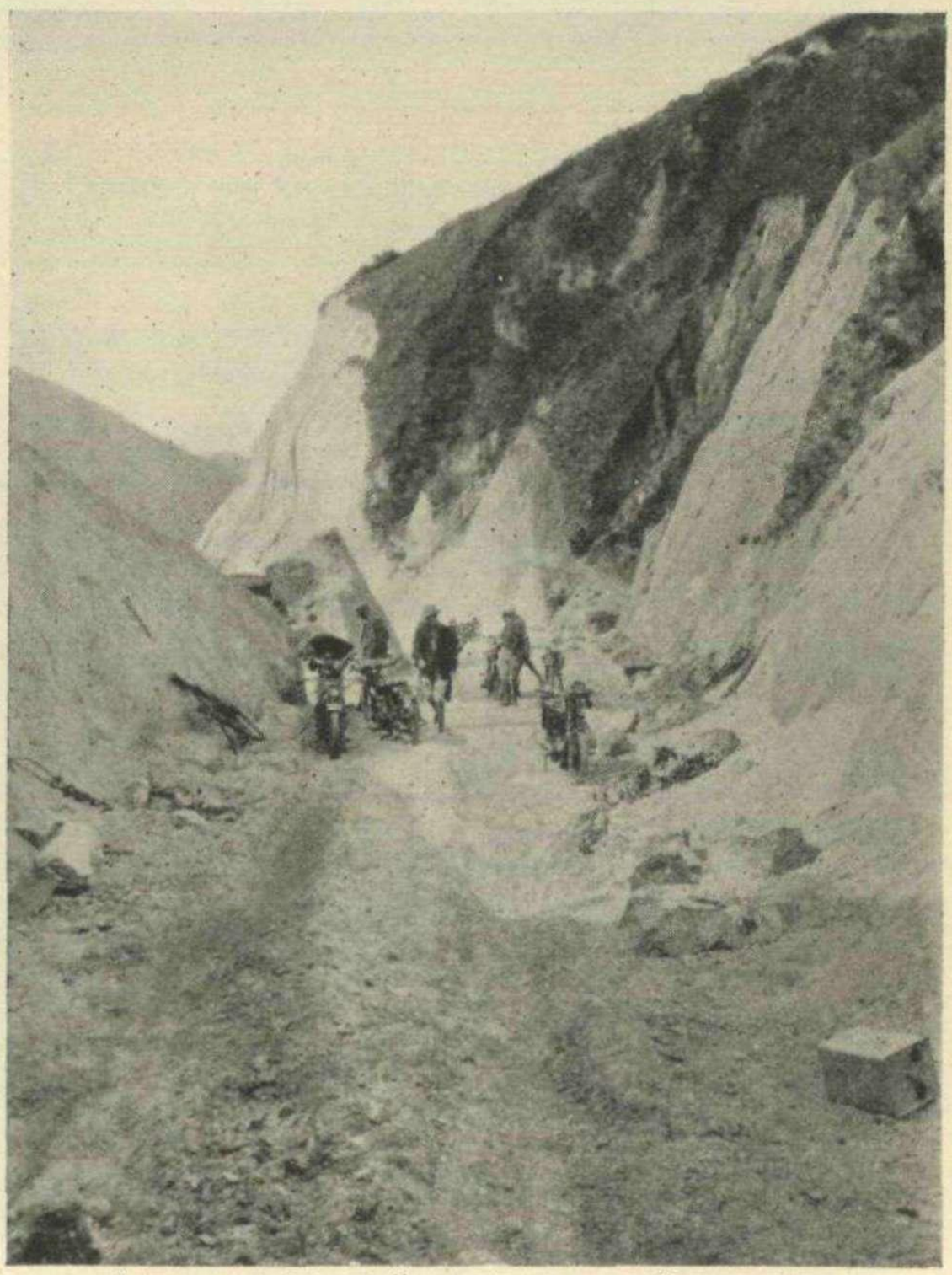
When it appeared in the streets all the urchins laughed and threw stones and nearly everybody thought the owner crazy, except a few far-seeing people who saw the dawn of a new era in the uncouth little contraption with its spidery wheels and spluttering engine.

It took fully ten years for the first real motor to arrive inland. A syndicate was formed to subscribe the money and import a car. The car came in the shape of a big red seven seater Pullman of American manufacture. It was imported in sections, on mule back remember! and put together by local mechanics, quite unfamiliar with such machinery. The oil and petrol incidentally had also to be imported. After weeks of trials and experiments the great day came, and the car made its first successful tour through the streets to the principal square amid a mixed chorus of cheers, cat calls, and banging from its own exhaust. The car had won despite the scepticism of those who distrusted the new-fangled creature. Why, with the cost of it and its food one could buy a hundred pack mules and feed them for a year. It must have cost £2,000 to get it on the road, but in spite of all, the car had got there and it told its tale.

Car followed car in increasing numbers as transport difficulties were overcome. Meanwhile, oil had been found in Colombia, a refinery established and its presence, of course, helped and stimulated motoring considerably. But the great problem remained, there were not enough suitable roads, their mileage was insignificant, and road construction in that type of country was an appalling task, and yet, the roads have been built and it is the car that has built them. There are only a few hundred miles so far; there will be thousands soon.

The purely sporting side of motoring has not developed much, but the keen competition of local American car agents led to a Cadillac doing battle with a Stutz over a winding road which ended in a victory for the Stutz, the Cadillac running off the road.

Only recently the motor cycle has made its appearance and its success was assured from the outset. It could not be otherwise, Colombia is pre-eminently a country of individual transport. Every Colombian is a horseman by temperament and training, and the motor cycle is a steel horse which goes faster and farther and does not complain. The big Harley Davidson and four cylinder American machines hold sway, for the grades out there are such that to stop and let the motor cool is a frequent occurrence. Nothing less than a "five-hundred" is any good because it must pull on top. In short, it must be every inch a motor cycle if it is to be any use in that country of gruelling climbs.



A TYPICAL "ROAD" OF THE PRE-MOTORING ERA.

COLOMBIA—continued.



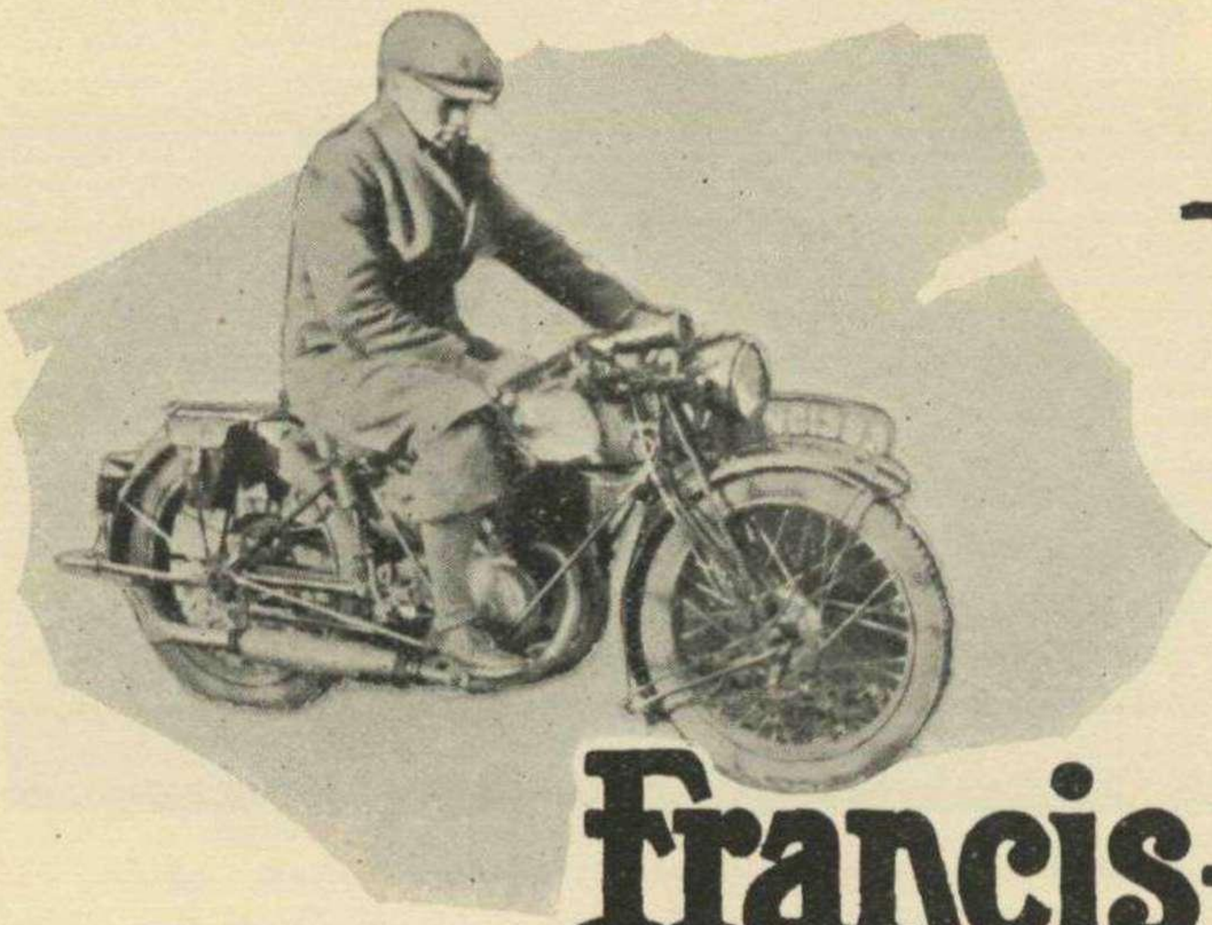
A STIFF GRADIENT ON ONE OF THE NEW ROADS.

There is the greatest enthusiasm prevailing about anything that has to do with roads and roadmaking. About a year ago an enterprising business man in Medellin suggested that a road should be built to the sea about four hundred miles away through very difficult country, such as is seen in the photographs. There was a certain amount of opposition; people said that the railroad and the river Magdalena was enough, but the idea matured, a loan was raised, and the work is under way. A distinctive feature is the personal interest taken in the work, as shown by the fact that a typical afternoon run is to go to the end of the "Carretera al mar" to see how the work is getting on, also additional funds are being raised by making an issue of stamps in the same way as stamps have been used for collecting for hospitals, etc. Much has to be done at the present stage of development and there are many difficulties, but the new roads are well engineered and the surface, although not first class at the moment, could be much worse. Motoring under all its aspects, one feels, has undoubtedly a great future in that country, for more vehicles mean more roads, and when the roads are built the people will want more cars in order to use the roads.

As a touring ground it will be wonderful for there are all the natural resources to please the tourist, there are ideal situations for health resorts to be established, sulphur springs and glorious scenery and a pleasant warm sunny climate, while higher up there are glaciers and tracts of land permanently covered in snow where the winter sports enthusiast can disport himself. Every kind of climate condition exists in Colombia, as the land rises steadily from sea level, where tropical conditions prevail, to over 17,000 feet in the interior, and the motor-car or cycle is the obvious means of making the most of the country.



SOME MOTOR CYCLISTS MAKE A TRIP TO THE "END OF THE ROAD."



The 172 c.c. Francis-Barnett

OUR first impression of the latest model 172 c.c. Francis Barnett was the very great improvement in the appearance. Although we have always had a great respect for this machine as one of the most scientifically designed machines of its class, the appearance has always struck us as being rather "unclothed." The craze for saddle tanks on modern machines has been responsible for a great many ugly designs in which the designers have been trying to emulate the camel, but on this machine the saddle tank has been carried out with great taste and there is no sign of humpiness.

On mounting the machine we were pleased to find that in spite of its small size there is ample room for a large rider without any discomfort, and during some long runs we were able to finish free from that cramped feeling which is inevitable with some so-called "baby" machines.

The engine in question was brand-new at the commencement of our test and like most new two-strokes was very stiff and fairly careful running was required for the first few hundred miles; however liberal lubrication was efficiently attended to by the automatic pressure system fitted to the Villiers engine which aided the settling down process, and we were soon able to extend the machine without fear of damage and found that quite high average speeds could be maintained without tiring and without any unpleasant feeling of fussiness. Fifty-five miles per hour appeared to be about a reasonable maximum, although we have no doubt that with some attention to the engine and under favourable conditions this could be exceeded. The road holding on indifferent surfaces was a very definite improvement on the older model Francis Barnett and this was due to the new type of fork fitted which is of the conventional parallel action type in place of the old rocking action fork.

On colonial going and rough lanes the solid feeling of the machine was particularly noticeable and it it had not been for the customary handiness one would not have suspected that one was only riding a 172 c.c. light weight.

However on encountering genuine sticky going of the kind so beloved by trials secretaries the light weight of the machine certainly proved a great blessing, as, if it became embedded it was a fairly simple matter to drag it through the obstacle, where a heavier machine would have undoubtedly caused a long delay.

Further comment on its suitability for trials work is rendered unnecessary by the very great number of successes already obtained by this model in open competition.

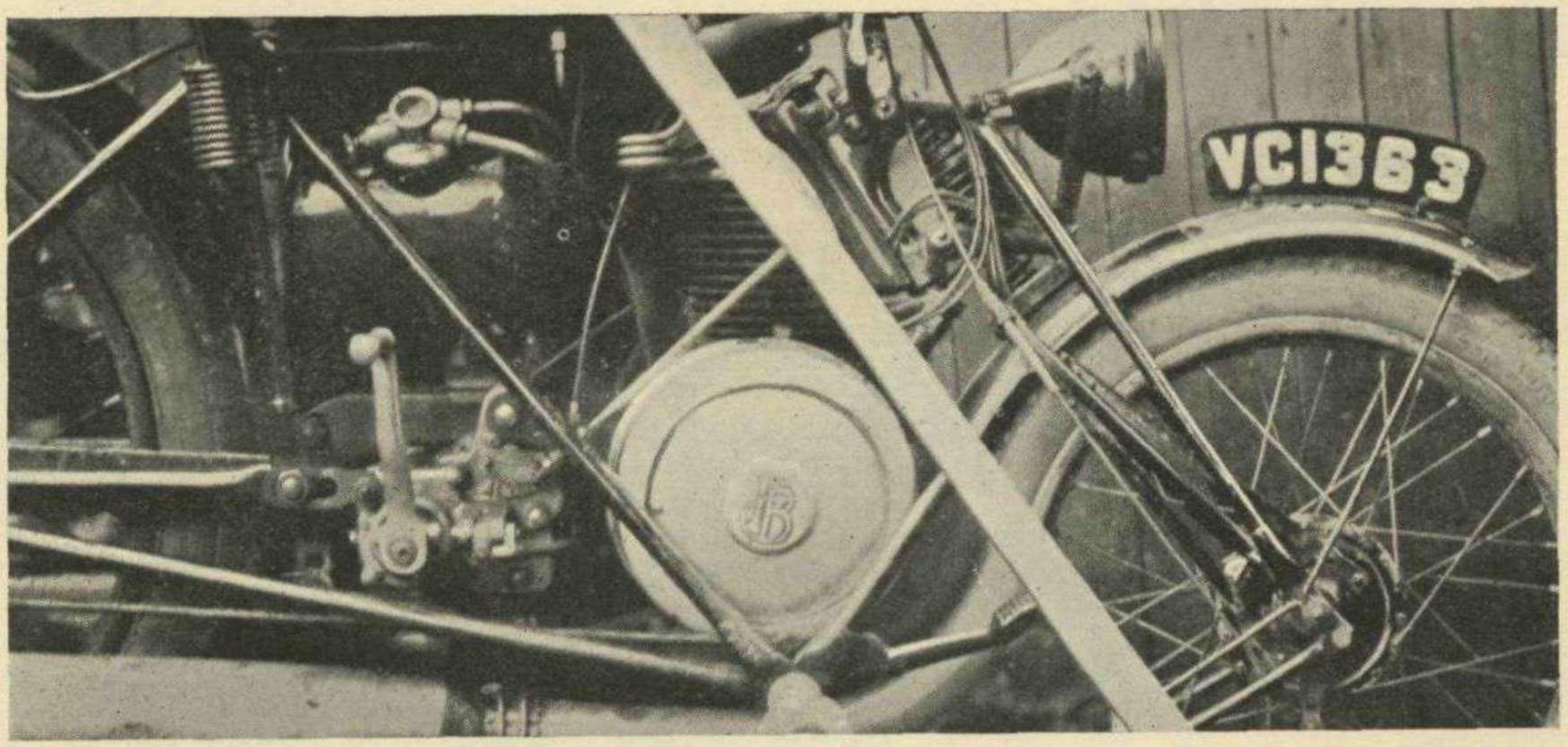
The controls have been arranged in more convenient positions than in the past, the gear change now being on the tank instead of being mounted directly on the gear box. The clutch was light in action and it worked very sweetly, in fact the control of the machine became a matter of automatic action which is a great point in tight corners.

Good Brakes.

The brakes are another point where the new model is improved and were both exceedingly powerful without being fierce, nor was any adjustment of them required during the whole of our test. One criticism of the brakes is the foot pedal, to operate which it is necessary to bring the foot in towards the machine. This however is so easily remedied by bending the pedal that it is hardly worth mentioning, but owing to the general excellence of the machine in its essentials, it is only possible to find criticism in very minor details.

The electric lighting set, which is of the type supplied direct from the engine, functioned satisfactorily and gave ample light for any speeds which were required for night driving, but we would suggest that a more standard type of bulb should be fitted as, when we accidentally broke one of them, considerable difficulty was experienced in getting a replacement, as the ordinary car side-lamp bulb stocked by most dealers is not

THE 172 c.c. FRANCIS-BARNETT—continued.



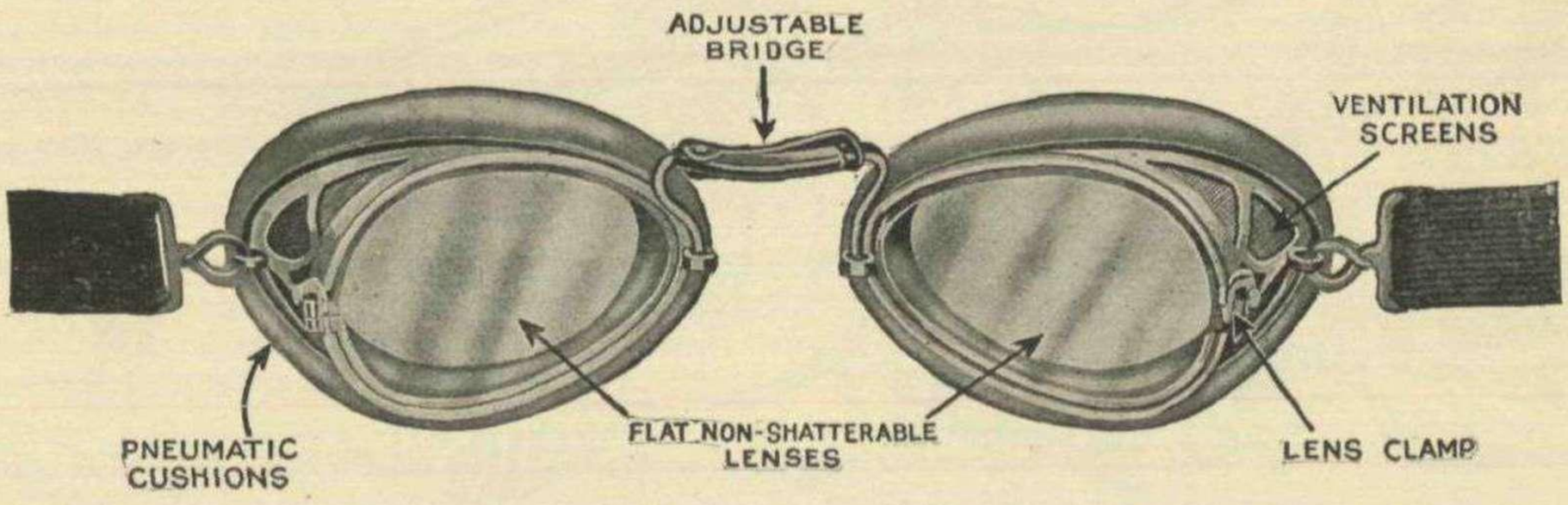
THE INGENIOUS AUTOMATIC OILING SYSTEM, AND (RIGHT) THE NEW FRONT FORK.

suitable; also the switch for the lights consists of a rotating bayonet catch in the holder under the lamp. To operate this it is necessary to get one's fingers inside the fork blades and it would be a good point if a more conventional type of switch in a more accessible position could be substituted for this rather crude device, as the present arrangement rather savours of "spoiling the ship for a ha'porth of tar."

Although, as we have mentioned, the lubrication system is entirely satisfactory in its operation and quite automatic, during the whole of our test we made a point of using oil in the petrol as with the variable needle-jet

(*Continued on page 45*).

LUXOR GOGGLES



The choice of the World's Greatest Airmen and Racing Motorists.

DESIGNED AND MANUFACTURED EXCLUSIVELY BY—

E. B. MEYROWITZ, LTD.

1a, Old Bond Street. LONDON, W.1. 199, Regent Street.

Details of Supercharged B.M.W. Engine.

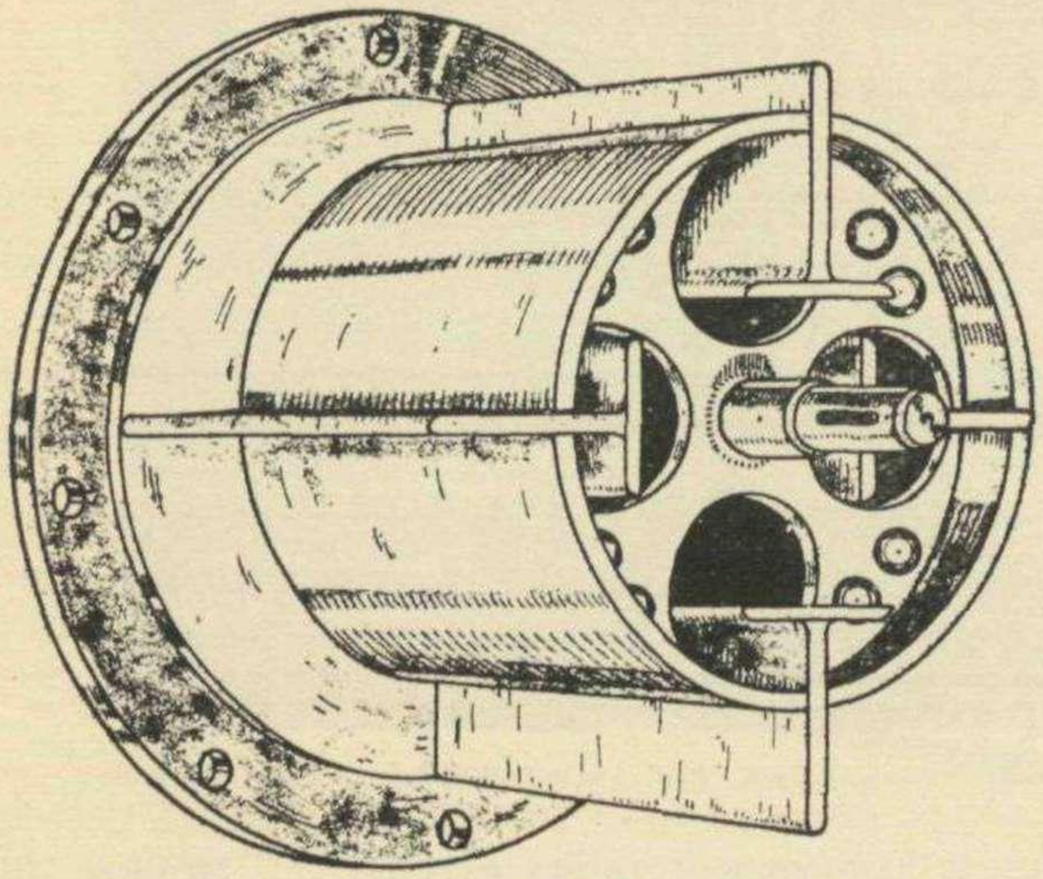


FIG. 2. THE COMPRESSOR MECHANISM.

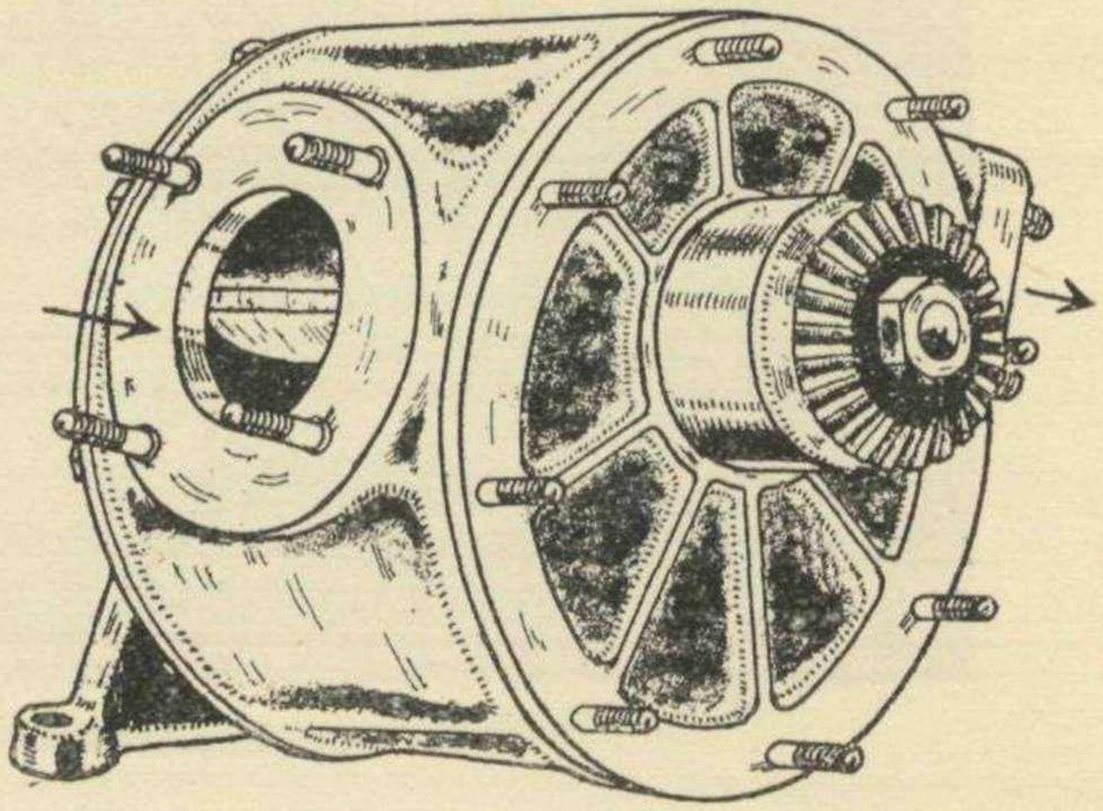


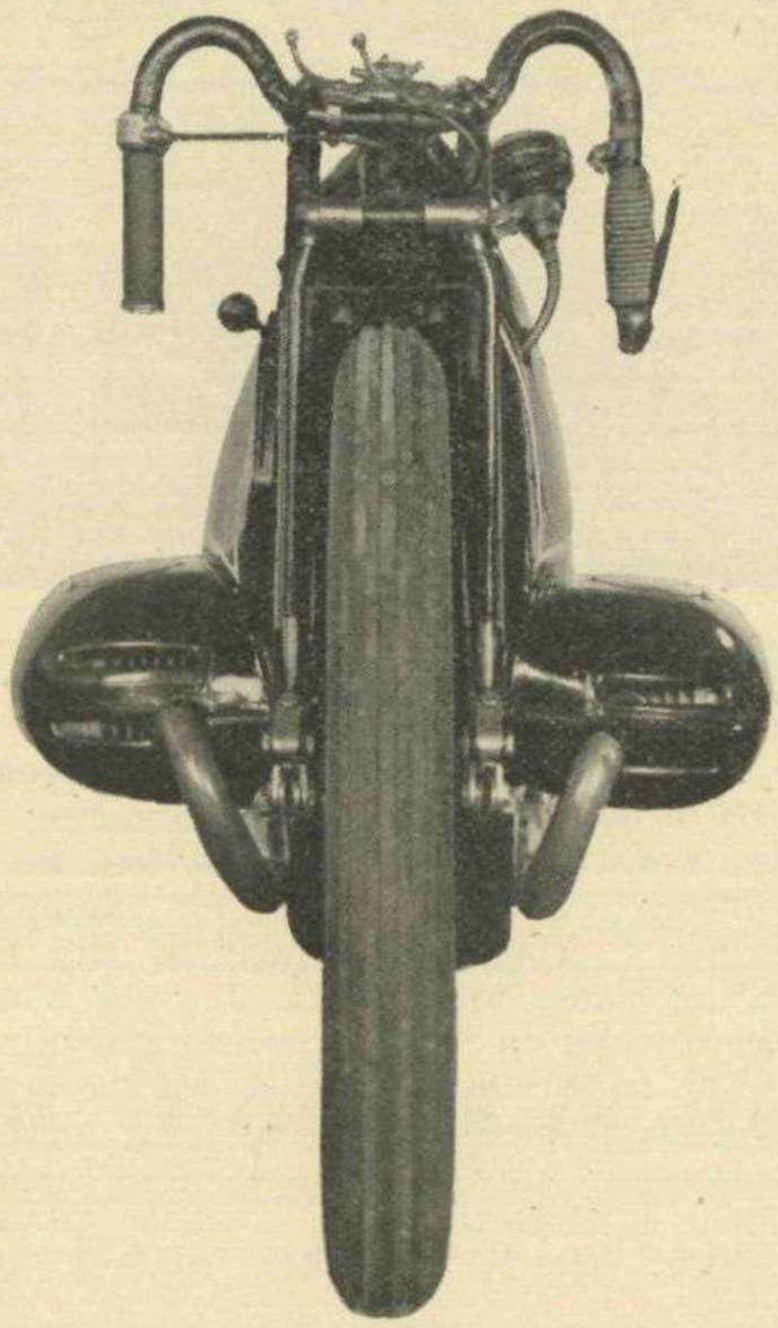
FIG. 3. THE COMPRESSOR (EXTERNAL VIEW)

FIG. 1. THE COMPLETE UNIT.

The Supercharged B.M.W.

The machine which has been causing much interest in its recent record attempts.

THE Bayerische Motorenwerke, Munich, had long desired to test their newly designed supercharged machine on a long straight track, at maximum speed, but had not succeeded in getting the machine placed according to its capabilities in the main racing events of the season, as a few teething troubles made themselves apparent in the design. A suitable track was selected on a part of the State Road from Munich to Ingolstadt, which here has a straight section of about 5 km., also the maximum permissible gradient of 1%, and is in good condition. The run was made with a flying start of 1 kilometre with 1 kilometre for slowing down, the timed stretch of one kilometre or one English mile lying between both. The timing was carried out with a Loebner watch. The record machine, which was ridden by the Munich rider Henne, was completely clad with sheet metal on the streamline principle with a view to reducing the air resistance. The rider's seat was placed above the axle of the rear wheel, to provide the necessary loading on this wheel. In the design, the possibility of easy interchangeability of the two engines of 500 and 750 c.c. was specially taken into account. The ratio was stepped down as follows by suitable graduation of the bevel wheels on the cardan shaft drive: 1st speed =110 km., 2nd speed =180 km., 3rd speed =approx. 220 km. (speed per hour).



Technical Details.

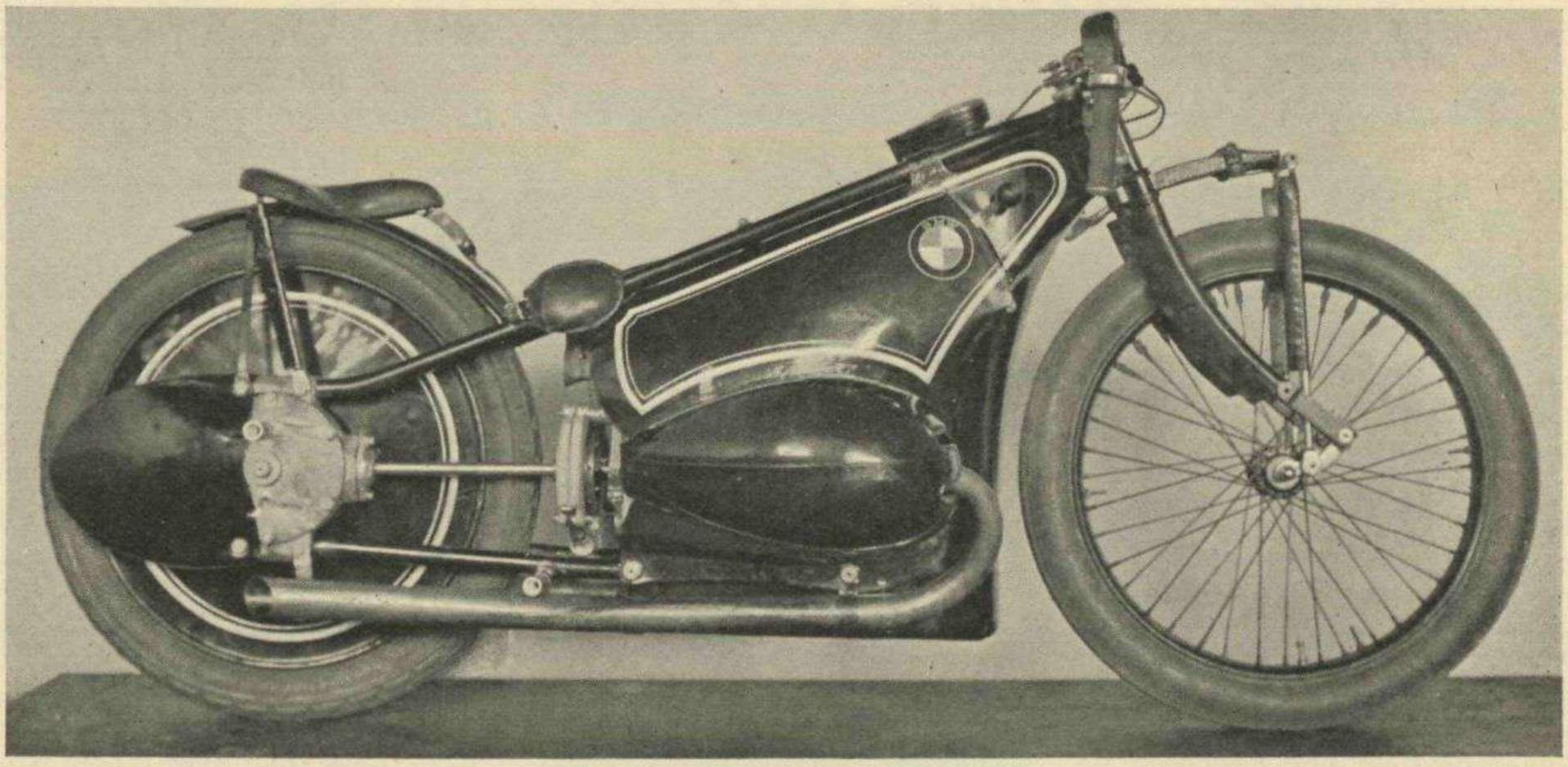
With a view to attaining the maximum speeds, it was necessary to raise the output of the motors to a considerable extent. To achieve this, certain technical points of refinement are nowadays practised on racing machines of which the following may be mentioned: polishing of the induction pipe, combustion space and crank-case interiors for the purpose of reducing frictional resistances, then the fitting of additional return springs on the rocking levers and thrust rods to reduce the inertia of the moving parts. A further method is to change over to rodless control of the valves, or overhead camshaft, which possesses important advantages by avoiding the mass inertia of the tappets and thrust rods, and is therefore gaining much ground recently. Not much regard was paid to these possibilities on the part of the Bayerische Motoren Werke; at the most there was contemplated a test with camshaft drive above the two cylinders, but this would have led to serious constructional modifications, which would have compelled the abandonment of the traditional design hitherto used with transverse horizontal cylinders. The B.M.W. thus decided upon the incorporation of a compressor, in order to achieve an increase of power output. This has, in fact, been contrived without any considerable structural alterations to the existing model, and the 500 c.c. motor of 29 h.p. was in fact increased to a power output of 55 h.p., while the 750 c.c. motor was increased from 36 to 75 h.p. capacity. Tests which were instituted with an existing Zoller compressor showed the practicability of the principle, but the design had to be improved. Instead of electron, for example, duralumin was used, the shafts were strengthened and made of special steel. The incorporation of the supercharger in the whole set is shown in Fig. 1. The impression of block construction is still further increased by the incorporation of the compressor. The compressor is mounted between the carburetter (V) and the two long induction pipes, and is driven from the crankshaft by spur gearing with a reduction ratio of 1 : 1.2 through the intermediate piece Z. The transmission from the intermediate shaft Z to the actual compressor shaft takes place through a set of bevel wheels. The block shown is of the 500 c.c.

THE 172 c.c. FRANCIS BARNETT—cont. from page 43.

type of carburettor fitted it is very easy when starting on a rich mixture to wash the oil off the cylinder walls and cause burring over of the piston ring grooves with consequent effect on the power of the machine.

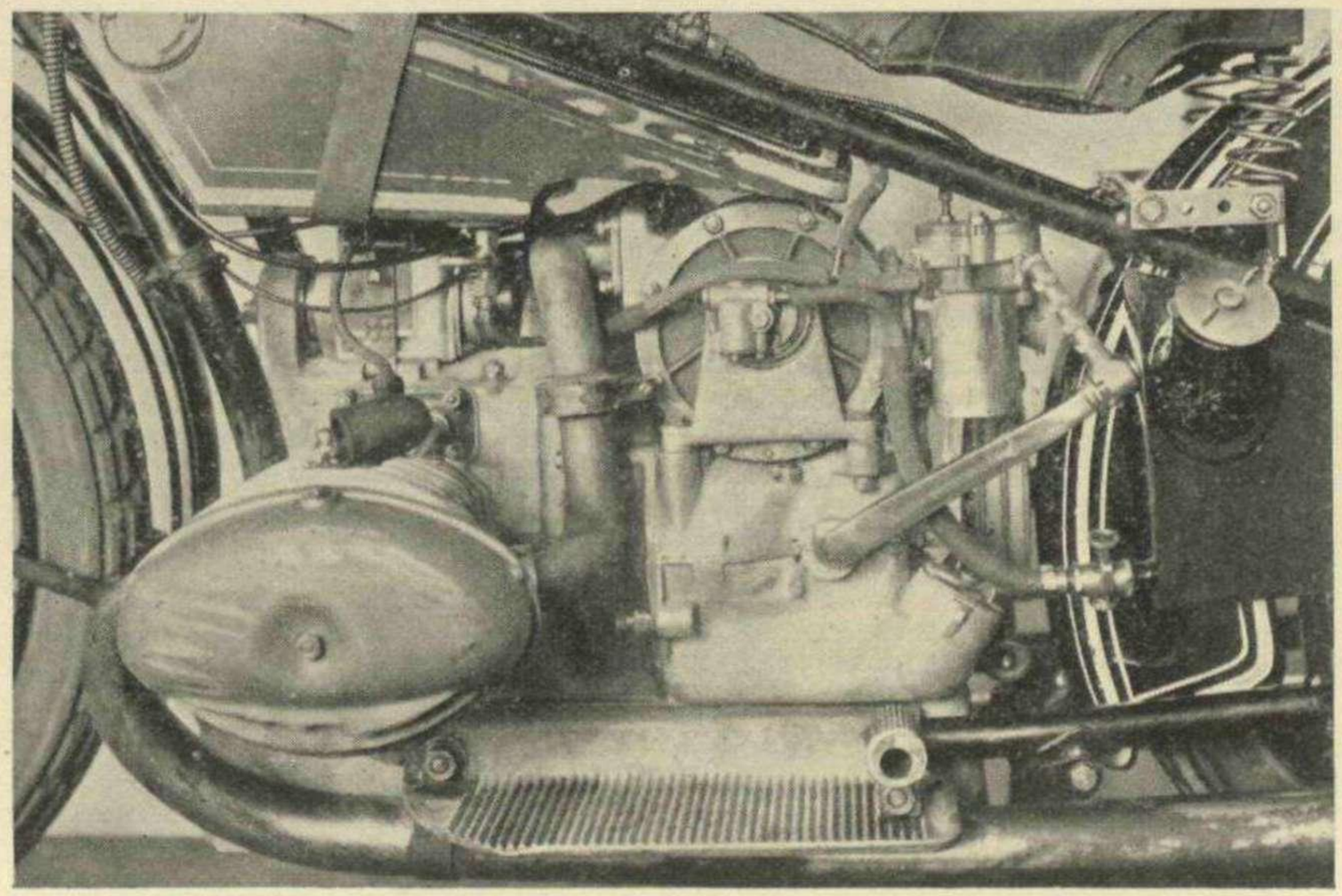
Taken on the whole we feel that there are few machines which are more suitable for economical motoring combined with suitability for rough sporting trials, the season for which is now upon us, and at £36 this model is a very complete answer to those who maintain that a 172 c.c. machine is too small and light for really hard work.

THE SUPERCHARGED B.M.W.—continued.



THE SPRINT MACHINE HAS BEEN VERY CAREFULLY STREAMLINED.

motor, as being brake tested on the test bed. All the basic elements of construction were left in their normal dimensions ; even the valve mechanism worked entirely satisfactorily under the unusual working conditions. The dismantled compressor is shown in Fig. 2. The open induction slot allows one of the rotating blades to be clearly seen. The shaft placed eccentrically in the housing strikes the eye at once. The front side is screwed to the cover of the intermediate piece Z (fig. 1). Work is done by the compressor only in the lower half of the housing, the upper is ineffective. At 6,000 r.p.m. of the engine and therefore 5,200 r.p.m. of the compressor the latter delivers a superpressure of 1.2 atmospheres. It is interesting to note that any alteration of power output, with constant maximum engine speed, can be brought about solely by variation of the compressor transmission ratio. From this results the fact that with the 750 c.c. model, if it must be done, speeds of 230 km. per hour and more can be attained. Notwithstanding the heavy strain on the engine, this only had to be modified to a very small extent, thus, for example, steel cylinder covers were used, similar to the B.M.W. aviation engine construction. Fig. 3 gives a clear idea of the appearance of the internal rotary drum with the blades. The blades are fitted in the compressor casing to a clearance of 1/100 mm. and naturally require the most extreme precision in manufacture ; indeed, the compressor as a whole, in its present form, is the product of lengthy and careful works tests. The spindle end clearly visible opposite the bevel gear drive serves to operate a supplementary oil pump, which forces the oil through the hollow shaft into the compressor blades. This supplementary lubrication, however, is in the first place provided for really long-distance racing, and is not necessary for sprint work.

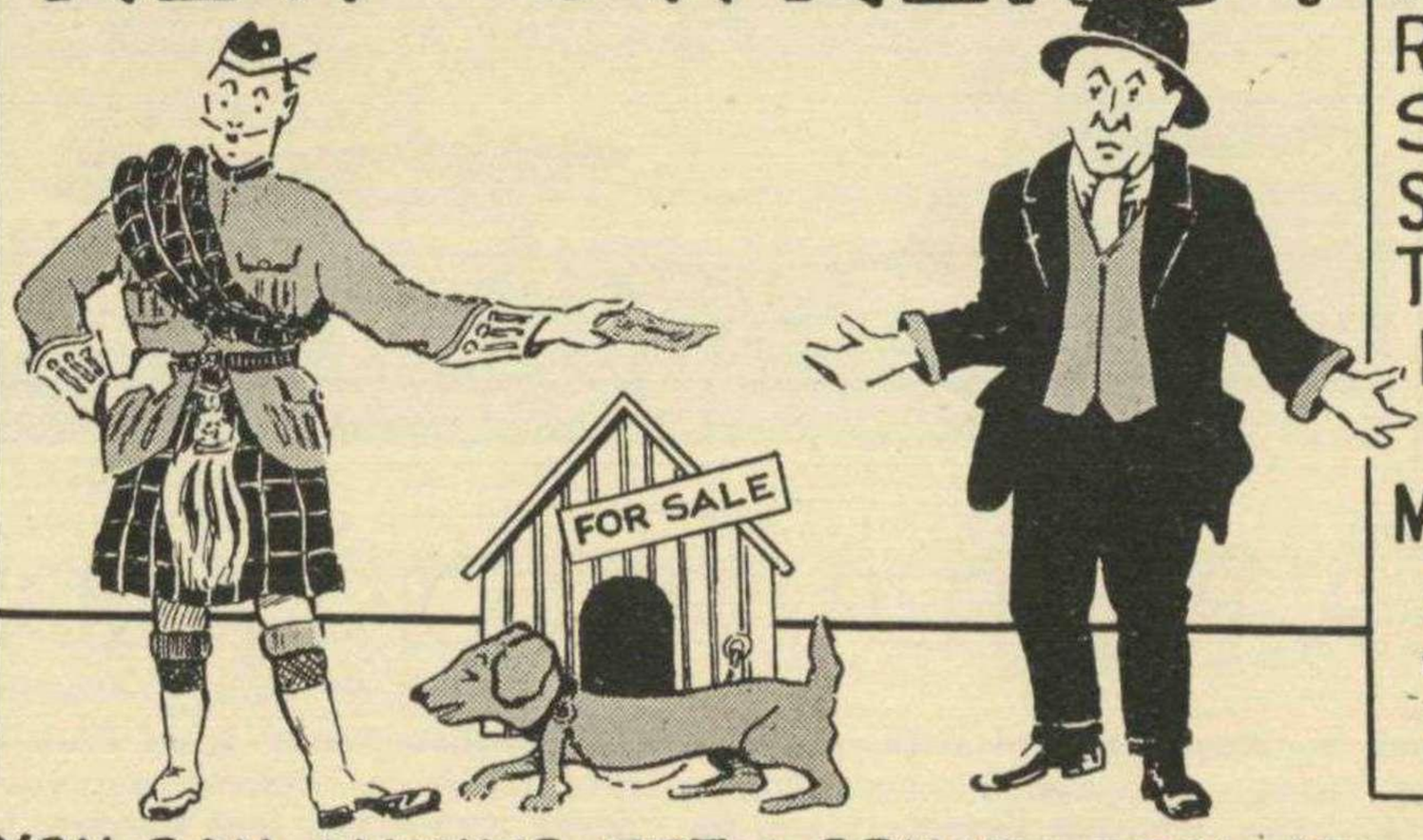


THIS SHOWS THE COMPRESSOR FITTED TO THE ROAD-RACING MODEL.

ARIEL
B.S.A
ENFIELD
DOUGLAS
NEW IMPERIAL
NORTON
MATCHLESS

Get our Quotation for your present Machine.

NEW OWNERS!



A.J.S
RALEIGH
SCOTT
SUNBEAM
TRIUMPH
LIGHT CARS
MORGANS

Exchange "it" for a 1930 Model.

"Easy" as easy can be.

YOU CAN ALWAYS GET A SQUARE DEAL AT

WAUCHOPES

Ten Years of Motors & Motor Racing

The Only Book of its Kind Ever Written

BY

Lt.-Col. CHARLES JARROTT

(The famous Pioneer Racing Motorist)

7/6 NETT.

8/= POST FREE.

" . . . . . A book which everybody who is the least interested in Motor racing should obtain at once. It is a revival of that old, famous, and well illustrated book, practically the first of its kind, by Charles Jarrott, which remains one of the finest books on motor racing that has ever been written."—THE AUTOCAR.

" . . . . . very splendid, very vivid, crammed with rare, ripe stuff obtainable—as far as I know—in no other. . . . . Anybody who wants to know what motoring could be, what it WAS, *must read 'Ten Years of Motors and Motor Racing.'"*—THE AUTO.

" . . . . . is, of course, a classic . . . . a historic document . . . . every keen motor cyclist will enjoy each page of it."—MOTOR CYCLING.

MOTOR SPORT (1929) LIMITED

34, DUKE STREET, ST. JAMES'S, LONDON, S.W.1.

THE SPORT AFLOAT



A WATER BROOKLANDS

"TRACK racing is tame compared with outboard motor-boat racing," said a well-known Brooklands racing-driver, who has recently taken up this wonderful new sport. Major Sir Henry Segrave has also stated that 40 m.p.h. on the water is as thrilling as 200 m.p.h. on the track. There is no doubt that speed on the water has an extra fascination and gives a sense of freedom that speeds on land lack—in fact, it is comparable to flying in many respects. The outboard motor has progressed so rapidly in design and power, that speeds which a year or two ago were thought unattainable are now considered commonplace.

Radical improvements in hull design, the introduction of new ideas in connection with shaping the underwater bodies and scientific streamlining of all parts and the development of more efficient and extremely powerful motors, have been factors largely responsible for the attainment of these remarkable speeds. It is difficult to believe that an engine developing 30 b.h.p. and weighing only 110 lbs. is capable of propelling a boat at close on 50 m.p.h. This is all the more remarkable when it is realized that to obtain similar results with an inboard-type of engine at least 100 h.p. would be required.

Inboard v. Outboard.

Inboard motor boat racing, like track racing was only available to a comparatively small number of persons, due to the high initial cost and subsequent upkeep, whereas the outboard motor has enabled this fascinating sport to be indulged in by anyone able to afford a small car. In this connection it is interesting to note that a first class outfit can be purchased for under £100, whilst the upkeep simply amounts to joining one of the racing clubs that are situated throughout the country, where for a nominal subscription the boat can be housed and in the case of the larger clubs such as the British Outboard Racing Club, special arrangements are made for tuning and testing out the boats and engines. The growing popularity of this new sport, has resulted in a "Water Brooklands" being formed at Bury Lakes, Rickmansworth, where Motor Boat Speedways, Ltd., have spent a large sum of money in adapting these lakes for outboard motor boat racing.

They have built large boat houses, repair shops, dressing rooms, refreshment bars, grand stands, car parks, club rooms, loud speakers for announcing results, scoring boards, and everything including "bookies" has been provided to enable both spectators and competitors to enjoy the sport to the full. To give one an idea of the enthusiasm being shown, it is only necessary to point out that it is quite the usual thing to have over 60 competitors in one afternoon's race meeting. There are thrills in plenty, as someone is sure to capsize in their eagerness to round the buoys as closely as possible!

The newcomer to the sport is assured of having a sporting chance of winning a pot, as the regulations of the B.O.R.C. are very strict with regard to only standard engines being used, thereby giving the man with small means an equal chance with his more wealthy confrère. There are three classes of engine catered for: "B" class engines not exceeding 350 c.c., "C" not exceeding 500 c.c., and unlimited, over 500 c.c. Apart from the trophies offered by all the well known clubs, several challenge trophies are annually competed for. The premier event of the year is for a valuable Trophy presented by the Duchess of York for competition with "C" class motors.

To those who for any reason are unable to participate in racing but desire to have a boat with a reasonable turn of speed, there still remain the fast runabout type of hull. There is a close parallel between motoring and outboard motor boating in that both may be pursued and enjoyed on very widely separated scales of cost. But there is this difference: there is an even wider range between the extremes of outboard motor boating than motoring.

A really first class racing outfit can be purchased for about £80 whilst a fast runabout capable of carrying 4-5 persons at a speed of 25-30 m.p.h. is available for approximately £130-£150, thus for a few pounds anyone can become the owner of a fast speed boat from which he or she will derive unbounded pleasure and thrills with their tonic effect. All that is necessary is an original disposition to take to the water as a means of recreation, and this is to Britishers a heritage.

SPEED BOAT DESIGN

II. STABILITY AND CONTROL

BY

R. R. POOLE, B.Sc.

HAVING dealt in the last article with the general design of the hull from the point of view of resistance to motion, we may pass on to consider those factors governing its stability both when running on a straight course and when cornering. Instability manifests itself in three principal directions: the boat may tip over, it may be unable to maintain a straight course if left to itself, and it may pitch to such an extent as to be almost unmanageable.

Next to being able to float the most obvious essential of a boat is that it shall float right way up, and to ensure this we must eliminate all those factors which might invert it, and further, must construct it so that the natural tendency is towards the more comfortable position. This appears rather obvious, but it seems to have been overlooked in some designs, if one may judge from some recent races. Secondly, the boat must be able to hold to a straight course without constant correction for small deviations caused by wind or rough water, and it must be able to corner neatly without undue rolling or sideslipping.

Provided that the hull is reasonably wide and low as to its centre of gravity, there is no reason why it should invert itself when travelling straight, even in rough water. Most spills occur when rounding a buoy, and they can generally be attributed to bad rudder design. Our theoretical ideal boat, consisting simply of an inclined plate skimming on the surface of the water, could presumably corner perfectly since the whole mass is concentrated at the waterline, but a practical skimmer hull necessarily has most of its mass considerably above the water, so that any change of direction produces an outward force tending to overturn the boat. Now this can be counteracted if we can produce a force in the same direction but below the waterline such as is provided by a stern rudder. Bow rudders, since they operate the other way, will only accentuate the outward roll, and their use should be limited to very wide, flat bottomed boats, or as small auxiliaries to a deep rudder at the stern. Reference to Figure 1 will make this clear. A turn in the direction indicated can be effected equally well by either the bow or stern rudder. In each case the thrust on the rudder blade can be divided into its two components. P_L in the direction of motion, and constituting merely an extra head resistance, and P_T transversely, the latter component producing the turn. Since these forces necessarily act well below the waterline, the one will oppose and the other assist the overturning moment. The turning effect of a rudder depends on its distance from the centre of pressure on the whole hull. In a well balanced single step hull, the C.P. will be roughly midway between the centres of pressure of the two immersed areas, which would make it some two feet behind the step in a 12ft. skimmer. Further, the turning effect is independent of the depth of the blade, except in so far as turbulence and the "following zone" are concerned, so that it is possible so to arrange the stern rudder as to compensate exactly for the overturning moment at all speeds. For if "h" is the height of the centre of gravity of the hull with the engine and pilot in position, "M" lbs. the total mass, "d" the depth of the C.P. of the rudder blade, "v" the velocity and "r" the radius of the curve taken, then

$$P_T.d = h.M.\frac{v^2}{r_g}$$

And since P_T is proportional to v^2, it follows that the compensation is the same regardless of the speed. The actual calculation of P_T is rather difficult, as the effect of eddies, as shown in Figure 2, is difficult to predict. The common treatment of the inclined immersed plate, as expounded in books on hydrodynamics, generally leaves so much to empirical constants based on fifty-year old experiments, that little value can be attached to it, and experience is the best guide. The usual size of the rudder on small boats is about 15 to 25 square inches, as larger plates offer too high a frictional resistance when trailing. The value of this resistance can be found from the ordinary formula, counting both sides when reckoning the area. For such small areas the figure given by the formula is usually on the low side, but the coefficient f may be increased to allow for this, and the relation

$$P = .005\ Av^2 \text{ lbs.}$$

is fairly accurate.

Although a bow rudder is a potential source of danger, a small fixed fin, well forward on the bow section, is undoubtedly a help when ruddering sharply, as it reduces the tendency of the bows to sideslip on the turn, and as the after section moves in response to the rudder, it will tend to bring the boat round more quickly. The overturning moment is still present, of course, but its effect is small if a shallow fin is used and placed well

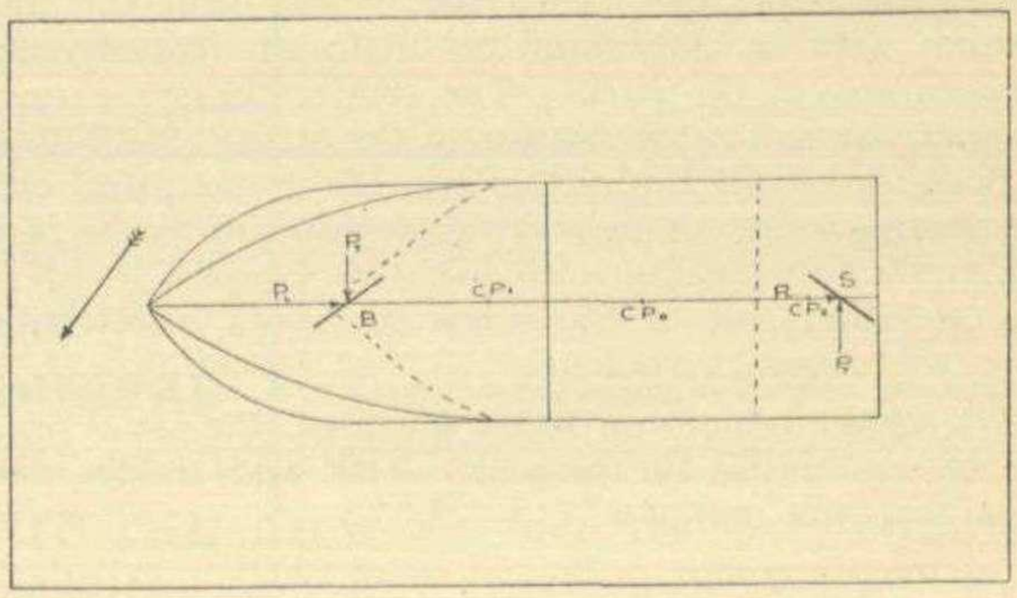


Fig. 1. The areas aft of the dotted lines represent the wetted surfaces when planing.

SPEED BOAT DESIGN—continued.

forward to secure the maximum advantage. A bow fin also helps to keep the boat on a straight course in a gusty side wind, and there is very little else in the bow section to offer much resistance to lateral motion when planing.

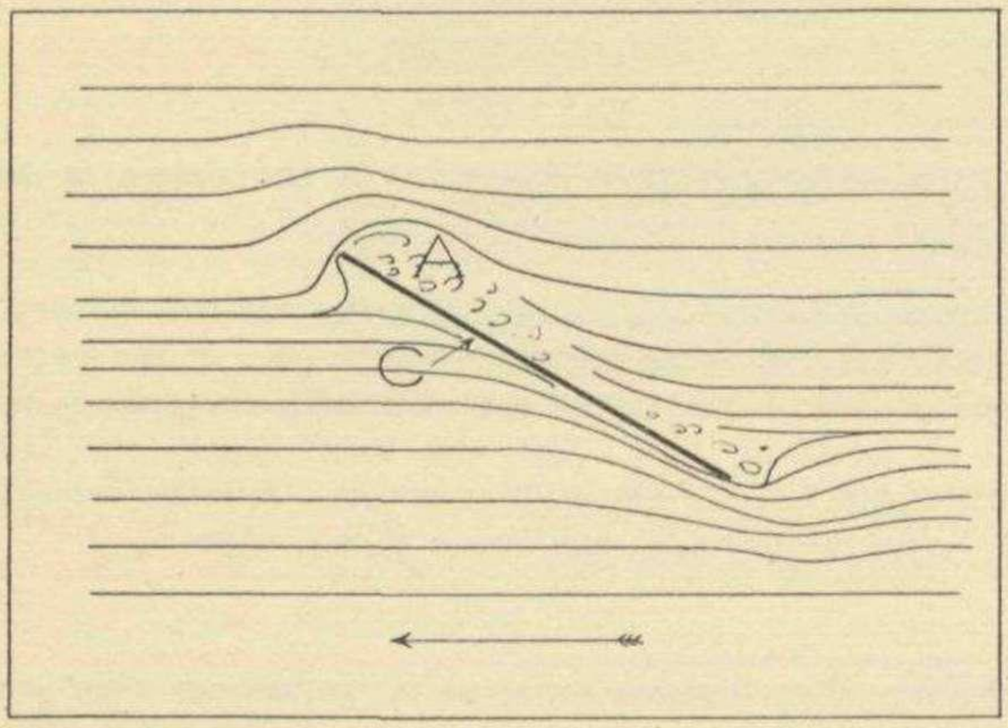


Fig. 2. The centre of pressure moves forward to the point C, due to the partial vacuum formed at A.

Two parallel fins are sometimes used, particularly with flat bottomed hulls, but this is not good practice, since the water is generally not moving in a straight line except near the mid line, and unless the fin is accurately parallel to the streamlines in its vicinity it will give rise to eddying and will have a considerably increased head resistance.

If the rudder is constructed so as to turn about an axis not far forward of its centre of pressure, the thrust on the forward part will tend to counteract that on the afterpart, and a light control will result. Much caution must be exercised in the design however, since, although the C.P. is not far from the geometrical centre when the rudder is trailing, it moves forward rapidly as the angle of incidence is increased, owing to the creation of a partial vacuum behind the forward part, as shown in Figure 2. This may cause the rudder to overbalance on reaching a certain critical angle, unless the forward part is fairly small, say a quarter of the whole surface.

The rudder spindle should be faired for minimum resistance, and a good plan is to have this fairing in the form of a fixed strut with the spindle down the middle. The fairing can then be carried neatly into the hull bottom with a minimum of hydraulic interference between any of the parts. The rudder thrust bearings are then carried at the bottom of the strut. See Fig. 3. In most outboards the rudder is made in one piece with the driving unit, though in larger inboard boats it is sometimes advantageous to use two coupled rudders, one on either side of the screw, to avoid interference from the screw turbulence.

If a single rudder and screw are used, the usual practice of combining the propeller strut and rudder post is perhaps the simplest.

The most common failing of small boats, particularly outboards, is the tendency to lift in the bows when planing. We have already seen that the most efficient angle of incidence is not more than 5° and it is evident that a boat travelling tilted at 15° or so, is both inefficient and unstable, since side winds and small waves can the more easily cause the bows to deviate.

Non stepped boats are the worst offenders in this respect, as they generally run with not more than two feet of the hull in contact with the water, and a simple experiment with a saucer in a bath will convince anyone that a short blunt object is very difficult to steer straight when propelled from behind. However, very few people now build any but single stepped hulls.

With the weight of an outboard engine at the stern the pilot should sit rather forward of the centre of gravity in order to maintain the correct turn when planing. The impression of great speed, caused by flying spray and tilted bows when one sits well aft is quite false and the pilot should adjust his position so as to keep the boat practically horizontal, the correct angles of incidence of the bottom planes being arranged for in the construction of the hull.

If the hull is trimmed so that the two parts share the weight equally very little " slapping " or deviation from the set course should occur. If most of the weight is concentrated on the after section the bows will be bounced by mere ripples, and while off the water can exert no control over the direction.

The use of horizontal fins or hydrofoils under the bow section to act as " dampers " to the pitching movement is a fallacy, since once the movement has been started the fin will be tilted so as to accentuate it, while if placed under the stern section, its function is already performed on a much larger scale by the bottom of the after body. One or two outboard engines have a horizontal fin on the strut, but it is difficult to see any use for it whatever, as there is no particular point in increasing the already large resistance of the driving assembly, and it can have practically no stabilizing effect on the boat, nor any control over the steering.

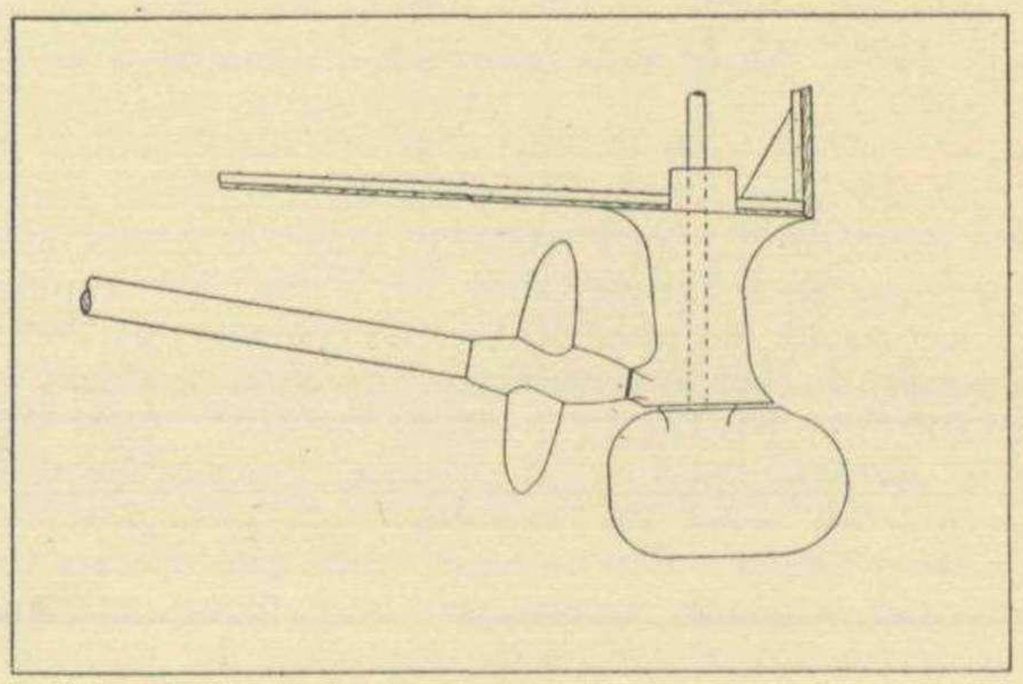


Fig. 3. The surfaces should be faired neatly into each other, to avoid all abrupt changes of curvative.

To summarize then : A deep stern rudder counteracts the tendency to roll on corners, while a shallow bow fin assists cornering and reduces deviation when running at speed. Pitching or slapping is reduced mainly by care in trimming the boat, and good design of the bottom.

Motor Sport Classified Advertisement Section

HEAD OFFICES :

34, DUKE STREET,
ST. JAMES'S S.W.1

Telephone: Regent 1937.
,, Gerrard 3436.

Telegrams : Agreynol, Piccy, London.

Rates (prepaid) - 1/- per line (minimum 3 lines).

CLOSING DATE first post on the **23rd** of the month, for publication on the 1st of the following month.

USED SPORTS CARS.

2 LITRE ROLLER BEARING FULL G.P. BUGATTI. Winner 37th 90 m.p.h. short handicap Autumn Meeting Brooklands, exceeds 109 m.p.h. for lap. No more tuning required for speed, competition work, sand or track. Car seen and particulars from Papworth's, Grant, 41, Filmer Road, Fulham, S.W.6.

ALFA ROMEO, 1929, Two Litre Supercharged. Fitted regulation four seater body, painted green. Engine just overhauled. Complete car in excellent condition and fully equipped touring and racing. Guarantee well over 100 m.p.h. £925. Headlam, Stakesby, Whitby.

SCHNEIDER AUTOMOBILES have several guaranteed 1927 10-30 h.p. open 4-seaters, in excellent condition, from £110. Below.

1929 13-55 h.p. sports 4-door fabric saloon, in perfect condition throughout, very fast. Schneider Automobiles, 138 Long Acre.

ASTON MARTIN side valve chassis No. 1922 Tourer, 4 sp. F.W.B. Fast and reliable. Exceptional condition in and out. Very full equipment. £165. Phone Cuffley, 88, Pollard, Goffs Oak, Cheshunt, Herts.

BARKER BENNETTS, the used BENTLEY specialists, offer :—

1925 Speed model, 3-litre, twin carburetters, sports body by Van den Plas, new tyres, taxed for year. Price £375. Barker Bennett & Co., 4, Upper Wimpole Mews, Devonshire St., W.1. Welbeck 4119.

A few second-hand H.E. Cars for sale. Repairs and adjustments for early H.E. models carried out. London Distributors, Welbeck Agency, 138, Long Acre. Temple Bar, 3322.

AT

18 BERKELEY ST.,

ALFA-ROMEO, 22-90 sports 4-seater, repainted, overhalued, a genuinely good sports car at reasonable price, 165 guineas.

LONDON AND COUNTIES AUTO DISTRIBUTORS, LTD. Mayfair 7050.

1926 BENTLEY special 3-litre speed model, fitted attractive 4-door saloon body, capable of 90 m.p.h., most excellent order throughout, £525. Schneider Automobiles, 138 Long Acre.

MATHIS, 1929, 2½-litre fixed-head sportsman's Weymann coupe, black patent leather, run under 4,000 miles, exceptionally smart, perfect condition, £325. City Car Agency, Ltd., 34 Queen St., E.C.4. City 2536.

MATHIS, latest 2½-litre twin-top gearbox, sports 4-door Weymann saloon, black, with aluminium moulding, wire wheels, exceptionally smart, fast and reliable, demonstrator, £355. City Car Agency, Ltd., 34 Queen St., E.C.4. City 2536.

TRIUMPH SUPER SEVEN, April - 29. Primrose and Black. Mileage under 5,000. Complete to makers' specification. Front buffers. Taxed, one owner. Genuine bargain, £120, differed terms or part exchange. Below :—

£122/10. M.G. sports 4-seater, 1927, full equipment, lighting, starter, pneumatic cushions, colour blue and aluminium, servo brakes, excellent condition, genuine bargain, deferred terms, exchanges. South Ealing Garage, 150-2 South Ealing Rd. Ealing 4161-2. Hours, 9 a.m. till 8.30 p.m., including Saturdays ; Sundays, 9 a.m. till 12.30 p.m.

HAVE YOU A USED SPORTS CAR, MOTOR CYCLE, BOAT OR 'PLANE FOR SALE?

If so, let *MOTOR SPORT* sell it for you at the Small Rate of **1/-** per line (min. 3 lines).

THE ONLY JOURNAL APPEALING EXCLUSIVELY TO THE MOTOR SPORTSMAN.

MACKS GARAGES, official RALLY agents, offer demonstration and shop-soiled 9 h.p. Rally cars, all fully guaranteed.

COUPE, ultra-smart body on sports chassis, genuinely capable of 65 m.p.h., finished in blue and cream, shop-soiled, price £295.

SPORTSMAN'S 2-seater, finished in red, complete with hood and all-weather equipment, a real 75 m.p.h. tourer, luggage locker at rear, used for demonstrations only, bargain, price £265.

PARIS-DEAUVILLE 2-seater, Moulin Rouge, used for track work and trials, a wonderful chassis with stripped sports body finished in red, a hot-stuff job for trials and fast touring, price £195.

EXCHANGES and deferred terms arranged.

3-13 PORCHESTER SQUARE MEWS, Bayswater, W.2. Park 9300.

SPORTSMEN ! £600 sports car for £95 ! ! 1925 DELAGE, 75 m.p.h., silent o.h.v., 14-40, large f.w.b., wire wheels, most attractive low-built 4-seater, comfortable seating with nice lines, choice of painting, dual-tone colours, tax £14, 26 m.p.g., genuine economical high-class car of superlative performance ; exchanges and deferred. Automobiles, 237 Brixton Hill, S.W.2. 'Phone, Streatham 4666.

1926 MERCEDES 24-100 h.p. 6-cylinder supercharged 2-seater, in exceptional condition, with two spare wheels, painted red and black, taxed, £275. Ryan & Ewen, Ltd., 26 Bruton Place, W.1. Mayfair 0093.

1928 Mark IV. 4-cylinder M.G. sports touring car, aluminium picked out in blue, blue leather upholstery, very fast, beautifully kept, 3 months' guarantee, £185 ; exchanges, deferred terms. Mann, Egerton, 156 New Bond St. Tel., Gerrard 9060.

1926 LORRAINE Le Mans model fabric saloon, black and red, perfect mechanically, smart and very fast, £210. Universal Aunts, Ltd., 37, Wilton Place, Knightsbridge, S.W.1. Sloane 5101.

1927 LAGONDA 14-40 h.p. semi-sports touring car, excellent condition, many extras, cost of £700, accept £245. L. F. Dove, Ltd., 115, Addiscombe Road, E. Croydon. Addiscombe 2444.

£350 LEA-FRANCIS, 1¼-litre supercharged 80 m.p.h. sports saloon, cost over £600. very slightly used ; no deposit terms. Thorns, 19-21, Gt. Portland St., W.1. Langham 3966.

MR. PHILIP TURNER'S famous LEA-FRANCIS, 1¼-litre supercharged, specially built, 2-seater, cost over £1,000, capable of 110 m.p.h., total mileage under 400, never been registered, indistinguishable from new, £325. Thorns, 12-21, Gt. Portland Street, W.1. Langham 3266.

1927 3-litre special sports short chassis DELAGE, fitted very attractive 4-door Weymann saloon body by Vanvooren, over 80 miles an hour, guaranteed, thoroughly overhauled, £375. Exchanges, deferred terms. Mann, Egerton, 156, New Bond Street. Tel., Gerrard 9060.

1920 LIGHT THIRTY DAIMLER COUPE. Lucas Electric Lighting and Starting. Engine suitable for installing in motor cruiser. Price £100 or offer.

Motor Sport Classified Advertisement Section—*continued.*

MR. PHILLIP TURNER'S famous DELAGE, 5-litre, competed Easter meeting and came in first at an average of nearly 114 m.p.h., will lap Brooklands at a guaranteed speed of 122 m.p.h., cost over £3,000, winner of many successes last year, including Brooklands Gold Vase, specially prepared for long-distance racing; no reasonable offer refused. Thorns, 19-21, Gt. Portland Street, W.1. Langham 3966.

CEIRANO, 1925, sports boat-shaped 4-seater, 11 h.p. o.h.v., f.w.h., etc., with 6 wire wheels £57 10s.; exchanges. Yarwoods, Stoneley South, High Road, Tottenham. Phone 3122.

1925 CHENARD-WALCKER 3-litre f.w.b. 15.9 sports, fitted magnificent English sports body, speed 75 m.p.h., excellent condition, written guarantee cost £595, our price £95. Archie Simons and Co., 135, Tottenham Court Road, W.1. (opposite Maple's). Museum 3268.

1928-29 Model ALFA-ROMEO 22-90 h.p,. 6-cylinder super-sports chassis, fitted with magnificent saloon body, finished in two shades of blue, upholstered in leather to match, fully equipped with every accessory, mileage under 5,000 83 m.p.h. guaranteed, condition as new throughout, 500 guineas cash or convenient hire-purchase term arranged. Lawson Pigott Motors, 322, King Street, Hammersmith, W.6. Riverside 5132.

FRAZER NASH CARS have several guaranteed second hand cars for disposal. Write for particulars.—A.F.N., Ltd., London Road, Kingston-on-Thames. Phone 6220.

MOTOR CYCLES.

498 c.c. A.J.S. actual 1926 T.T. machine. Engine completely rebuilt with double oil pump and pressure-fed big end. All wearing parts renewed including new racing specialloid piston in reground barrel. 3½ gallon twin tanks and sprint tank. Spares include cylinder head, barrel, valves, complete range of engine sprockets, and 2 spare wheels. Also T.T. sidecar chassis with spare wheel. 95 m.p.h. in sprint tune, perfectly flexible on the road. £40 the lot. Box S.85. MOTOR SPORT.

---

85 M.P.H. Scott 1927, genuine TT. model, raced in the Isle of Man; excellent mechanical condition throughout and paint. Brand new Fort Dunlop tyres, special cellulose finish twist grip, £55 or near offer. Box S95.

1928 RUDGE WHITWORTH Sports Model. Specially tuned by Works. Polished head and ports. Fitted T.T. 3-gall. petrol and separate oil tank. Just overhauled and new big end fitted. £38. Box S.87.

1928 K.S.S. VELOCETTE. 3rd in 1929 Amateur Road Race. Reconditioned, £38. Box S.88.

1927 K.S.S. VELOCETTE, perfect mechanical condition, and paint unscratched, £36. Box S.89.

AIRCRAFT FOR SALE.

NATIONAL, Flying Services Ltd. 'Phone Gerrard 9316. Quick deliveries. New or second-hand machines.

S. H. MOTH. Cirrus engine, many spares. £400. Particulars from Box P. 71.

Your used Sports Car will appeal to our readers——

ADVERTISE IT IN OUR CLASSIFIED SMALLS SECTION

AT **1/-** PER LINE

(minimum 3 lines)

PRACTICAL FLYING.

NATIONAL, Flying Services Ltd. 'Phone Gerrard 9316. Join N.F.S. Learn to fly. Fly when you wish.

AIR TAXIS.

NATIONAL, Flying Services Ltd. 'Phone Gerrard 9316. Go by N.F.S., 1s. a mile; 1s. 6d. two passengers.

MOTOR BOATS.

28 foot Motor Cabin Cruiser Kelvin Engine, Ketch Rigged, full inventory, sea-going gear. Particulars Major Henderson, Derby Haven, Isle of Man.

MOTOR BOATS

(continued).

12 FT. SINGLE STEP HULL, with Johnson Class C motor, overhauled, very fast, winner numerous awards, wheel steering. £65 or near offer.—Box H 76.

REPAIRERS.

SCORED CYLINDERS. Scores in cylinder bores can be filled in by Barimar Metallurgical (Patented) Process, to fit existing pistons and returned in two days under money-back guarantee, at low cost.—BARIMAR, Ltd. (Scientific Welding Engineers), 14-18, Lamb's Conduit Street, London, W.C.1. Branches in Birmingham, Manchester Leeds, Newcastle-on-Tyne and Glasgow.

MISCELLANEOUS.

BINKS 2-jet Mousetrap Carburetter complete with twist grip control. New cost £5. Accept £2 10s. Box 0100.

DRUMMOND 3½ inch screw cutting gap bed lathe, back gear, face and 3 jaw chuck, T and slide rests, complete set change wheels, metal and wood tools, and other accessories. Outfit cost £40, accept £17 10s.

ALSO BENCH DRILL, self-feeding, taking drills to ½ inch. £1 15s.—Box 0250.

NATIONAL PARAFFIN ENGINE, 4ft. fly wheel, runs very steadily. Suitable for running 100-light electric lighting set or large workshop.—Box 0245.

SIDDELEY WOLSELEY CAR engine 10 h.p., used for charging batteries. ¾ gall. No. 3 per hour. £5.—Box 0255.

MORRIS-COWLEY ENGINE, completely overhauled and complete with gear box, new magneto, dynamotor, etc. Ideal unit for fast inboard launch or small cruiser. Whole in first-class condition. £12.—Box 0210.

ADMIRALTY-TORPEDO AIR COMPRESSOR, 3-cylinder radial, suitable for spraying plant or similar. £4 10s.—Box 0230.

CONVERTED FORD UNIT with oil rectifier, and special reverse gear for marine work. Complete with 4 ft. x 1 in. steel shaft and 12 in. 3-bladed propellor. £10.—Box 0240.