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INCORPORATING **SPEED** AND THE BROOKLANDS GAZETTE

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LORD WAKEFIELD

THE motor industry and the entire sporting motoring world lost a valued friend and benefactor when the Rt. Hon. Sir Charles Cheers Wakefield, Bt., Viscount Wakefield and Baron Wakefield of Hythe, passed away last month at the age of eighty-one. Lord Wakefield, like many other great men, lived simply and sincerely. He founded the famous concern of C. C. Wakefield and Co. Ltd., makers of "Castrol" lubricating oil—which has since then looked after the bearings and other internals of so many different types of engines—as long ago as 1899. From the success of "Castrol" he achieved his great prosperity, and he responded by giving vast sums away—not to the project which could raise the most publicity by the loudest blare of trumpets, but back to the pursuit which had given his wealth to him. Thus we find Lord Wakefield supporting Sir Alan Cobham, Amy Johnson, and others in their adventurous motoring in the sky, as well as founding the scholarships at the R.A.F. Cadet College and finding hundreds of pounds as prize money for the R.A.C.'s King's Cup Races, and for the International Schneider Trophy seaplane contests. Criticism that all this was done with an advertising motive was nicely counteracted by Lord Wakefield's backing of humble folk with doubtful projects because he liked them as individuals and by his habit of turning a deaf ear to others of greater and proven ability. In our world, apart from thousands of pounds donated to prize funds, Lord Wakefield financed Sir Henry Segrave's absolute speed attempts at Daytona and his motor-boat speed records at Miami, and he put up the Wakefield Gold Trophy for speed and that prize of £1,000 a year to the current holder of the "Motor Car Speed Record." Further, he presented the 232 m.p.h. Irving-Special "Golden Arrow" and the record-holding motor-boat "Miss England" to the nation. On the less adventurous side, he twice held the office of President of the Motor and Cycle Trades Benevolent Fund and donated to it the sum of £10,000. He gave away a lot more of his wealth publicly and made numbers of gifts of which we shall never hear.

He lived the life of a simple, shrewd man, following in many ways the standards of the Victorian age. He had no extravagant tastes and his personal transport was looked after by a far from new Rolls-Royce car.

Motoring sportsmen and followers of competition motoring owe a great debt of real gratitude to Lord Wakefield. We only wish that others who have made their fortunes out of motoring would be half as generous to that side of the game which improves the breed of the Industry's products and does so much to keep the wheels turning. Lord Wakefield did more than his fair share in that direction. Perhaps the best way in which we can show our gratitude would be by contributing something to the Royal Air Force Benevolent Fund, which exists to look after the airmen Charles Cheers Wakefield so greatly admired, and on behalf of which he appealed only a few months before his death.

Who better than he could appreciate the wonderful feats of those "lords of the air" for whom he worked so hard, and who, although they may not all be cognisant of the fact, owe so much to his ability and the encouragement he gave to research and experiment in every modern development of the internal combustion engine.

Where can we look for another to take his place? Let us hope that the good work so freely assisted by Lord Wakefield will not be allowed to languish for want of a patron.

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THE BRIGHTON RUN

The Inimitable Veteran C.C. Event Recalled by John Bolster, who used to compete successfully with a 1903 Panhard

NOW that all real motoring is at a standstill, and even talking cars over a pint has become a rare pleasure, the average motoring enthusiast probably spends many hours as I do, dreaming about the fun we used to have. There were those journeys to distant places, with the "Special" on a trailer behind the "30/98" Vauxhall and a passenger posted to watch constantly astern for speed cops. There was the thrill, ever new, of trying to keep the "racer" straight while it accelerated like a bullet, and sometimes there was even the pleasure of achieving a "fastest time of the day." Those were happy days, but yet there was one red-letter day in all the year which excelled every "dice" in enjoyment. I refer to that day each November when about a hundred cars, all manufactured before 1905, started off from London in their attempt to get to Brighton.

The last two or three runs have been organised with a strict time schedule and a compulsory lunch stop, which has rather spoilt the free-and-easy nature of the thing, though I suppose it was necessary to prove that it wasn't a race. However, it was the earlier runs which were particularly enjoyable, and I shall try to describe a typical one of these.

The start was from a big London garage, where we had left our car a few days previously to be scrutineered. We arrived very early to make sure that she was in good fettle for the run, and as dawn broke my brother was greasing chains or checking the action of the drip feeds for the oil. I was removing the sparking plugs to put a little petrol in the cylinders for an easy start, and my wife was fitting numbers or polishing brasswork. Of course, the car had been meticulously prepared weeks beforehand, but you can't be too careful. Anyway, about the time when we simply couldn't think of anything else to check over, we heard some of the earlier starters being warmed up. The oldest cars were started first, and the others followed in order of age, at half-minute intervals, the parking arrangement in the garage facilitating the process by the very old gentlemen occupying the ground floor, and the comparative youngsters coming down later in lifts from the higher floors. As our car, a 1903 Panhard et Levassor, was one of the later starters, we had time to go downstairs and see the earlier people go off.

The 1894 Connstatt Daimler was the first to leave, followed by a number of Benz and Benz-type cars, such as the Star Dogcart and the Arnold Motor Carriage. The Benz device consists of a two-seater, with tiny front wheels and enormous back ones, the horizontal single-cylinder engine operating a countershaft through a two-speed belt drive, and the countershaft, which carries the differential, urging the back wheels through a pair of very flimsy chains. If that were all, no harm would result, but in order to start off you have to use a thing called a "Crypto," which is a subsidiary epicyclic reduction gear, and is so violent in action that the lightly loaded front wheels invariably leap high in the air, assisted by the weight of the engine, which is carried above the back axle. We laughed at our friends going through this indignity, but an even better laugh was to come, when Andy Leitch (of Bugatti fame) arrived on the line with the 1900 Begot et Mazurie, because this is quite the smallest car there has ever been, and Andy is so enormous that he absolutely dwarfs the little machine. There was a colossal crowd outside the garage, applauding each car as it set off on its exciting journey, and when one of the drivers made a bad gear change, the applause turned to shrieks of laughter and boos, which suddenly made me remember that our Panhard has a very difficult gear change. I immediately suggested to my brother that he should take the first shift of driving, but he said it was my turn to drive the London end of the journey, as he had had that job last time, and those slippery cobbles and tramlines just weren't funny!

When we went back to our Panhard to warm her up we found that the exhaust fumes of the earlier cars had absolutely filled the building, and it was almost impossible to breathe. We watched Dick Nash winding furiously at his Panhard before it would start, and then I told my brother that if I was having first shift of driving, he was in for first shift of winding. I flooded the carburetter and closed the choke, retarded the ignition commutator and switched on the trembler coils, and brother Richard, with a thick leather glove to protect his hand, attacked the starting handle. Incredible to relate, she burst into life with one pull up, and was quite soon running at her working speed, at which she is maintained by a centrifugal governor. I suppose it would not be very original to describe the ensuing scene as bedlam, but by the time all the cars on our floor were running, it was hardly possible to see for fumes, and everyone was coughing and wiping their eyes. The noise, though, was delightful, compounded of the quick "tuff-tuff-tuff" of the single-cylinder De Dions, the much slower "terff-terff-terff" of the Cadillacs and Oldsmobiles, the uneven "putter-putter" of the twins, and the steadier rumble of the rare and exalted four-cylinders. Our two-cylinder Panhard often made an extra loud "chuff" when the action of the governor caused an explosion in the silencer, but we knew that this was a sign that everything was adjusted correctly, so were not as alarmed as some of our friends.

Eventually, when almost suffocated, it came to our turn to go down in the lift, and most of the way down I held the clutch out, so that the enormous cone would have time to slow down enough for first gear to engage without too much noise. This was fairly successful, and we were flagged off by the starting marshal and got away without a spectacular leap, soon achieving our maximum speed of 7 m.p.h. in bottom gear. It was then regrettably necessary to transfer the gear lever to the next notch on the quadrant, which isn't as easy as it sounds, as the engine always runs at a constant speed, though it can in some way be influenced by the "act of God pedal," which has a slight effect on the governor. However, if you don't shift rapidly, she won't "take" the next higher gear, so the quickness of the hand had to deceive the gearbox, and we got cracking with only a fair amount of laughter from the crowd. On second gear she will approach 20 m.p.h., and this is a nice ratio for traffic, which you can nip through very prettily with the high-geared steering and short wheelbase. If you apply the handbrake, there is a hissing noise from the rear of the car and the clutch is automatically disengaged, whereas if you apply the footbrake there is a chattering noise under the floorboards and the clutch, again, is put out. As neither of these methods results in much retardation, I thought that second gear would do very nicely, but another competitor was catching us up, so in went top gear. The car got into her stride, and soon we were dashing along at 32 m.p.h., which meant close on 1,000 r.p.m., and gave an impression of speed about equivalent to 90 m.p.h. in a modern car.

Very few people understand quite what a constant-speed engine entails. In the case of our Panhard, running on a level road, you can choose between driving at 7, 20 or 32 m.p.h., and although the "act of God pedal" may vary the rate to a certain extent, the gears are "speeds," as they were always termed in days of yore. All the gears are indirect, and top gear can only be used under favourable conditions, so that in a "scrap" with another veteran, smooth and rapid gear shifting is a *sine qua non*. In our case, the journey to Brighton was enlivened by numerous "races" with other competitors. The very old cars, such as the Benz, were passed as if stationary, and the Oldsmobiles and Cadillacs were fairly easy meat, as were the Bollees and M.M.C.s. The Darracqs, on the other hand, made short work of us, the big Mercedes left us standing, and the Lanchesters could pass us on a hill. The larger De Dions, however, were just our match, and we would pass and repass, the passengers sitting on the floor to improve the "streamline," and the drivers making appropriate gestures of joy or despair, according to their fate. It was wonderful how the very heavy traffic on the road made way for us, and how the police would help us in every possible way, so that all rules of the road were waived in our favour, and we were kings for a day.

At last, yet all too soon, the Pylons told us that we were entering Brighton, and checking in at the Madeira Drive, we found that we had averaged 23 m.p.h. We had made the journey non-stop, but as we walked among the cars, and

THE BRIGHTON RUN—continued

congratulated those of our friends who had won through in spite of serious troubles, we remembered our first Brighton Run, when the radiator burst, and my wife in the "30/98" collected vast quantities of water, which we poured through a funnel to keep the engine cool, the water cans being passed from car to car at our full 32 m.p.h. So at last we were at Brighton, but that is over 50 miles from my home, so after supplying ourselves with food and drink, the Panhard had all her greasers, drip feeds, etc. attended to, and, after a certain amount of winding, the old engine said "putter-putter," and off we went on the homeward journey.

We got through Lewes before stopping to light the oil lamps, and then, in pouring rain, had almost reached Tunbridge Wells when death from exposure seemed imminent, and a public house had to be visited to get a little warmth into our frozen carcases. Coming out of the warm pub, it seemed suicide to climb on to the Panhard and battle against the wind and the rain. As soon as the old car was clattering, though, we forgot all discomfort, and the task of picking out the road by oil light, coupled with the pleasure of increasing the performance with accurately timed gear changes, made the miles seem shorter. Soon we were splashing through Tonbridge, Ightham, Wrotham, and up Wrotham Hill (with, as they used to say, "power in hand"), and in a few minutes we were home. The engine was switched off, the enormous flywheel gradually slowed, the automatic inlet valves gave a last convulsive snort, and the Panhard settled down to her well-earned rest. We were very proud of our veteran after this non-stop run, especially when a letter arrived from the Panhard works in Paris congratulating us on our performance, and saying that some of the men who built our car were still employed at the works.

In addition to the Brighton Run, the Panhard has competed in a lot of Veteran Car Club events, some of which have entailed quite long journeys, 170 miles in a day being about the best we've done. She doesn't always complete her journeys non-stop, in fact one usually seems to arrive at one's destination with oily hands, but whatever happens, it always seems to be possible to make a temporary repair at the roadside, and her slow-revving engine seems quite unwearable. Before making a long run, a couple of hours of greasing and oiling is needed, but sometimes I think that the more preparations you have to make, the more you enjoy the drive. It is partly the feeling that without intelligent preparation and skilful driving a breakdown is almost inevitable, and partly the sensation of living again in the very earliest days of motoring history, that makes Veteran motoring the best there is.

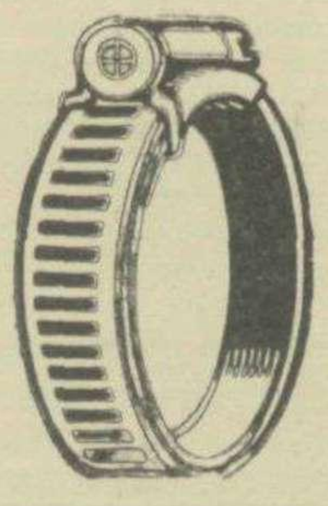
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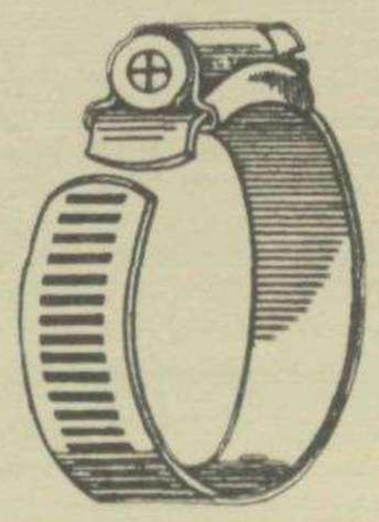
In the course of his article last month, Douglas Tubbs referred to a certain little side-valve sports which he found very unsatisfactory, and over the make of which, for obvious reasons, he drew a veil. Unfortunately, the remarks intended to apply to this car in the table with which Tubbs concluded his observations were, by a printer's error, attributed to a 1933 M.G. The text made it obvious that the car could not have been an M.G. and most readers know that the M.G. Car Company, Ltd. did not list a s.v. model in 1933. Certainly M.G.s have never suffered boggy cornering, uncomfortable bodywork, poor coachwork and mechanical unreliability, as did the nameless car concerned. Further, Tubbs tells us his bad writing led to the handling of his 1931 M.G. Midget, which appeared one line above in the table, going down as "Poor for speed," whereas he intended us to inform the world that it was "Good" in spite of Mr. Centric getting the maximum speed up to 83 m.p.h., or about 18 m.p.h. more than Abingdon intended. We offer our apologies to Mr. Kimber. In Clutton's article the Moss was wrongly quoted as a Mars.

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MODIFICATIONS TO THE 4¼-LITRE BENTLEY

A NEW MARK V MODEL FOR POST-WAR PRODUCTION. INDEPENDENT FRONT SUSPENSION

[We have decided for once to depart from the usual methods in announcing this new car, and the article which follows was written, at our invitation, by Mr. W. A. Rowbotham, of Rolls Royce Ltd. themselves. He tells very modestly how this fine car was evolved and of the many ways in which it improves on the former 4¼-litre.—Ed.]

SINCE Rolls Royce Ltd. took over the Bentley Company the evolution of the Bentley chassis has proceeded on well-defined lines.

The object of the Development Staff has been to produce a completely reliable automobile from which the driver can extract the maximum performance with the minimum amount of fatigue.

There are cars which can put up astonishing averages over certain roads when handled by expert drivers. Performance only interests the Bentley engineers if it can be used by the average driver under average road and weather conditions, seven days in the week. It will not be so used unless the driver is, and feels, safe and also suffers from the minimum amount of fatigue travelling over a given distance. It is not difficult to understand why the above formula fails to produce an exciting car. In point of fact, it can be said that, since its inception, the Rolls Bentley has become less and less exciting to drive at any given speeds. The late 3½ litres were less noisy than their predecessors. The immediate impression was that the car had less performance and therefore was not so thrilling. Ride control improved the high speed stability; a stable car minimises the impression of speed. Big tyres increase the comfort of the suspension; if you are thrown about sufficiently, it is not difficult to believe a fast speedometer, but if you ride smoothly at 90 m.p.h., the impression of speed is diminished.

So the Bentley was evolved, and in spite of its first cost, has always been an economical car to run. To drive as fast as conditions will permit means an average of between 50/55 m.p.h. on most of the English main roads, and yet, even in the hands of a hard driver, it is seldom that the consumption is worse than 17½ miles to the gallon, whilst to require brakes relined at under 50,000 miles is the exception rather than the rule. An enthusiastic owner, Mr. E. R. Hall, one of whose hobbies was motor-racing, was so impressed by the sheer performance of his Bentley, quite apart from its good manners and economy, that he managed to persuade the company to let him run as a private entry in the T.T. over the Ards circuit. To run one single car in any race is tempting providence, since a single minor defect or even a puncture may cause defeat. However, having bought the car, it was his to race if he wished. Three years in succession he ran in the T.T., on every occasion against teams of cars having larger engines, and on each occasion he put up the fastest time for the course, though beaten for first place by a small car, on handicap.

His average speeds were :—

1934	78.4 m.p.h.
1935 (record for any car, supercharged or unsupercharged)	80.36 m.p.h.
1936	80.81 m.p.h.

If anyone has a car which he thinks is fast, let him get up early one morning, take it on to the fastest section of the Great North Road, and try to cover 65 miles in one hour. Compare such a stretch with the tortuous Ards circuit, add a tyre change, and Hall's figures speak for themselves. And so to 1939 and the outbreak of war. At this date a new Bentley, known as the B5, was just starting in production and the first half-dozen had been completed. But instead of gracing the stand at Earls Court, they went into service on war work. They have covered many tens of thousands of miles and now, having become almost veterans, are being lent to the Technical Press, so that the Bentley Public will have something of additional interest to look forward to when Peace comes. The Mark V Bentley, as it is now called, has independent front suspension, a new frame, and more body room, whilst actually being built on a shorter wheelbase. It is an improvement in every respect over its predecessors. It is a little quieter over the speed range, the brakes are slightly more powerful and progressive, the clutch and steering are lighter and the lock is better. The engine is smoother, it pulls better at slow speeds and is less obtrusive when idling. Probably the most noticeable difference between this car and its predecessors is its road-holding, directional stability, and suspension. A description of this sort of improvement can convey little. The narration of an incident during the chassis evolution may be more illuminating :—

> Two testers were doing an oil consumption run, comparing the old with the new type Bentley. To get accurate results, one car had to be driven immediately behind the other. The new model was leading. At the conclusion of the run, the driver of the second car walked up to his colleague and said 'What the dickens were you in such a hurry for? I could hardly keep up with you.' The reply was, 'I didn't drive any harder than usual.'

This is the best description of the new Bentley Mark V. You do not drive any harder, but you put up a much higher average speed without realising it. The Rolls Royce engineers have decided that they must endeavour to produce this sort of result, without sacrificing economy or durability, every time they alter the specification of the Bentley chassis.

The points where we consider that the Mark V has been improved in comparison with its predecessors may be divided up into five sections.

Section 1—Comfort

The general silence level of the vehicle has been raised, the engine smoothness has been improved, the ride is better. With regard to the body, access to front and rear seats has been improved, and here is more elbow room and increased luggage accommodation.

Section 2—Safety

The brakes are more powerful; the directional stability of the car has been improved.

Section 3—Performance

The road holding and cornering abilities of the new model are very much better than was achieved on previous Bentleys. This enables a high average speed to be maintained over any stretch of road.

Section 4—Ease of Handling

The starting is now fully automatic, i.e., there is no longer any necessity to adjust the mixture strength. The engine pulls better at low speeds, which means that it is unnecessary to change gear as often as previously. The clutch operation is lighter, the steering is lighter and the lock is better.

Section 5—Durability

At many points durability has been improved by increasing bearing sizes. In particular, the dimensions of the crankshaft have been increased. The rear axle has been modified to give greater ability to withstand abuse. The basic object in redesigning the Bentley has been to enable higher average speeds to be maintained without the driver suffering from increased fatigue. Running through the modifications made to the various units of the chassis compared with the last series, we have the following :—

Independent Front Suspension

Independent suspension is now fitted to the front of the car. This results in three basic advantages :—

Better steering stability at high speeds;
Better cornering ability, and
Better ride.

The suspension also is arranged so that it is completely insulated from the rest of the chassis with rubber. This eliminates the tyre and road noise which is often accentuated by other independently sprung systems.

Engine

Crankshaft journal sizes have been increased to improve durability and smoothness. A completely new engine mounting has been evolved, which permits the engine to be driven at full throttle at low speeds, without torque reaction being felt.

A raised crown piston has been standardised, which reduces detonation to the minimum.

Clutch

A semi-centrifugal clutch is now fitted. This reduces the pedal pressure and gives a smoother take up.

Steering

This has been lightened without materially lowering the overall ratio, while the lock has been improved.

Continued on page 280

TRIALS WITH A TROJAN

[A. F. Scroggs, now with the R.A.F., used to achieve notable trials successes with Trojans—the engine-amidships type—when not driving a Ford Ten. This is such an unusual trials car that we asked Scroggs how it was done, and this is the answer. We admire his patience on the run back from, say, a "Land's End," and wish him equal success with present, faster, mounts.—Ed.]

IT would probably be fairly safe to say that very few drivers would regard a Trojan as an ideal trials motor; in fact, anything less like the conventional competition car would be hard to find. And yet, although they have not played a very big part in trials, I doubt if many cars can claim a higher proportion of successes. At first sight it may seem a little strange that a vehicle designed essentially as a cheap utility car should have been able not only to compete successfully in contemporary trials but to hold its own in company with up-to-date sports-cars for so many years. It is even possible that some of those who have watched a Trojan making its leisurely and determined way up, say, Doverhay or Blue Hills Mine may have wondered vaguely how it was done.

As a matter of fact, there really isn't any mystery at all; there are no weird and wonderful devices and no "secrets of tune." The truth is simply that the Trojan was designed as a utility car, and in the mind of the designer that meant that it must be able to "go anywhere"; it must be able to climb precipices and travel over any kind of road surface or even where there wasn't a road at all, and it had to be so robust and reliable that it would go on doing these things until the cows came home. Sometimes I dare say it was used to bring them home! Well, isn't that (all except the last bit) just what you want in a trials car? To do all these things it was given a simple two-stroke engine with immense pulling power especially at low speeds, an epicyclic gear, very flexible springs, a large ground clearance, and a solid back axle. It also had a good turning circle, high-geared steering, and excellent driving vision, all of which are, in my opinion, highly desirable features.

Of course there were snags as well. It was noisy, ugly and slow, but when I got my first Trojan, in 1925, I didn't pay much attention to these things. Anyway, I had no intention of using it for trials and I would much rather "get there" slowly than stick half-way, even if "there" happened to be the top of a precipice or the middle of a moor. I have been laughed at pretty steadily for the last fifteen years and it doesn't worry me at all; on the contrary, the very quaintness and unconventionality of the vehicle was, and is, an added attraction.

Having got my Trojan, I used her for a few months for ordinary driving, including rough stuff for amusement, and then it occurred to me that it might be rather fun to try her in an easy trial, such as the M.C.C. "Edinburgh." At that time the schedule speed was still 20 m.p.h., and I thought that even with my maximum of 30 I might just manage it, for of course the hills were easy. It was a pleasant trial, though not without its excitements, for I found that with my low speed and solid tyres even a 20 m.p.h. average took some pretty hectic driving, and I don't think my passenger, who wasn't used to the peculiar behaviour of solid tyres on bumpy roads, has ever forgotten it!

We got our "Gold" all right, and that rather whetted my appetite. The run was an easy one, but at least it showed me that trials on a Trojan were a practical possibility, and for the next five years I drove this remarkable vehicle (which incidentally I had bought second-hand) in as many trials as time and cash would allow. The low speed was the only real drawback, but as long as there was no Special Test calling for something more in this respect than the Trojan could achieve, she won "Golds" with great regularity. On top gear about 1 in 8 could be climbed, and on bottom something over 1 in 3. By the way, my performance figures are taken from Tapley readings and a Bonniksen speedometer which I have personally checked on a stroboscope and found correct. This pulling power, together with the gripping power due to the solid axle, made almost any hill easy, but sometimes I had to hurry all I knew between observed sections.

During this time I made little alteration to the car, which remained substantially standard in all except details. After about three years I gave up solid tyres, not because they were uncomfortable, but because they got expensive and rather unreliable. There were many rude stories told of Trojans in the old solid-tyre days, but I never suffered the fate of an enforced visit to the tramway depot, as folks used to say was unavoidable once one got into the tram lines! Only in one of these trials did I have any real trouble. That was in the Land's End of 1929, when my top gear band came adrift somewhere near Newquay. It is made in two halves, and I was able to remove the broken part, tighten the remaining half and continue. Top gear slipped rather badly, and the vibration due to the unbalanced band was unpleasant, but we got there and acquired the "Gold" which had seemed to be lost.

Eventually I began to feel a desire for something new, preferably with a little more speed, and I handed over the old car to a friend. Some time later she was crashed, while still going strong. I was rather relieved in a way, for I am a sentimental person and was glad to think that she had not broken down or worn out through old age. My next car was also a Trojan, but it had a larger body and was specially fitted with a three-speed gear (the standard one at that time was two-speed) and a modified engine which was said to have done great things on test. This engine presented me with a pretty mechanical problem, for although it had excellent pulling power, the speed was mysteriously far below what the reputed b.h.p. would lead one to expect, and I spent the next few months trying to trace those lost m.p.h. One day, one of my passengers had a brain wave and suggested that the trouble might be due to surging in the induction pipe, which after certain tests I decided was true. I then fitted a redesigned manifold which made an almost unbelievable improvement, and, together with a slightly altered cylinder head, it increased the power output by some 60 per cent., and the peak r.p.m. from 1,000 to 1,800. These experiments, and the incidental difficulties which appeared, gave me quite a lot of fun and also taught me several things I didn't know before.

I kept this car only a comparatively short time, as I was posted abroad, but she had time to win two M.C.C. Triple Awards. While I was away, I spent much time looking forward to choosing a new car when I got home, and thought this time I would get something more respectable, but when it came to the point I just couldn't find anything which completely filled the bill. The car I did buy was very good for ordinary purposes, but didn't much like rough stuff, and although she won a few P.A.s I began to find trials difficult. Moreover many people seemed to connect me inseparably with Trojans. The only thing seemed to be to get another, which wasn't very easy as they hadn't been made for some years, but I did succeed in getting a very second-hand one. It had the old performance, but had been rather badly treated and needed a good deal done, and before long I changed it for another which I was fortunate enough to find just about to be broken up. This was a 1927 model, and after I had spent about £10 in fitting my old engine and sundry modifications I drove it in an M.C.C. Sporting Trial, only missing a P.A. through the unauthorised movements of my passenger in an observed section. As I had got the car for nothing I felt that a thoroughly "trial-worthy" car for £10 wasn't bad going!

Alas, the war has sadly curtailed the activities of this, my present, Trojan. She has, however, achieved P.A.s in the "Exeter" and "Land's End," which gave me great joy as it showed that after all these years the old Trojan has still "got it there." She is now awaiting more favourable times—still starting without fail on the coldest mornings; still doing her 39 m.p.g.; and still capable of climbing hills, but now only doing odd jobs. I only hope that some day trials will come back, and then I am confident that the old car will once again come in with a clean sheet.

I have said that trials, unless they include timed sections, are easy on a

TRIALS WITH A TROJAN—continued

Trojan, and this is true, but to get the best out of one of these strange vehicles one must forget all normal ideas of driving. It is easy, but different. The same applies to maintenance. Possibly the greatest advantage from the competition point of view is the epicyclic gear, which I believe is unique in having a hand control. This makes re-starting on even the steepest hills easy and almost fool-proof. It is like this : with the *left* foot on the brake pedal and the right hand on the gear lever, you trickle up to line " A " with everything under complete control and no " juggling." It is never necessary to change the position of hands or feet. At the word " go " you just push the gear lever gently forward and it's done ! The clutch pedal is never used at all. It may sound odd, but believe me it works. It is, of course, no sort of use to " rush " hills—one must rely only on pulling power. On the other hand, the ability of the car to pull slowly and grip bad surfaces enables one to keep complete control and pick a course carefully. One can change gear either way with the throttle wide open, which is sometimes a distinct advantage.

Almost equal to the gear in its value for trials is the solid back axle. There has been a good deal of argument from time to time about these, but it seems to me that their prohibition is in itself an acknowledgment of their value, which is not confined to trials driving. On slippery roads, or in snow, I feel safer driving a Trojan than anything else I know. The designer knew what he was about. The front axle, too, is unusual in that it is tubular and can be rotated so as to allow varying degrees of castor angle for the steering pivots. I find that a little less than standard is pleasanter, as it enables full lock to be obtained with one hand, but it is a matter of taste.

The chain-drive, as will be appreciated by members of the " chain gang," has the advantage of allowing for different gear-ratios to be easily selected. The standard top is 4 to 1, giving a bottom of 12 to 1, but I find that with a hotted-up engine a somewhat lower ratio is better on the whole and I now use 4.6 to 1. Anything from 3.5 to 6 to 1 can be obtained. Chains wear out in time, of course, but with reasonable treatment last about 25,000 miles. It is very important to keep the gearbox full, as leakage from it oils the chain, and I find Castrol " R " is the best. It also makes the gears quieter.

The springs are exceptionally good for very rough roads, but were designed for running at low speeds. When the speed is increased it is desirable to fit shock-absorbers (not standard) and slightly stiffer springs.

As regards the engine, it needs very little attention beyond periodical cleaning of the exhaust ports. It never needs decarbonising and, of course, there are no valves. Mine, though essentially similar to the standard one, is peculiar in having a detachable head, which allows me to make experimental modifications—interesting, but a bit expensive !

The discerning reader will have gathered that I have a great affection for Trojans, but I hope he will also realise that it is by no means mere sentiment, and is based on practical considerations. Quite apart from trials, I am very fond of pottering about unfrequented country, and for this the Trojan is supreme. I have also used the car very successfully lately for towing a caravan. It is difficult to describe or analyse the peculiar fascination of a Trojan, but there is no doubt it is there. In the early days I lent mine one day to a friend who was thinking of buying quite a different kind of car ; he was so fascinated that he promptly changed his mind and bought a Trojan ! You can't hurry them, but they give one the impression that they will quite certainly get there in the end, and although Trojans have their limits they nearly always do.

I have always thought it a pity that the manifest advantages of what was in its day a really brilliant design—advantages which are not even now to be found all together in any single car at any price—should have been accompanied by drawbacks which made the car unacceptable to the average motorist. I believe these drawbacks could be overcome, and that a car embodying the same principles in a more up-to-date form could be produced and sold. There has been some discussion lately in various quarters concerning the two-stroke as a possible power unit for popular cars. It certainly has points to recommend it—cheapness of production, simplicity, reliability, long life, and easy maintenance—but I think a good deal of research would have to be done to make it satisfy popular demands, especially in the relation between developed and taxable horse-power. Nevertheless, I do think that this research would be, ultimately, worth while and I hope it will be done. All the same, I should not be surprised to see two-strokes raced before they appear in any numbers on the road.

Before I finish, I should like to explain that I have no business connection with the Trojan Company, although I have some valued friends among their staff, and I acknowledge with gratitude the help they have given me from time to time during the fifteen years I have known them. I also take off my hat to the genius of Mr. L. H. Hounsfield, the original designer. The Trojan is not everybody's cup of tea, but it still tastes good to me !

ODD SPOTS

C.U.A.C. DINNER

Another C.U.A.C. dinner is scheduled for March 8th, at 7.30 for 8 p.m., at the Red Lion Hotel, Cambridge. These functions are *the* motoring socials of the war. Tickets, at 8/6 each, or 10/- for non-members, should be applied for at once, from J. B. Jesty, A8, New Court, St. John's College, Cambridge, where Cambridge enthusiasts now forgather every Friday from 8.15 p.m. onwards.

"CARS I HAVE OWNED"

The Editor wishes to offer sincere thanks to those who have contributed voluntarily to this series. Enough articles are now in hand to continue the series until at least the June issue, but further contributions will be very welcome. Will those contributors who, through an oversight, receive no acknowledgment and whose articles do not appear for some months, please accept this appreciation of their efforts and wait in patience, consoled by the thought that the Editor has greatly enjoyed reading their contributions, as readers will do as soon as space can be found ?

TRUE STORY

A racing-car owner once asked a well-known automobile consulting engineer to carry out a technical examination of certain parts of his car, offering to drive this august person to where the car lay dismantled. The place, a certain Watford garage, was named and the owner was a little irritated when the engineer replied that he was a busy man but he would see how soon he could spare time for the journey. Time went on, and always the engineer pleaded he was too busy to make the trip. He was approached yet again, and the bottom fell out of things when he calmly announced that surely the fall of France rendered the project out of the question . . . . ! He had confused the garage, of course, with a well-known racing venue on the Continent. Yes, true story.

Club News

There is very little club news, although there may be a Vintage S.C.C. meeting later on, Sam Clutton has some pretty devastating ideas which may well come into operation before the war ends, and the J.C.C. has produced yet another "Gazette." The latter is really good, more particularly the copious news of members, as well as the naughty cartoon and rhymes. E. N. Duffield has an article on small cars of the first year of the previous great blitz and says some quite cutting things, chiefly about Enfields, Hurlincars, G.W.K.s, J.B.S.s, Marlboroughs, rear-axle-gearbox Singer Tens and such like. He praises an 8-15 h.p. De Dion Bouton which we remember meeting previously in the pages of "The Auto" before that paper developed into a cinder-track newspaper. Duffield is said to be busy on a book and if it mentions cars by make, as this brief article does, and is as rude about the bad 'uns as his writings in "The Auto" used to be, it will be amongst the motoring best-sellers.

750 CLUB

The January Bulletin contained many articles of interest to Austin Seven fans. A meeting was held at the end of last month, and the next fixture will be a gathering at the pleasant Ashdown Park Hotel, Coulsdon, at 11.30 a.m. on March 2nd—a Sunday. Non-members are welcome, especially if they run cars of 8 h.p. R.A.C. rating, and we hope a large number of enthusiasts will support this only war-time club fixture. Hon. Sec., P. H. Hunter, 39, Warland Road, London, S.E.18.

WE HEAR. . . .

We hear that Roddy Seys is running a Talbot "75" pre-selective saloon, complete with trafficators, stop-lamps, armrests, scent bottles, powder puffs and the like, and is enjoying it. He has sold the "J2" M.G. and his 4½-litre Bentley is stored at Peter Cox's in Gloucestershire, with the latter's "PA" M.G. On the run down he noted a "38/250" Mercedes-Benz in Cheltenham and one of his officers runs a blown 2-litre Lagonda. Mertens still runs his 4½-litre Bentley and John Morley his sports Packard, of which only six came to England and a mere three of which were in use when war came. Morley recently had sick leave from the R.A.F. on account of a damaged leg; Peter Robertson-Roger is also in the R.A.F. Lieut. Pat Stephenson, of the now famed "Scuderia Impecuniosa," is working on a "Brooklands" Riley Nine; Harry Mundy spent a week's leave from the R.A.F. (engine repair branch) overhauling his "12/60" Alvis which he still uses; and Peter Templeman has changed his "12/60" Alvis for a Norton motor-cycle. Charlie Martin is down at Gosport, while in the I.O.W. Cavanagh is building a rear-engined special with the aid of an f.w.d. Alvis front end, and is searching for one of the straight-eight f.w.d. Alvis cars. Lots of readers have been stirred by Guy N. C. Smith's description of a 1918 racing Sunbeam in Bradford, and as we have lost his address, would he please let us have it again? G. C. Oxley-Sidey, P/O. in the R.A.F., is overhauling his "Ulster" Austin Seven and running a special Austin with 1932 500 Mile Race engine, "Ulster" type clutch and gearbox, downdraught carburetter, bronze head, and 12-gallon rear tank, the whole installed in a lowered van chassis, with new "Nippy" body, oversize tyres and Telecontrols. Midshipman R. Harty, R.N., is running a car built in 1937 at Devonport, and still known as "College Special," comprising a special-series Riley Nine engine and parts from various other cars. He is getting only 23-25 m.p.g. from twin horizontal S.U. carburetters on a long, streamlined manifold, with VS needles, and raising the running temperature from 60°C. to 80°C. has increased power but had no effect on fuel consumption. If anyone can suggest a remedy, please write to him c/o The Royal Naval Engineering College, Devonport. Gunner O. P. Bell, of the 307th (H) Field Battery, R.A., is thinking of buying and preserving a 1931 T.T. Aston-Martin, once owned, it is believed, by Whitney Straight. At present he co-owns a 1932 M.G. Midget which covered some 150,000 miles without a re-bore, only being given new rings, before being put aside for overhaul. Samuelson, now in the 123rd O.C.T.U., has laid up his 1914 7½-litre Peugeot for the duration. A G.P. Salmson engine, less magneto, dynamo and carburetter, and a D.M.S. Delage Vanvooren saloon, at a low price, are for sale in Lancashire. Quite a lot of enquiries come to hand for inexpensive Frazer-Nashes.

Norman Smith is prepared to dispose of his overhauled 1926 10.8 h.p. Rhode, and has for disposal Blake's short-chassis Lancia Lambda tourer, in good order but with the engine dismantled, the price being £8 10s. 0d. Anthony Mills is now in the Warwickshires, complete with a commission and a Bren-gun carrier to dice. He acquired a Brescia Bugatti while he was stationed near Hartley Wintney—a blue three-seater with f.w.b., two good high-pressure tyres, safety glass aero-screens, twin Solex carburetters, overhauled back axle and the rev. counter faired off way out in front of the driver's screen. Alas, he could not get the oil pump to work and the car is now for sale at a garage near Camberley, at £15. There is a supercharged, straight-eight Amilcar saloon derelict, in Hayes. Peter Vaughan, of Becke Powerplus fame, is in the Welsh Guards, stationed in London, and T. A. S. O. Mathieson is A.D.C. to a real general and was at Le Mans *after* Dunkirk. Everyone who met Percy Bradley in his official capacity of Clerk of the Course at Weybridge will be sorry to hear he has severed his connection with the B.A.R.C. A contemporary recently published a drawing of the F.I.A.T. "Mephistopheles" in 1908 guise, but the outside drilled brake and gear levers had apparently fallen of. A prominent road-tester has bravely admitted that he was for a time quite unaware that the Type 57 Bugatti had a four-speed gearbox and constant-mesh four-speed, when he took the wheel of one of these cars recently. Miss Worthing, of South Farnborough, is rebuilding a Frazer-Nash which has a twin o.h.c. four-cylinder Anzani engine like that which the Squire used in blown form. There is a rumour that twenty of these unblown engines were made experimentally in 1934, but can anyone solve the mystery of who put this engine in a Frazer-Nash chassis? The very last 3-litre Bentley to leave the works, a tourer, now mildly tuned and in very fine order, is available in the London area for a moderate sum. A reader wishes to acquire a Napier; someone else a Gwynne Eight car or engine. An instruction book for the Le Mans 9 h.p. Singer is requested, also a big-port "12/50" Alvis head, cylinder block or complete engine.

I.A.E.

The Institution of Automobile Engineers recently held a Graduates' Debate on "Can Small Quantity Production Survive?" The opening speaker was firmly of the impression that the British temperament would always demand a "car that was different." Two classes of specialist buyer were mentioned, the sportsman who will buy performance even at a high price and the man to whom a car, either of luxury or quality type, was a valued possession. Such cars were bought by those who had pride of possession and "investment," traits that are essentially British. Later speakers, while conceding a personal wish that such cars would continue to be made, felt that utility models would force them from the market. A large factory could offer value for money and service which would outweigh other considerations. The vote was taken and indicated that quantity production had won the day. Nevertheless, Morris, Austin and Ford all offer large-engined cars, and the quality car of high performance, while it can never be made in large numbers, plays an exceedingly important part in meeting the transport needs of a certain section of the community—which is especially the case these days, as witness

CLUB NEWS—continued

the big-engined cars sold under permit since the new-car sales ban came into force, and the Rolls-Bentleys and V12 Lagondas and Big Alvises you encounter these times on business journeys. Our correspondence columns are open to anyone wishing to continue this debate.

TOURING WEEK-ENDS ?

Naturally, we all hope that competition motoring will start again in earnest as soon as peace breaks out, but if for any reason trials and races take some time to get going, those clubs which want to open up right away might well consider putting over touring week-ends. Such social occasions, usually at a venue abroad, to be followed by a return visit to this country, have proved useful and enjoyable functions in the aviation world for a number of years. After we have won this war we shall want to enjoy the luxury of motoring unlimited mileages again. We might well wish to meet old friends and gradually to relax in an atmosphere less strenuous than that engendered by competitive motoring. If a venue were chosen by a club at which members could forgather at lunch time on Saturday after a decent morning's motoring and from which they would disperse after lunch on Sunday, the aforesaid need could be met. Cars could be discussed and examined at leisure, the scenery and change of air fully appreciated, and a bit more thought given to the lady who in the past has sat so enduringly on your left throughout trial after trial. It cannot be said that very much occasion for such relaxation offered itself during trials week-ends, unless one was fortunate enough to go down to the starting place on the Friday and return on the Monday, a happy procedure which only the favoured few could follow. A simple arrival contest, a short run through good scenery, perhaps a demonstration of an outstanding new car, and, for the rest, good food served in idealistic surroundings, should be all that would be necessary to ensure the success of such week-end gatherings. In any case, competition motoring, while it enlarges one's knowledge of the country and takes in much varied and pleasurable scenery, is not entirely conducive to a detailed study of our land. Unless trials break out in great profusion immediately we have recovered from our armistice hang-over, we intend to fill in the interim by driving through Friday night to distant places we have always wanted to visit or re-visit, spending Saturday and Sunday morning motoring and walking at the chosen venue, then hurrying back, perhaps over 300 or more miles, during Sunday afternoon and evening. Doubtless many other enthusiasts will put fast cars to good use in this manner. Meanwhile, what an added incentive for each and all of us to work just that much harder at our war-winning tasks. . . .

BAD MEMORIES ?

Will readers expecting a reply to letters, or enclosing correspondence they require forwarded, please remember the 2½d. stamped envelope.

BOOTS

Norman Smith, 61, Great Bridge, Staffs, has a collection of tyres of Edwardian sizes, which he is prepared to dispose of for a few shillings each, if anyone needs tyres for a pre-1914 carriage—and there is quite a lot to be said for getting as much motoring as possible, in point of time, from each unit of the basic ration. So Edwardians may come amongst us again next spring. C. H. Peacock's Gwynne is sold.

LOSS

The Post Office lost Forrest Lycett's "Cars I Have Owned" MSS., prepared for last month's issue. We hope to be able to present this long-awaited article in the near future.

GENERAL NOTES

Well, the first full year of the war has not been exactly a time for motoring relaxation, but it went out very effectively with a run in the Mark V Bentley, which excited friends delivered to the exiled one lateish one Saturday evening, whereupon "A30" was promptly sought and very good time made right down into Somerset, until, carelessly, we had to go in search of more fuel, so that our hotel, high up on a mound overlooking Watersmeet, was not gained until the early a.m. A hilarious supper consumed and we all slept soundly, starting the next day's diverse motoring quite late, which you can do in a car of this calibre. We were not stopped once on the road, either going down or returning, but nevertheless had ample evidence of how well protected and completely militarised this island is. The writer could not accompany the car right into London, but he understands that the great fire in the City, seen quite 35 miles out, was watched from the vantage point of the Crystal Palace parade, after which the energetic crew went on to a private cine-film show, featuring some Brooklands shots and an Alpine tour, in colour, with an open Speed Twenty Alvis. Very different was a run up to London in the black-out, when the Gwynne disgraced itself by splitting its radiator cowl in such a manner that it could not be swung, and, the battery having condescended to light the laps without the dynamo's aid, but only just, it became necessary to tear off the shell and cast away the bonnet, an act watched with awe by some very inebriated passers-by. But it is typical of the vintage car that six pennyworth of whittle belt put the dynamo drive right, although it is of interest that while the car has a real radiator honeycomb, a very well-made header tank and most sensible water hoses, it nevertheless was given a dummy tin shell, and that in 1924. Next day, the decidedly Alvis-like engine exposed to all and sundry and the make setting a real poser by reason of the lack of radiator-identification, we ran most satisfactorily out to Henley-on-Thames to discover a really old De Dion tourer and a model T Ford tourer, neither of which greatly intrigued. The real object of the excursion was to review the Targa Florio and ex-"Bluebird" Itala—alas, the radiator has been sacrilegiously remounted too far forward, the Vauxhall engine looks more early "Prince Henry" than "30/98" and the elements have done their damnedest.

But the drive was really worth while, albeit, as longer evenings make heavier demands on the coupons, and as the longer it takes to burn the ration the greater fun you have, it really seems as if our enforced retreat into the country will do what loads of peacetime enthusiasm never brought to a head, and that the spring may see us motoring in some sound, small Edwardian. . . . After all, the war must be momentarily put aside sometimes.

The restrictions on motoring which the war has brought about result in one casting back all the more fervently on what driving was possible during the past fifteen months, and, whereas in former times only fast, good road-test cars seemed worth renewed comment, one now ticks off the cars one has experienced sort of reverently, one by one. Personally, the war saw me using a very funny contrivance, in the form of a hoodless and scruffy 1928 "Chummy" Austin Seven endowed with a 1934 four-speed engine unit which was quite standard save for Terry double "Aero" valve springs, light pistons and a compression-ratio of 6.1 to 1. In the first place this little car had cost £3 10s. 0d. without an engine, and some £8 had been paid for an overhaul to the four-speed unit, now in its fifth chassis, while new tyres graced the front wheels, and some wood had been bought from which to manufacture light front wings—these, and the scrapping of the running boards and the use of a semi-outside exhaust system even increased the traditionally cheeky appearance of these little cars. The finished article was about the cheapest non-standard car to run imaginable from the point of view of tax, insurance and fuel consumption, and, indeed, it was quite a practical little vehicle, going along journeys before the war. I remember that it had electrical troubles and poor brakes and cost me £2 for a fine because some unsporting mobile policemen found out that the brake ratchet had yet to be made to work, although admitting the braking power to be adequate. But it was an excellent mud-stormer and would have been better still had we troubled to put a lower-ratio axle in, and it must have done 60 m.p.h. or so in places, and had brisk acceleration on a useful third gear. Once, it is true, it nearly got parked for eternity in a side street, having unshipped its front axle radius arms just prior to being reversed up the camber during process of turning, the spragging effect being both astonishing and baffling! And, dependable as the late-type Austin unit was, a worn carburetter sometimes resulted in much swinging to get started and for a long time I never dared to make the tyres squeal on corners. But the Austin took me back from all-night A.R.P. duties during the early days of the war and enabled me to get a little air and sunshine off duty. It lined up with the best of them for a last complete tankful before fuel rationing came in, and afterwards did yeoman work in evacuating persons, and their property,

CLUB NEWS—continued

where previously it had been scorned. Alas, "Pool" eventually resulted in chronic misfiring—maybe a valve had stuck or the h.c. gasket commenced to blow, I never had time to look—and I let the car go, although I have often wished that I had kept the engine. After that an Austin "Ruby" saloon was shared with a friend, and it cruised at 45 or so, did its over-40 to the gallon, and always started instantly. It nearly always justified its ration by carrying four persons and proved worth its weight in gold (about 12 cwt.) as a means of relaxation from 24-hour spells of A.R.P. until a 'bus unkindly smote it hard one dark night in the fog and ice and "black-out."

Meanwhile, Peter Clark's Le Mans Meadows-H.R.G. had provided me with an entirely joyous return to the real thing, and did a phenomenal average down to, of all places, Southend. This car handles so much more enthrallingly than spongy, podgy moderns, and really does go for a 1½ litre.

All, or nearly all, the Frazer-Nash appeal is there, and I sometimes wonder why seekers after quite expensive 'Nashes don't look out simultaneously for a secondhand H.R.G.—not that there are many about of either *grande marque*. Having discovered that I could still use a plain gear-change and go into the roundabouts not too slowly, I did my best to depart this planet by getting well and truly frozen up on a 900 mile motor-coach trip to Scotland, while hardly recovered from the Austin crash and at low ebb, withal, after long, sleepless nights playing Air Raid Precautions. But the dizzy feeling and the black spots subsided after a time, and, anyway, there was that great run down almost to the Cotswolds, as passenger, in Anthony Heal's 5-litre 1919 Ballot, which, at 92 m.p.h. or so, felt about as dangerous as anything I've been in on those narrow roads. On that occasion I rode, too, in Anthony's very lovable, if not very standard, high-compression 90 m.p.h. "30/98" Vauxhall. His handling of the black-out situation on the homeward drive was a revelation and full return for having to leave our Fiat 500 behind with a lack of electrics and all that implied in unanticipated "Pool" absorption in fetching it on the morrow. As we agreed to mention every car tried since war began this Fiat must be included, but it wasn't a very brilliant example, being hard to start and prone to a chassis-shaking wheel-wobble, though it was snug enough and quite delightful to put round bends—we contrived, of course, to stick with it on a Buckinghamshire trials hill, ere it swallowed the last current coupon. . . .

Another Austin "Ruby" later replaced the crashed one, albeit a rougher example, and one which had quite a thirst for oil. But it gave excellent service, like its predecessors, and was greatly in demand during the spring and summer as a means of much-needed relaxation, within the limits of fuel rationing. We actually tried to do without a car for two months in the summer, but it was a terrible strain, and when the need arose for transport into and out of London independently of trains, it was thankfully retaxed before a new quarter started. Then, at the time when the air raids broke, it proved absolutely invaluable and was in use right through the winter, taking part in the "Free Lifts" scheme. Towards the end it broke a rear spring, had hardly any brakes, and a temperamental dynamo, but it was given a quick overhaul, stiff rear springs imparting an amusing sit-up-and-beg attitude, and was only sold, at a profit with the tyres almost through, a short while ago. This anticipates things, for early in the year that keen and methodical person, Peter Clark, provided a 2-litre Georges-Irat for brief fun and games—the last time, alas, that we were able to take a car on Brooklands. The Citroen engine and f.w.d. transmission gave assurance of reliability and the rest of the car was very modern and distinctly handleable, the curious rubber suspension lending additional interest. The advent of summer was greeted by a week-end of over 350 miles in a 2½-litre six-cylinder Daimler saloon, a very admirable car which imparted a sense of luxury suggesting a far higher price than the £525 at which it sold. Incidentally, it was the first pre-selector job the writer had seriously handled. It could hurry on occasion, cruising at 60-70 m.p.h. and achieving 74 m.p.h. on the level, and the i.f.s. worked well, albeit we incurred the wrath of our passengers for taking one double bend far too fast and having slight difficulty from i.f.s. roll. You could play amusing and instructive tricks by leaning on the car and holding it stationary at small throttle openings on the fluid drive, and altogether a happy week-end was spent on the coast, where naval gunfire yet reminded us of sterner things. It then became possible to test a Ford Eight "Anglia" saloon over 200 miles, when the car's liveliness, correctness of handling, and fuel consumption of 40 m.p.g. endeared this war-time small car to all to whom we demonstrated it; once again we enthused over those very admirable Girling anchors. The modern Ford is certainly a very faithful servant indeed, and you can observe them these days serving the farmer, off the beaten track, as well as going fast and economically about the highway. Much more exciting, naturally, was the 1934 Mark II long-chassis Aston-Martin, which Rowland Smith put up for test and in which we did about 100 miles of excellent motoring. The o.h.c. engine would run down to 6 m.p.h. in top gear, but, at the other end of the scale, would propel this not very light four-seater at 80, and gave no trouble at all. The steering and road holding, in old-school style, were entirely satisfying and the plain remote-control gearbox was sheer joy, if very noisy, while the engine ran up willingly to 4,700 r.p.m. on the indirects. A most pleasant day was spent, in shower and sunshine, with this sound second-hander. Next followed an invitation from Sam Clutton to go out in his 1911 9-litre sleeve-valve Great Daimler, a most dignified if leisurely proceeding, from which we returned by motor coach. Incidentally, on sundry other occasions we have had to do a certain 35-mile journey by local coach service, and it is good that such services remain extremely popular and able to get their fuel, even for running many extra relief coaches at busy times, for they score in every way over the now chronic short-distance train services. You are doing road transport a distinct good turn by using them. There were runs, too, in a modern Ford Ten saloon, and an older Ford Eight, and sundry excursions in a Riley "Gamecock," one, to a car club gathering, coinciding with the raid on Croydon. Nor must the divers Austin, Wolseley and Morris A.R.P. cars and American Terraplane and Studebaker ambulances be forgotten, nor will the game old Sunbeam "Sixteen" used in one of these services be easily overlooked. The 1924 Gwynne Eight was bought to put certain pet war-time theories to the test, and must now have done over 1,500 miles, largely under black-out conditions. More recently, there was that great run in Lycett's 8-litre Bentley, when one could claim one of the fastest passenger experiences on the road, to line up with a similar "record" of happier times, on the track; and the 500-mile dash to Devon and back in the experimental Mark V Bentley. So war has not entirely spoilt one's continued motoring experience, and maybe, now we are acclimatised to limited mileage, 1941 will not seem too grim, and after that Hitler will probably have had about enough and the prospect of resuming *real* motoring will be in sight.

SOME "12/50" LEA-FRANCIS NOTES

Through D. B. Tubbs, Eddie Wrigley sends some notes on the Lea-Francis vintage editions, which may assist prospective owners of these cars. His own "12/50" was tuned mainly with the aid of Woolworth tools, copper wire and insulating tape. Tappet adjustment is achieved, *vide* the Instruction Book, by twiddling the push-rods! The "12/50" twin-carburetter model has an axle-ratio of 4.75 to 1, and 4.4, 4.1 and 3.9 to 1 axles are available. Post-1927 cars have no torque members and long half-elliptic springs. Earlier cars, sometimes 1928 in the log-book, have a torque-reaction member from the axle, which axle is less satisfactory. The clutch is heavy and the gearbox noisy, but both components are reliable; the latter is removed by uncoupling the front universal joint and pushing the prop. shaft sideways, away from the battery. Properly adjusted, the brakes are sound and the radiator is reliable. Valve bounce sets in about 4,000 r.p.m., but Wrigley got 4,700 r.p.m. regularly, using heavier springs. Normal oil pressure: 12-15 lb. per square inch at 30 m.p.h., when hot. Wrigley used 12 h.p. Talbot steel connecting rods, but duralumin rods are satisfactory if lubrication is in order, and J. L. Currie's blown Lea-Francis does just over 90 m.p.h. and has never thrown a rod. With close-ratio box the "12/50" did 20, 38, 62-65 and about 72 m.p.h. in the gears. The close-ratio box has constant-mesh third and top gears and is far superior to the inverted tooth-type gearbox.

VETERAN TYPES—XXIII

BABLOT'S 3-LITRE DELAGE, WINNER OF THE 1911 COUPE DE "L'AUTO"

THE regulations for the 1911 Coupe des Voitures Legeres, organised for "l'Auto" by Charles Faroux, were specially framed with the intention of fostering the development of the fairly normal small car. Freak designs like the Lion Peugeot, with its enormous single-cylinder engine, had shown that the regulations for the 1910 race had served only to evolve unpractical vehicles. For 1911 the regulations stipulated 3-litre cars weighing not less than 800 kgs. Engines had to have four cylinders with a stroke : bore ratio not greater than 2 and not less than 1. The organisers evidently felt that the ultra-long stroke engines of the Peugeots and the Hispano Suizas, which had been so successful in the 1910 race, were not developing motor car design in the right direction. Two-seater bodies with wings and running boards had to be fitted and certain minimum dimensions were specified for these.

Before describing in detail the Delage car, which was ultimately victorious in the hands of Bablot, it may be of interest to make a quick survey of the other competitors. After their defeat in 1910 by the new Hispano-Suiza cars designed by Marc Birkigt, Peugeot Freres were more than ever keen to win the race in 1911. As exponents of the long-stroke engine they used, as one might expect, the maximum stroke : bore ratio permitted by the regulations. With their "V" four-cylinder engines (78 mm.×156 mm.) the Peugeots were undoubtedly the most formidable of the Delage's rivals. It was claimed that in spite of their long stroke 2,400 r.p.m. was attained, but the power developed was kept secret.

Many makers, particularly those who were using the shorter-stroke engines, claimed the hitherto undreamt of crankshaft speed of 3,000 r.p.m. In their search for extra b.h.p. Alcyon, Sizaire Naudin and Mathis used four valves per cylinder. Nearly half the entry had two plugs per cylinder, but Sizaire Naudin decided to use no fewer than three!

Lubrication by pressure was by no means universal, three makers relied solely on "*barbotage*."

Overdrive gearboxes were popular. The Cote (a four-cylinder two-stroke which ran with great regularity) and the Delages both used five-speed gearboxes. On the latter fourth speed gave direct drive and fifth was an overdrive. On the Cote, however, direct drive was on third, and there were two geared-up ratios! Peugeot used a conventional four-speed box, while Calthorpe, Gregoire, F.I.F. and N.S.U. had four speeds with direct drive on third. Chain drive had almost disappeared being used only on two makes, Koechlin and N.S.U.

The Delage entries were handled by Bablot, Guyot, Thomas and Rigal. The car which I had an opportunity of inspecting recently is the winner, No. 10, which was driven by Bablot. Shortly before the last war it was owned by Captain Leslie Corah, of the 4th Leicesters, who was killed in action in 1915. He left the Delage to his cousin, Mr. R. Corah, of Leicester, who has kept it ever since.

The engine has four cylinders (80 mm.×149 mm.) which are cast in two pairs. Two camshafts, one on each side of the crankcase, operate push-rods and rockers which, in turn, actuate the valves. These are placed horizontally in detachable cages on each side of the cylinder heads. This unusual arrangement necessitates exhaust ports on top of the engine and the four exhaust branches, in consequence, emerge through the top of the bonnet in a most spectacular fashion. Only two valves per cylinder are employed. A Bosch magneto is driven from the timing gears on the near side. Two plugs, situated centrally in the top of the head between the valves, are provided for each cylinder.

Originally a Claudel carburetter was fitted, but a Zenith has since been substituted and a hot-water jacket added to the induction pipe. These alterations have made the car much easier to start. Petrol is carried in a 25-gallon tank in the scuttle.

Oil is forced to the three main bearings, additional oil feeds being taken to the base of each cylinder bore and to each of the exposed rocker shafts. The oil, which is carried in a tank in the scuttle, reaches the engine via a visible drip feed on the dashboard.

Thermo syphon cooling is employed in conjunction with a large bow-fronted tubular radiator which is fitted with a quick-action filler cap. Surely this must be one of the earliest examples of the rapid-opening, clamp type filler cap used on a racing car.

The 3-litre engine was said to give off 70 b.h.p. at 2,250 r.p.m. and the car attained close on 100 m.p.h. with the overdrive in use.

The drive is transmitted through a multiple disc clutch to the five-speed gearbox. Fourth is direct drive, fifth being the geared-up overdrive. It is interesting to recall in this connection that fifteen years later the wonderful 1½-litre eight-cylinder Delage racing cars were also equipped with five-speed gearboxes.

The body is only 28 inches wide and the mechanic's seat is staggered some 9 inches behind the driver's. Both brake and gear levers project some way outside the body.

The back axle is located by means of long radius arms on each side of the chassis in a manner rather reminiscent of the 2-litre Grand Prix Bugatti. The radius arms take the torque both of driving and braking. The axle ratio is 2.95 to 1. The brakes on the rear wheels are applied by the hand lever, while the foot pedal takes effect on the transmission brake. Axle movement was originally controlled by Triou hydraulic double-acting shock-absorbers, but friction dampers have been fitted subsequently to Mr. Corah's car.

The Delage team ran in the race with larger tyres at the rear than at the front. Rudge Whitworth wheels shod with 820×120 Michelins were used on the back, while 815×105 covers were used on the front. In spite of a narrow track (4 ft. 4 ins.) and a comparatively short wheelbase (8 ft. 11 ins.), the Delages were some of the heaviest cars in the race. They weighed in at 1,030 kgs., as compared with the Peugeots which turned the scale at 860 kgs.

In the race itself the Peugeot and Delage cars were very evenly matched. Georges Boillot (of immortal fame) took the lead with his Peugeot closely followed by Bablot's Delage. They were, for the first few laps, closely pressed by two English Calthorpe cars. On the fifth lap Boillot lost his lead as a result of tyre failure and Bablot took his place. The tyre change put the Peugeot four minutes behind owing to the jack not functioning, but by hard driving Boillot began to reduce the Delage's lead.

On his last lap Bablot had a puncture when only some 3 kilometres from the finish. With unabated speed he drove on, taking corners in wild slides and only managing to keep on the road as the result of a good deal of hard work with the steering wheel. He crossed the finishing line on the rim, just one minute ahead of Boillot's Peugeot. Thomas and Guyot made the Delage victory the more complete by finishing third and fourth, thereby gaining the Coupe de Regularite in addition to the Coupe de "l'Auto."

LETTERS FROM READERS

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I then had a 1933 J.2 M.G. Midget—quite a pleasant little car if not driven too near its maximum. (Yes, it did break its crankshaft!)

A 1934 Austin Ten gave excellent service for six months and was then traded in for my present car, a 1931 "International" Aston-Martin. It has a special close-coupled open two/three-seater body by Youngs of Bromley, in black fabric, which is still in perfect condition. A previous owner fitted 19" wheels with 5.00" tyres at the rear in place of the 21" wheels, which much improved the appearance. Should any of your readers have owned this car I should be pleased to know some of its history. It is KR 8731, chassis No. JO-79. I still manage quite a decent mileage on supplementary rations, and recently had a good run from South Wales to York.

Finally, I would mention that I have taken MOTOR SPORT since 1931 and am very pleased you are continuing publication.

I am, Yours etc.,
H. D. M. SEYMOUR.

Tackwith,
Yorkshire.

TO THE WEST, WITH A MARK V BENTLEY

A Hurried Run to Devon and back, in the Experimental Independently-sprung 4¼-litre Bentley. High Average Speed and Extreme Refinement, in what will be a Post-War Rolls-Royce Production.

THE opportunity arose to most aptly conclude a year of war, and yet one of not-too-stinted motoring, by taking an example of the new Mark V 4¼-litre Bentley, only recently released from the experimental stage by the Rolls Royce engineers, down to Devon in something of a hustle. The test was such as would bring out the good and bad points in even a fast-average car very clearly, for while over 500 miles in some twenty-seven hours may not sound especially trying, it has the qualification that the first half of the journey was completed in the December "black-out" and that we contrived not to cut down sleeping and meal times unduly; moreover, a very late start marked the return to what was once civilisation. This latest model of the famous 4¼-litre is described elsewhere in Mr. Robotham's own words, and it is well known that coil-spring independent front suspension and a new chassis are salient features of the specification. Looking to the future, Rolls-Royce Ltd. have carried on with experimental work and the Mark V Bentley represents this research finalised. However, they have no intention of commencing production until the next armistice has happened, so the latest 4¼-litre remains the plaything of the Rolls-Royce Research Department and of a handful of fortunate motor scribes, being unattainable even to permit-possessing prospective purchasers. We were very interested to try the car, particularly following the high-speed run to John o'Groats put up with a normally-sprung, pre-overdrive type 4¼-litre Bentley three seasons ago. War work necessitated a start in the "black-out" and without a moon, and with the same crew as on the former drive, supplemented by an Alvis Speed Twenty owner and a recently acquired wife (not the Editor's!), we planned to sleep that night in North Devon. At once confidence for carrying out such a plot is instilled by first impressions of the car. In the gloom it seemed a very large vehicle, in outline rather reminiscent of a certain V12. But it handled like a very much more compact car, and the excellent brakes, shorter bonnet and, in a different sphere, the twin rear lamps, largely compensated for the enforced suppression of light. There was also the entirely effective fog-lamp, mounted centrally above the ribbed front apron (the starting handle, if used, passes through its mounting), which cleared the mist patches so that they presented actually less strain than the clear visibility of the "black-out" itself.

Very soon after taking the wheel the smoothness and extreme silence of the car, its accurate handling, and its perfection of detail, ready response to every control included, began to draw praise from occupants of other seats besides the driver's. As the night grew chilly the heater, comprising a fan which distributes air from a radiator fed by the cooling system, was put to use and loudly acclaimed by the front seat occupants. In the rear seat the effect was not so noticeable, but daylight revealed that the rheostat control of the fan-speed had only been placed at "low," while the windows were not fully closed, owing to a slight "hot-water-pipe" odour, undoubtedly due merely to the newness of the heater's plumbing. The long night run was accomplished uneventfully and a climb of Porlock was an almost unnoticeable achievement, although bottom gear was employed. No oil or water had been consumed, and a very casual check on "Pool" consumption gave approximately 18 m.p.g.

Engine: Six cylinders. Bore 89 mm. Stroke 114 mm. Capacity 4,257 c.c. R.A.C. rating 29.4 h.p. Tax £37/10/0. Push-rod o.h.v. Twin S.U. carburetters. Coil ignition with automatic advance and retard. Pump cooling with dummy radiator shutters and thermostatic flow control.

Gearbox: Four speeds and reverse. Ratios: 4.3, top gear. 3.64 to 1 overdrive. Right hand lever.

Suspension: Coil spring independent at front. Half elliptic rear. Bentley over-ride control and hydraulic shock-absorbers.

Brakes: Girling actuation via Rolls-Royce mechanical servo. Right hand brake lever.

Dimensions: Wheelbase, 10 ft. 6 in.
Track: (rear) 4 ft. 10 in.
(front) 4 ft. 8¾ in.

Makers: Bentley Motors (1931) Ltd., 16, Conduit Street, London, W.1.

The next morning no attempt was made to rush out of Devon, and we could take stock of the car. The body is a Park Ward four-door four-light saloon. The rear doors carry particularly wide windows, and there is far more room in the rear seat than formerly, without the use of foot wells; headroom is rather restricted, as is permissible with extreme stability. The front seats are Leveroll-adjusted heavy buckets, and we still think the support to the shoulders a thought inadequate. Upholstery is leather and the rugs and rear blind, the latter now electrically operated, match the interior most effectively; indeed, it is difficult to tell where the blind is positioned when it is in use. The rear luggage locker is extremely capacious and should obviate the need for carrying anything inside the car, even on a long tour, although there is a useful shelf behind the rear seat for oddments required on the run. The rear windows wind on the one-direction of handle system and the front doors have pivoting half-windows as well as winding rear panels, of which the driver's has a quick-action release—on the car tried this was inclined to jam. There are no running boards, but entry and exit is very comfortably accomplished, and the altered positioning of the right-hand gear and brake levers is a definite improvement. The walnut facia carries, from left to right: a hand-grip; a big locker with lid; cigar-lighter; ignition and lighting panel; clock below; heater control; fuel gauge below; dash-lamps; rev.-counter reading to 5,000 r.p.m.; speedometer; fuel pumps switch; combined oil gauge and water thermometer; ammeter; fog-lamp switch; and rear blind control. In the steering wheel centre you have the divided horn push for operation of the loud and soft Lucas horns; and the hand throttle and suspension over-ride control, working in the famous Rolls-Royce manner. The pedals are small and well placed and the Lucas Bijur one-shot system of chassis lubrication is operated with the left foot. Ventilator panels in the scuttle are opened and closed by a tiny remote control about by the driver's right knee. In addition, there are big fuel and ignition warning lights on the facia. It is these details that emphasise the quality of the car you are about to handle. The ignition switch is separate from the lock, you have the choice of either or both fuel pumps, and the fuel gauge is dead accurate, the warning light coming in with three gallons remaining in the 16-gallon tank; it is best obscured, if one has to continue driving at night without immediately replenishing. To continue this account of small but highly appreciated minor matters, speedometer and rev.-counter dials are beautifully calibrated and the white-tipped needles move in the same plane in top gear, while those of the oil gauge and thermometer sit in a straight line at normal readings.

The doors are restrained from falling fully open, "pulls" assist in leaving the rear seat, the sliding roof operates very easily, there are independent screen-wipers, and the switch for the self-cancelling direction indicators is right below the steering wheel rim for actuation by the left forefinger. There is a folding arm-rest in the rear seat squab and a tiny one for the front seat passenger. Every switch moves with smooth certainty. It is thus possible to offer praise in matters which are yet still hardly out of the experimental stage, as the wooden plug in lieu of an ashtray and the gaping hole which revealed itself when the radiator filler-cap was unscrewed, reminded us. Outside the car, one observes the excellent lines of the new body, compact by reason of the forward-mounted engine and 2 inches shorter wheelbase, yet imposing and beautifully finished withal. The frontal aspect encompasses the huge Lucas headlamps with Cornercroft mask on the near-side one, neat ribbed apron, central fog-lamp aforementioned, the twin horns, and the fixed radiator slats, the thermostatic control now being applied only to the water flow. An excursion beneath the car reveals the unenclosed coil springs of the i.f.s. system, a new frame with cruciform central bracing, and Girling brake actuation via

TO THE WEST, WITH A MARK V BENTLEY—continued

the Rolls-Royce mechanical servo-motor. The brake drums are ribbed. The bonnet is of the fashionable four-piece opening top variety, locked by single handles through a system of rod-remote-control to the bonnet clips. The engine is the same six-cylinder push-rod o.h.v. unit as before, magnificently finished in black and polished alloy, but now flexibly mounted, with a pressed mounting at the front. The twin S.U. carburetters with enormous air-cleaner on the off side have virtually the same layout, but a thermostatic mixture control on the rear one eliminates the old hand choke, and the petrol pumps are out of sight. The water pump seems to have been reduced in size, possibly to obviate too great a pressure in the heater, and the sump contents indicator is of needle-type. On the near side the three-branch exhaust system appears to be of smaller bore than formerly and there are twin coils (one a spare) and the latest type external oil purifier. The oil filler orifice no longer has the "B" breather, but the huge air-cleaner is still over the engine and the dynamo, the accessible fusebox and the whole of the electrical equipment is typically Bentley. The starting handle clips beside the near-side bonnet panel, adjacent to the jacking equipment, while the tool case clips inside the scuttle in the passenger compartment, closing flush with the upholstery. The radiator filler, reminiscent of the domestic thermos-flask-stopper, is under the bonnet in a new square-section header tank. The front suspension is aided by a stabiliser. Underneath, the car is well-cowled, and the wings, of sweeping, semi-streamline type, have wire-mesh mud-catchers. The body lines conform well to the wing shape and the curve of the raised waistline is seductive. The spare wheel now lives in the off-side wing, with a fire extinguisher in the bracket, and all the wheels carry "Ace" discs—the tyres being 6.50″×16″ Avon. The central rear-view mirror gives adequate, if not extensive, vision. That, then, comprises the new Bentley on first acquaintance.

As there is no longer a hand ignition-timing control, it is not possible to start the engine on that alone, a game you could play on the old 4¼-litre, but the starter works silently, and after a night in the open in winter the car starts instantly and idles happily with no controls with which to juggle. The Borg & Beck clutch is in every way excellent; very light, very positive, and absolutely smooth, and an improvement on the earlier component. The flexible mounting of the power unit is observable when idling and results in a rather harsh sound as the engine first fires, but once under way there is no sound, no fuss, not a trace of vibration from beneath the bonnet. The body, too, is devoid of serious rattles; the tyres are silent, and even the tramp of the wheels riding over inequalities is absent. One goes at once up to high speeds and there is merely the wind-rush to indicate the pace; that is as true of 80 m.p.h. as of 60. Sixty is a very ready cruising gait, when the engine is doing under 2,500 r.p.m. in the overdrive top. This really is an overdrive gear, as distinct from a high direct drive, although selected quite conventionally by using the gear lever. It is just possible to hear the gear whine within a certain limited speed range, if one listens for it, but to all intents and purposes this gear is as silent as the other three. The makers intend, of course, that it shall be used to save effort and fuel on long straights, but, anxious to conserve "Pool" on so long a run, we used it as a normal top gear and can definitely state that to do so is perfectly satisfactory. A change to the normal top gear gives extra performance up main road hills and better behaviour in town driving, and an enthusiastic driver might take the very slight whine of the overdrive as a signal to drop down into the next ratio. But so flexible and powerful is the engine that it pulls away cleanly on overdrive from 1,000 r.p.m., or 26 m.p.h., with very reasonable acceleration, and will run down to some 8 m.p.h. on this ratio. So we felt quite justified in regarding the box as a normal four-speed. On the other hand, it must not be overlooked that it is, in actual fact, a three-speed unit, and that second is as high as you expect the middle gear of such a box to be; the car can be started on second, but we preferred to use first and to go into this ratio too for serious hill-storming. It had also to be remembered that top-gear acceleration is not so great as that available if second gear is employed. The direct-drive top ratio is 4.3 to 1 and the overdrive is 3.64 to 1, so that quite an appreciable difference in engine speed results. For example, in top gear 40 m.p.h is equivalent to 2,000 r.p.m., but if overdrive is used the engine speed falls to 1,700 r.p.m.; or, conversely, if the same engine speed is maintained, the road speed rises to 48 m.p.h., and at higher speeds, of course, the contrast is greater. Incidentally, the top-gear ratio of the pre-overdrive 4¼-litre was 4.1 to 1 and later 4.25 to 1.

The right hand gear lever has been re-positioned to give more room when the driver's door is in use, but it is easy to reach and typically Bentley. Synchromesh has now been applied to second gear and it works admirably, if one discounts an occasional tendency to catch-up on the change from top to second. The upward changes go through just as quickly as the lever can be moved (though a pause is desirable between first and second), and the same applies particularly to the downward change between overdrive and top, for which double-declutching may be resorted to without embarrassing the automatic selection. The gear lever is depressed to locate reverse, which is forward on the inside of the gate, and the difficulty was to decide whether or not a gear was already engaged, so silkily does the lever move. Incidentally, there was just the merest trace of warmth or well-being about the lever, where it emerges from its draught-excluding gaiter, after a deal of hurrying. The hand brake is also on the right-hand side, cranked at right angles to follow the good example set by the new gear lever. It is perfectly placed and has a beautiful ratchet-action, although it is essentially only a parking brake. The main braking system is a revelation. It slows the car decisively and in an entirely progressive manner without a trace of protest, under the lightest pedal pressure we have ever experienced. Incidentally, a severe impromptu test of this aspect of the Mark V was indulged in when the first climb of Porlock was spoilt by our carelessness in running out of fuel, so that it was necessary to run the car down the greater part of this notorious hill backwards. The brakes proved entirely adequate and lost none of their power, so that next day we had no compunction about coasting in neutral at very considerable speeds down some of North Devon's more appreciable gradients, an oft-condemned practice. So immensely powerful are the Bentley's brakes that under very hard application on a dry road the car deviated from the straight and compressed its front suspension quite noticeably; such braking would never need to be resorted to normally, even in an emergency, but as a test it was interesting and a tribute to the silent-tread Avons, which did not protest.

In negotiating Devon lanes, Somerset by ways and the main roads of Wiltshire, the new suspension was put to an excellent all-round test. The greatest compliment one can pay it is to observe that the Bentley over-ride suspension control now seems less effective than formerly. While it stiffens the springs up in the "hard" position so that the car can be slid round open bends instead of rolled round, the ride remains so remarkably comfortable that there is less contrast than before with the "soft" setting; albeit the latter is still worth having for completely luxuriating the ride in town or over rutty going. That the Derby design staff have evolved a quite outstanding independent front suspension system is evidenced not only by the cornering stability, but by the entire absence of unwanted up-and-down motion. So far as the former is concerned, there is some roll, but nothing which approaches that still common with i.f.s., while as to the latter, there is no fore-and-aft pitching, only a gentle corner-to-corner motion at speed over bad surfaces; nor do the occupants leave the rear seat when humped bridges are taken very fast. The only time that the i.f.s. makes itself known, other than by virtue of these pleasing ride-characteristics, is under the unnecessarily heavy braking aforementioned, or when an acute corner is entered so rapidly as to promote a front wheel slide, when some wheel spragging happens. To a certain extent, too, the return motion through the steering wheel is greater, but this varies in direct proportion to the roughness of the surface and is practically non-existent on main roads. The new suspension can be praised for the exceptionally fine steering lock and an ability to run up a kerb if occasion arises, without the passengers having any reason whatsoever for comment, far less for protest. Frankly, we did not altogether like the lower-geared steering, which asks 2½ turns of the fairly small, thin rimmed wheel, lock to lock, against the former 2¼. There is extremely quick and vigorous castor action, and if an attempt is made to control this on a fast bend the car does not return soon enough to a straight

TO THE WEST, WITH A MARK V BENTLEY—continued

course. Let the wheel play through your fingers and the control becomes 100 per cent. accurate under all conditions of fast main-road motoring, while being outstandingly light. The rather low gearing then only becomes a thought unhandy in narrow, winding lanes or up trials hills, which the average 4¼-litre owner would probably not take at the gaits we invariably employ. Definitely, this is finger-and-thumb steering up to the car's maximum and there is scarcely any column movement ; the whole frontal aspect of the Bentley is commendably rigid. The big front wings, with their in-built side lamps, do not seem quite so visible as before, and, for a while, are slightly embarrassing in restricted going, but accurate steering, and the compact overall dimensions, soon permit the Mark V to go down and along the back ways with complete confidence.

The engine is smoother than before, if that is possible, by reason of the flexible mounting, idling with only a subdued exhaust beat, instantly responsive, and then entirely silent up to very nearly the end of the speed range. The rev.-counter colour-marks suggest peak speed as 4,500 r.p.m., but 4,000 r.p.m. seems a more reasonable limit, giving 33 m.p.h. on first, and 61 m.p.h. on second gear. Upward changes would normally be made at 3,000 r.p.m. (22 m.p.h.) in bottom, 3.100 r.p.m. (41 m.p.h.) in second, going into overdrive at about 2,500 r.p.m. or at 50 m.p.h.

In possession of such performance capabilities, the prospect of a long run, even under existing conditions, is that of keen anticipation, so, although we did not leave Brendon, in Devon, until nearly midday on the Sunday, there seemed no immediate need to take to "A.30." First, we tried some hill climbing, taking Lynnatt at a maximum of 2,900 r.p.m., or 24 m.p.h. in bottom gear, and afterwards tackling Beggar's Roost in the same ratio at the same speed. Thereafter, a timed ascent of Hookway gave a reading of 38.8 secs. for a nasty loose gradient approached via a water-splash and having two hairpin corners on which severe wheelspin could not be entirely avoided. That we took this hill and the notoriously rough "Roost" without damage to the wings clearly shows that they represent a sensible balance between modernity and practicability. The Bentley was thrown joyously about on typical Devonshire going, when all the excellent qualities aforementioned were fully proved. Then, when it seemed time to hurry in search of that now elusive item, a satisfactory lunch, and later, when daylight had but a few hours to go, we enjoyed the all-too-rare pleasure of holding a sustained 70 m.p.h. in complete silence, cornering at scarcely reduced speed round open bends, slowing the car with the merest pressure on the brake pedal and maintaining the pace up long gradients by snicking in the direct-drive top. Throughout, the oil pressure held a steady 25-30 lb. per square inch, and the water temperature stayed at 75-77°C., only rising to 80°C. during some standing start acceleration tests. Incidentally, the Bentley carried its full complement of passengers throughout, and some idea of the performance available on the overdrive is afforded when it is mentioned that the long hill out of Yeovil was entered at 40 m.p.h., the speed rising to 46 m.p.h. at the corner, the car going over the summit at 52 m.p.h., in spite of a momentary check. Even on overdrive the Mark V can, if so desired, be regarded as virtually a one-gear car, in ordinary going and once under way. That it has more urge than formerly through the gears is indicated by a casual acceleration check, when 0-50 m.p.h. was achieved in 10.6 secs., and 0-60 in 16.8 secs. The excellent output of the engine at moderate crankshaft speeds is indicated by the fact that a better time was recorded by changing into second gear at 3,500 r.p.m. than when bottom gear was held up to 3,800 r.p.m. and 4,000 r.p.m. The silence of the engine makes it difficult to judge when to drop the clutch in for a racing start, and we did nothing sensational in that direction, although this component is designed to withstand such treatment up to the engine's absolute maximum of 4,500 r.p.m. Before returning home we could not resist carrying out one more test, and, deviating to Middledown, a climb was made, using bottom and second gears, from before the first left-hand bend to a point some way along the straight beyond the third and hairpin bend. The writer confesses to ragged cornering and a time of 54 secs. Only on really fast corners do the wide-tread Avons protest, and then not at all objectionably. Incidentally, the recommended pressure is 23 lb. per square inch front, and 25 lb. per square inch at the rear, but recalling how rather hard tyres improved the old 4¼-litre, we put things up to 28 lb. all round at the commencement of the drive. They attained rather a temperature after rapid motoring, but gave no trouble whatsoever. Indeed, no water and no oil were needed, nor any adjustment of any kind, in some 550 miles running. Owing to the restriction on leave from work of national importance the car had to be hastily put through its paces and handled by several drivers and, under the circumstances, it was not easy to make a fuel consumption check, but it would seem that, driving very hard and with all the hill fun-and-games thrown in, and with no real attempt at coasting, the Bentley gave approximately 18 m.p.g. throughout. That is extremely creditable, especially as in normal times a higher grade of fuel would undoubtedly be employed.

That, then, is a car, now only emerging from the experimental stage, which those fortunate mortals who have tried it proclaim to be the finest all-rounder ever built and which will unquestionably establish a great reputation amongst British fast cars when it goes into production after the war. It seems likely that the price of the model tested will be in the region of £2,000. This long test of the Mark V Bentley has convinced us that it retains all the qualities and performance characteristics which resulted in the earlier 4¼-litres achieving a record popularity in the sphere of high-grade cars, while being most adequately modernised by the introduction of i.f.s. and an over-drive top gear, as well as improved in detail and mechanically in several important respects. It only remains to add that the front suspension system employs exposed coil springs and transverse wish-bones rather reminiscent of the pioneer Packard wide-spaced wish-bone i.f.s. system, in conjunction with lower centre of gravity by reason of smaller wheels, and that the change in the gearbox, already well-tried, has been quite simply carried out, the actual ratios being 0.4199, 0.6693, direct and 1.181 to 1, respectively, in conjunction with an axle ratio of 10/43, or 4.3 to 1. We returned "FYH 539" with respectful regard for Rolls-Royce foresight and a re-awakened enthusiasm for their always near-perfect productions.

OBITUARY

We deeply regret to announce the death of Miss Amy Johnson, while on active service with Air Transport Auxiliary. World famous for her great light aeroplane flights, Amy Johnson turned to motoring events of recent years, driving a 4½-litre Bentley with McMinnies in the 1938 Monte Carlo Rally, a B.M.W. at Shelsley-Walsh, a Bentley in the R.A.C. Rally, and a Darracq in the Paris-St. Raphael of that year. Her modesty, zest for activity, and her resolute determination to see a difficult job through, set an example to British womanhood. She was drowned in the Thames, flying an Envoy in bad weather.

We regret to record the deaths of Donald T. Yates, the well-known motoring journalist and road-tester ; A. W. Dougill, M.I.A.E., who was the first hon. sec. of the Yorkshire A.C. and organiser of early speed events ; F. W. ("Pa") Applebee, famous trials competitor on a Levis motor-cycle in pre-1914 days, who rode in the 1922 T.T. at the age of sixty ; Harry Vincent, of Vincents of Reading, who knew the fascination of Weybridge in the early days ; and of Flying Officer L. S. Delaney, killed on active service, who used to assist C. T. Delaney, the well-known Lea-Francis exponent. The body of Meier, the German driver, is said to have been washed up on these shores.

Letters from Readers

Sir,

I have been very interested in the recent letters *re* "Scuderia Impecuniosa." However, for me, the adjective Impecuniosissima would be more appropriate! Nevertheless, I am a great Bugatti enthusiast.

Soon after the war started I bought a very aged four-cylinder, 1,500 c.c. sixteen-valve model and after spending a lot of time thinking out improvements to give more urge, got only as far as stripping it when I was given a 1925 2-litre Bugatti. This had been laid up since the end of 1929 and had done less than 25,000 miles. I received it in pieces and soon built it up and had it on the road (on trade plates). Bad misfiring occurred and at the moment the engine is down again, prior to it coming on the road next quarter.

I have never come across any articles or road tests about this model and I should be exceedingly glad if any of your readers could let me know what can be done cheaply in the way of increasing performance; also if anyone has cheap spares I should be glad if they would get in touch with me. Ignition is by Delco-Remy coil, the distributor being driven from the back of the camshaft. The dynamo is driven by a flat belt from an enormous pulley on the back of the camshaft. The engine number is 4486.

I really would be grateful if anyone can give me any further information about this engine.

I am, Yours etc.,

DONALD L. MORDELL.

St. John's College,
Cambridge.

[Please write direct. There were several types of 2-litre.—Ed.]

* * *

Sir,

The list of books given in the December issue of MOTOR SPORT by Eric Sydney was very comprehensive and extremely interesting. I would appreciate more particulars of the fictional works.

A German publication was included in a similar list drawn up by Eric Sydney and printed in "Speed" (January, 1937), viz. "Der Kraftfahrsport im Neuen Deutschland," by Adolf Maurer (Verkehrsverlag Deutschland G.M.B.H.). Another book dealing in part with motor racing in the early days is "Wheels of Fortune," by Sir Arthur du Cros, Bt. (Chapman & Hall).

In the May, 1940, issue of MOTOR SPORT a book by Wilbur Shaw was reviewed entitled "Why I Became a Race Driver."

I am, Yours etc.,

STANLEY SEDGWICK.

Cobham.

[The last-named was merely an advertising booklet.—Ed.]

Sir,

I have just finished reading Mr. J. L. Wyer's article in the December issue and make haste to congratulate him as I think it is excellent in every way. There are just two points I wish to query.

Why did Sunbeams build an Indianapolis car in 1917?

There was no race at Indianapolis that year and I cannot make out how Sunbeams could spare the time to build racing cars at that period of the Great War when they must have been very busy building aero engines. When did the car actually run at Indianapolis, in 1919? I seem to remember reading that Resta drove one and a Portuguese named Porporato drove the other.

My second query concerns the 1½-litre car. Where did they run, as I do not remember any mention of these cars in motor journals of that time? They must have appeared when the Talbot-Darracqs were starting their unbroken series of wins.

Perhaps at some future date Mr. J. L. Wyer would clear up these two points for me.

I am still keen to get hold of a 1924-25 2-litre as I think they represent one of the finest efforts ever turned out to represent Britain on the Continent. Others seem to have the same view, but if anyone has one for disposal I am a buyer. I shall look forward to more articles from the pen of Mr. Wyer.

Mr. P. T. C. Clark's article on Mercedes I have read with interest.

I think Mr. Clark is wrong when he says that the eight-cylinder 2-litre Mercedes won the 1924 Targa. I think he will find that Christian Werner on a 2-litre four-cylinder won the race. Three Mercedes started, driven by Werner, Neubauer and, I think, Lautenschlager. Three similar cars had run at Indianapolis the year before, but their road-holding was bad, and although one of them held third place for a time, only one finished. The drivers were the same as in the Targa, but Carl Siehr drove in place of Neubauer.

In the autumn of 1924 four 2-litre eight-cylinder supercharged cars ran in the Italian G.P. at Monza. They were outclassed by the P.2 Alfas and all were withdrawn when Count Louis Zborowski skidded off the course at the dreaded Lesmo bend and was killed. Two of the other cars were driven by Count Massetti and Neubauer, and I think Werner drove the fourth car. My records are not beside me so I speak from memory. These cars did not appear again until 1926 when Otto Merz won the 2-litre class at the Solitude races in Germany. These races I think, were national events, as no foreign drivers' names appear in the list of starters. Later on in the year Caracciola won his first big race in one of these cars, i.e., the G.P. of Germany run at the Avus. The race was marred by a very serious accident, when Rosenberger, driving a similar model, skidded off the track and crashed into the timekeeper's box, killing three of the occupants.

Raymond Mays ran one of these cars in this country in sprint events in 1927, and in one small meeting at Brooklands when he lapped at 117, I believe. The road-holding was bad owing to wrong weight distribution and the car was not very controllable compared with the G.P. Sunbeam and Bugatti of that period. With regard to the 4½-litre, I have seen a photograph of this car in the Klausen hill climb of 1927 when it made second fastest time of the day to Chiron's Bugatti. It is definitely stated there that the car was supercharged.

I am, Yours etc.,

T. A. S. O. MATHIESON.

H.Q. 52nd Lowland Division,
Home Forces.

* * *

Sir,

When reading your last few issues one cannot help noticing a growing dissatisfaction with British cars, expressed by contributors and correspondents alike.

The opinion of these people cannot be lightly dismissed with the suggestion that they would be completely satisfied with the British vehicle were it twice as dear and bearing a foreign name.

Many people buy British cars because they want reliability. In fact, they state that Continental cars are unreliable. This is a very mistaken view.

One hears more about Continental failures because most mechanics are not acquainted with the car, making repairs slow and tedious, while the car has to spend long periods in dock, waiting for some small spare costing perhaps £1, while the carriage due on it is £5.

British cars? Every mechanic knows something about every model. A spare, if not actually in stock, may be obtained by 'phone in five minutes. There is no inconvenience, and the owner soon forgets all about it—but the breakdown was there all the time.

Who does not know the British car which habitually breaks its shock-absorber mountings: or another whose spring shackles tear away when the brakes are applied fiercely?

The British are a cautious race, and will accept nothing until they think it is proved. Is it for that reason that one of our manufacturers turns out a model giving 25 per cent. less b.h.p. than other similar cars, while another gives us a sports model with hardly any springs at all?

Where is our reply to the beauty, comfort, and controllability of the Fiat 500, even at a 25 per cent. increase in

LETTERS FROM READERS—continued

capacity? Where is our 1,350 c.c., 80 m.p.h. five-seater saloon, like the Aprilia; or our safety for the timorous with low build and f.w.d. like the Citroen? Why did we not have f.w.d. and integral construction in 1935, when Citroen swept the world's markets?

One could continue thus for some time. It would appear that in the past our manufacturers have used the Continental marques as experimental shops, trusting to our insularity to prevent us from buying the latter's wares.

If we are to increase, or even maintain, our present markets at home and abroad, this state of affairs must cease. After the war, if we are not first and best with every class and type of vehicle, that market will be lost for good.

What should be the manufacturer's aim? More efficient engines, even if less flexible: four-speed with high top for cruising: a choice of gearbox, either a sweet, straight one, or a fully automatic one: better i.f.s.: more roomy large bodies, and more streamlined small ones: a choice of large, or aero-dynamically efficient bodies with similar engines: lower centre of gravity: integral construction: some f.w.d. models: hydraulic brakes: and much, *much* less weight.

Perhaps the British public don't want such things. Don't they? Look at the success of the Fiat 500, the Lancia Aprilia, the Citroen, and the Vauxhall Ten.

This last car started from scratch, incorporating most of the required features. It achieved immediate recognition and a phenomenal success in competition with many already well-established makes. It was designed to fit in with the then existing market. After the war, when markets are altered, it could form the basis for a very fine model—£50 more to be spent on increased power, or a four-speed gearbox with higher top gear, and minor alterations to body to provide less wind resistance and a lower centre of gravity. We should then have a car equal to the Lancia Aprilia, yet costing £100 less, and the superior of every other small car.

It does not seem much to ask. Most Continental manufacturers are already nearly through this programme, and are laying down new ones. Ours have hardly started. We have much leeway to make up before we can be in a position to lead the motoring world. Let us "Go to it."

I am, Yours etc.,

GRAHAM C. DIX.

Bristol.

[To which we would observe that there is a major, all-in war to win. Is the Continental manufacturer really getting on producing new models? Are not new car sales virtually banned in this country? Concerning the Vauxhall Ten, it is an excellent car: the Director of this paper has done 12,000 miles with his with absolutely no attention of any sort.—Ed.]

* * *

Sir,

I have read with great interest Prince Chula's article in your November issue entitled "Those Who Work and Those Who Don't." It seems that Prince Chula's remarks about Raymond Mays are rather unkind. They definitely give the impression that the author has decided doubts as to Mays's actual engineering ability and knowledge of his cars.

Even to suggest that he is not completely *au fait* with every detail of his cars seems completely absurd in view of the fact that he was, together with Peter Berthon, very largely responsible for the construction of the E.R.A. in the first instance, and that it was his accumulated knowledge and experience, obtained over a period of years, in modifying and racing so many different types of machines ever since the years directly following the last world war which so largely contributed to the immediate success of the E.R.A.

Prince Chula is very fond of taking every opportunity, in the motoring Press, to extol his cousin's undoubted race-winning capabilities that I wonder if he has ever realised that "Bira's" run of successes would probably never have come about but for the opportune advent of the E.R.A.—which in turn can be directly traced to Mays's great work on the "white" Riley and his earlier cars.

Also Prince Chula often seems to overlook the fact that while "Bira" has been busy winning races Mays has often failed on account of his driving experimental and untried machines. Thus while "Bira" has undoubtedly an excellent record of success, it is my humble opinion that his contribution to the Sport will go down in history as only negligible compared with that of Raymond Mays.

Be that as it may, I can assure Prince Chula that those who know best have the greatest respect for Mays's capabilities as a test driver and his ability to trace and identify faults which would pass unnoticed by the majority of drivers. This is, perhaps, hardly surprising in view of the fact that he has been personally responsible for the testing and tuning of every E.R.A. produced.

As to whether Raymond Mays ever does any actual work on his cars, it is probably true to say that no other driver has ever worked harder on the actual work of preparing his cars than Mays did during all the earlier years of his racing career from 1921-1932. Remember, too, that Mays was busy racing at a time when "Bira" was scarcely out of his cradle, and during these exciting early years it is safe to say that Mays and his friends Villiers and Berthon seldom had "clean hands and faces" day or night!

Since the advent of the E.R.A. Mays has, admittedly, done less actual manual work on his cars, but none can deny that no other driver has ever taken greater interest in the actual preparation of the cars, and seen that the work was properly done whilst taking many notes on every detail of the development and experiments on his cars.

It must be borne in mind, too, that Mays, in contrast to so many other drivers, has a business of his own to attend to, which, no doubt, takes up a great deal of his time.

Certainly, despite the unfortunate tone of Prince Chula's remarks, there is every reason to suppose that Raymond Mays is, in fact, a very capable engineer and a driver of the very front rank, who is fully conversant with every detail of the cars he drives.

Congratulations on "carrying on" with MOTOR SPORT and making it so very interesting. Best wishes for its future.

I am, Yours etc.,

R.A.F. PATRICK GREEN.

* * *

Sir,

I should like to second Mr. Farquharson's suggestion for an article on the Aston-Martin.

I wonder how many of your readers have come across the Harris-Leon-Laine? Some years ago I had the use of one of these cars and thought perhaps a few notes might be of interest.

I believe only three cars were built, under French patent, in this country about 1933, the chief point of interest being that they had rubber suspension. Two had rear-wheel drive and one front-wheel drive. It was the latter car which came into my hands.

The chassis members were tubular and it was powered (or under-powered) by a six-cylinder 14-h.p. Standard engine set back-to-front. The transmission was bad as the differential was a separate unit from the gearbox and correct alignment was difficult.

The suspension was independent. Each wheel being carried on an arm coupled to a piston operating between two rubber blocks within the chassis members. The blocks were about 5″ diameter by 5″ long. One block looked after the suspension, the other taking up the rebound.

The front arms trailed and those at the rear faced forward. On sudden braking the nose would go down and the back come up, a most unpleasant sensation.

Steering was excellent, about one turn from lock to lock. The view from the front seat over the low bonnet was rather reminiscent of a Lancia "Lambda."

The vertical gear lever worked in a gate which protruded through the dashboard. The selector adjustment was rather vague, the selector rod itself being inclined to jump out of position, necessitating immediate removal of the top of the gearbox; this usually occurred on the most awkward occasions.

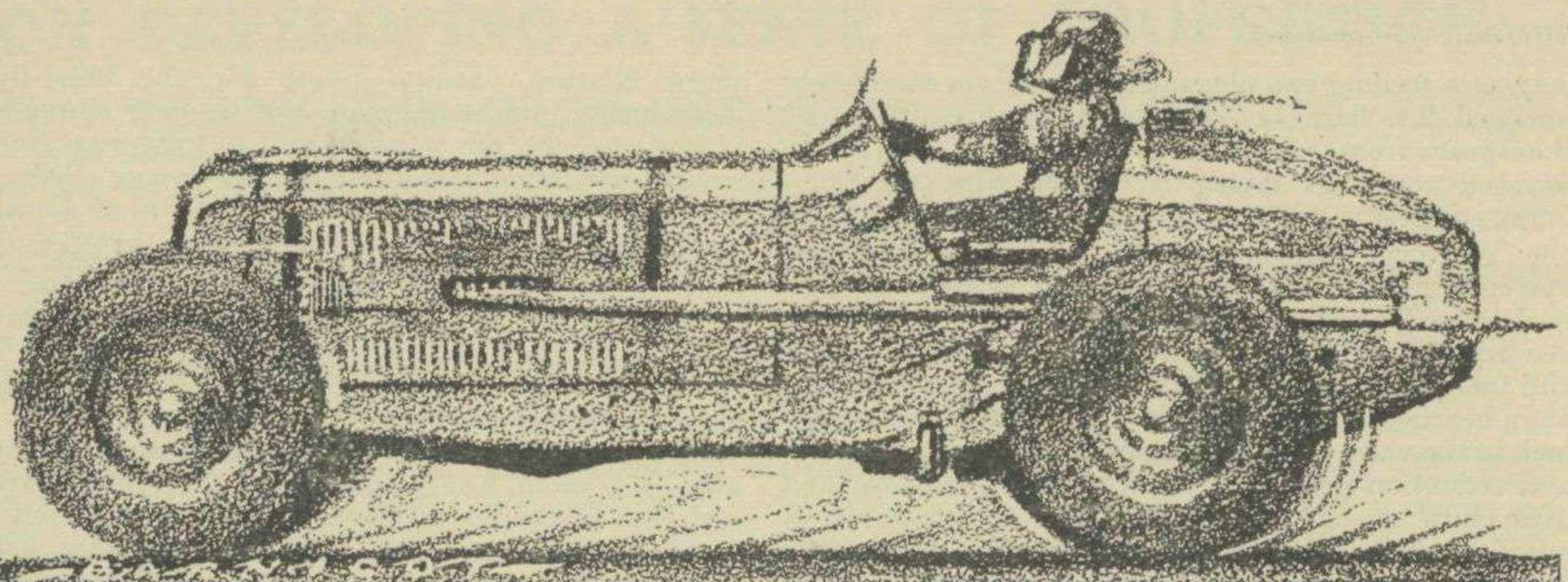
The car as it stood was not a success, but perhaps a f.w.d. Alvis assembly and attention to the damping arrangements would have improved matters.

Of other cars that come to mind there was a rather special 1927 (I think) D.M.S. Delage coupe, reputed to have attained 100 m.p.h. when new. I myself did 89 in it on an indifferent road. It had, I believe, a 3 to 1 back axle ratio, 60 being quite a normal speed at which to change into top. Incidentally, the exhaust note altered at that speed in third.

Another Delage was my father's Type D.8.N saloon; a very fine car which I always considered was undergeared, but which possessed remarkable acceleration.

My first car was a 1931 Wolseley Hornet which originally was a saloon. On being inverted by its previous owner it started life anew as an open car. Much time was spent on this car, the reward being a neat hole in the crankcase.

Continued on page 273



RUMBLINGS

Mine's a "Merlin"

WAR from the air concerns almost everyone in this country, excepting only those isolated folk who have fled to hidey-holes where no bombers are heard and where no shell fragments are ever found.

So, naturally, the R.A.F. comes in for universal praise and well-earned admiration from all classes of the community. Motoring enthusiasts, in particular, appreciate the task of the fighter and bomber pilot and understand the splendid work which goes into the evolution and production of the aircraft with which they defend us. So some notes on the specification of the Rolls-Royce "Merlin" aero-engine, which is used in our fastest fighters and so many of our bombers, should be very opportune.

The "Merlin" is a liquid-cooled V12 motor of 5.4″×6.0″, giving a swept volume of 27 litres. Running on 100 octane fuel, the "Merlin X" develops 1,300 h.p. for take-off, and has a maximum rating of 1,145 h.p. at 16,750 ft. That is a figure of over 42 b.h.p. per litre, which is a remarkable output for a large motor of this type. The two R.R. 50 aluminium alloy cylinder blocks carry six "wet" carbon steel cylinder liners apiece, and sit at 60° to each other on the heat-treated R.R. 50 alloy crankcase, held by fourteen holding-down studs. The cylinder heads are fixed and have screwed-in valve seats and cast-iron inlet valve guides and phosphor-bronze exhaust valve guides. The pistons carry three compression and two scraper rings each and are forged in R.R. 59 alloy, with hollow, circlip-retained, fully-floating hardened nickel-chrome-steel gudgeons, working in floating phosphor-bronze bushes. The one-piece crankshaft of Vickers chrome-molybdenum steel has integral balance weights and is nitrogen-hardened after machining. It runs in seven split mild steel bearings lined with special lead-bronze alloy. There are two nickel-steel, H-section connecting rods on each crankpin, the master rod running on the pin and the plain rod on an outer lining on the master-rod, the bearing material being special lead-bronze. The crankshaft pins and journals are lapped to a tolerance of – 0.0001 in.

There are four valves per cylinder, actuated by a single nickel-steel case-hardened camshaft above each cylinder block. The camshafts operate via rockers and run in seven bearings, the drive being by a bevel-driven shaft at the rear of the engine. Each valve is closed by two concentric coil springs, and the exhaust valves are sodium-cooled, Brightray treated and have nickel-steel hardened end-caps.

The two-speed supercharger is of centrifugal type, driven from the rear of the crankshaft through torsionally-flexible spring-drive shaft and a gear-train. In the "Merlin II" Rolls-Royce motor the supercharger runs up to approximately 24,500 r.p.m. at full speed. The "Merlin X" incorporates a two-speed gear, the change-over being operated by oil pressure and occupying about one second under full load. A friction drive protects the supercharger drive against impeller inertia on acceleration and deceleration, while the torsional shaft aforementioned damps out torque irregularities in the drive to the auxiliary components and timing gears. The supercharger draws from a twin-choke, updraught Rolls-Royce S.U. carburetter. Mixture control is automatic according to altitude and is also automatically enriched if the throttle is opened, while an accelerator pump additionally enriches the mixture as the throttle opens; there is also pilot-control over the rich and weak settings. Supercharger boost is automatically governed to altitude without attention from the pilot, in relation to throttle opening, a cut-out being provided for emergency use. To obviate icing-up the carburetter throttle is heated by warm oil, the pressure of which is controlled by an automatic by-pass, and the chokes are coolant-jacketed. Fuel feed is by dual gear-type pumps, each one able to supply the needs of the engine independently and each driven by a separate quill-shaft. Excess fuel is by-passed to the suction side by a disc-type relief valve. Ignition is by two spigot-mounted twelve-cylinder

RUMBLINGS—continued

magnetos feeding two plugs per cylinder via completely screened h.t. harness. The magnetos are driven by skew-gear from the timing gear shaft and have serrated couplings giving a vernier adjustment.

Lubrication is of the dry-sump type, employing one gear-type pressure pump and two gear-type scavenge pumps, the latter working in parallel. Oil is delivered through a triple relief-valve, at 150 lb. per square inch to the two-speed airscrew control and fuel pump bushes, at 70 lb. per square inch to the main bearings and big-ends, and at 4 to 8 lb. per square inch to the valve gear, supercharger bearings, generator, and reduction gear unit jet feeds, etc. Pistons and little-ends are splash fed and the camshaft drive, auxiliary drives, etc., are drain lubricated, the reduction gear unit bearings being lubricated by a combination of splash and drain feed.

Coolant is circulated by a centrifugal vane-type coolant pump running at 1½ times crankshaft speed, via the rear lower ends of the cylinder blocks, and three outlets on the inner sides of the blocks delivering to main outlet pipes. The electric starter drives through a 393 : 1 reduction gear and Bendix engaging device to one of the supercharger gears, and the hand-starter operates at a ratio of 14 to 1 through part of the same gear train, a multi-plate clutch on the starter layshaft safeguarding both systems in the event of a backfire. The generator is driven at 1.914 times crankshaft speed from a gear-train off the supercharger drive, and the tachometer drive is from the rear of the port camshaft, at a quarter engine speed. Provision is made for drives for a constant-speed air-screw control vacuum pump for the blind-flying instruments, automatic-pilot and de-icing equipment, a low-pressure air compressor, a high-pressure air compressor, the Lockheed undercarriage hydraulic pump, and a gun-turret pump.

The airscrew is driven from the nose of the crankshaft through a single-spur reduction gear unit and in the case of v.p. airscrews the actuating oil is fed via an internal rotating tube. The "Merlin II" motor gives 880 b.h.p. for take-off at 3,000 r.p.m., on a boost of 6.25 lb. per square inch for a nett dry weight of 1,335 lb. on 87 octane fuel, and its frontal area is a mere 5.85 square feet. This performance, and that of the later two-speed supercharger and 100 octane Rolls-Royce "Merlins," has given our fighter aeroplanes the supremacy of the air and has enabled our bombers to so potently attack Germany's military objectives with very small losses. The high quality materials and perfect assembly of these Rolls-Royce aero motors results in high praise of their absolute dependability, in spite of their great performance, wherever pilots of the Fighter Command and Bomber Command meet. So let the foregoing very abridged specification be respectfully digested by those who owe so much to the Royal Air Force. Unlike Leonard Engel, who, last November, in the American journal "Flying and Popular Aviation," wrote shamelessly of "Tornado," "Whirlwind," "Manchester," "Stirling," "Vulture," "Griffin," and "Sabre," we are giving away nothing by publishing these notes, for the "Merlin" was written up fully in the British aeronautical Press as long ago as April, 1939.

MODIFICATIONS TO THE 4¼-LITRE BENTLEY—continued from page 267

Frame

This has been enormously increased in stiffness, which, besides increasing the durability of the body, contributes towards the better suspension and road-holding.

Gearbox

This has been completely re-designed to produce simplification and reduce weight.

Rear Axle

The opportunity has been taken to strengthen up the rear axle, so that it will stand more abuse than previously.

Brakes

Owing to the fact that the front suspension parts are more rigid than the conventional front axle and leaf springs, it has been found possible to increase the proportion of front braking without causing the car to deviate from a straight course when a violent stop is made. The Bentley Mark V with standardised body has a top speed which is the same as previous Bentleys, i.e., under favourable road conditions between 95 and 100 m.p.h.

Since, however, immediately prior to the outbreak of war, there were a number of Continental roads where a speed in excess of 100 m.p.h. could be utilised, a special model has been developed to cater for these conditions, and this is known as the "Corniche." The "Corniche" body contributes towards the increase in maximum speed, owing to a scientific reduction in windage, but little room has been sacrificed ; in fact, the car is actually wider, though it has slightly less head room. The luggage accommodation is less than the standard car, as the spare wheel is stowed at the back. It is, however, at least 10 m.p.h. faster than the standard model, though obviously, owing to its very high gear-ratio and higher compression engine, it is not so tractable in top gear. There is no doubt that the Standard model will prove fast enough for more than 90 per cent. of customers, who habitually use their cars in England. Extensive tests have been carried out on both models on the Continent, and various production models of the Standard Mark V have now covered over a quarter of a million miles in the company's service. The durability has proved to be better than that of any Bentley which has previously been produced. There is no doubt that the new car will put up a higher average, for the same amount of driving effort, than its predecessors.

[Qualifying the above, the Mark V has independent front suspension using unenclosed coil springs ; synchromesh on second gear as well as on the third and top ratios ; more conveniently placed gear and brake levers ; a new top opening bonnet ; and the engine set further forward. Nor did Mr. Rowbotham, in his modest announcement, mention the comprehensive interior heating system in conjunction with the engine cooling water. The hand ignition control and the radiator shutters have gone.

The over-drive top gear is retained, having a ratio of 3.64 to 1 ; likewise the famous over-ride suspension control. The wheelbase has been reduced by 2″ to 10′ 4″, the front track is 4′ 8½″ and the rear track 4′ 10″, while smaller tyres, of 6.50″×16″, are now used. Brakes are now by Girling, tyres by Avon. We publish full test impressions of this historic high performance car on another page in this issue.—Ed.]

ON DEVELOPING A SENSE OF PROPORTION

MY good friend "Bunny" Tubbs has a not inconsiderable bee in his bonnet. In saying that, I am referring to a line of thought he has been letting off at me lately on the subject of American automobiles, and not to what goes on in the engine-compartment of his D.K.W. . . . It seems that he spent some time motoring a V8 Ford cab about the States and returned to find all of us over here suffering from a distorted sense of proportion, or so it seems to him. He says that we will argue until the black-out lifts on the respective merits of vintage versus modern cars, whereas everyone in his right mind knows that a 4¼-litre Bentley is better than a 4½-litre, a "12/70" Alvis superior to a "12/50," and a V12 Lagonda nicer than a 3-litre, and so on. Yet what we will *not* do is recognise that our modern sports-cars, some of which even the vintagents admit to be the best yet built, are just low-performance toys in comparison with the Yanks. Well, I will leave the former theme severely alone, thank you very much, but I would like to scribble a bit against friend Tubbs on the latter score. First, he talks about maximum speeds. His "30/98" Vauxhall, it seems, came of an era when touring cars were fast if they did over 65, albeit racing cars were attaining 120-130 m.p.h. It could do its 95 m.p.h., untuned. To-day, Tubbs observes, any Yank will do its 80 m.p.h., and is faster than our so-called British "sports-cars." The late Frank Lockhart got 164 m.p.h. out of a litre and a half thirteen years ago and Caracciola got 245 m.p.h. from the Mercedes *Rennlimousine*. The modern Bentley and Lagonda Tubbs considers to be beautiful carriages, gentle to drive or ride in, but they only go at 110 m.p.h. at the most. He remembers that the S.S.K. Mercedes-Benz, the Blower Bentley, the multi-valve Duesenberg, the "2.9" blown Alfa-Romeo, and the Type 57SC Bugatti exceed 120 m.p.h., that Lycett's 8-litre Bentley does 130 m.p.h. But then, he remarks, Mr. Wyer told us that the 2-litre G.P. Sunbeam could touch 130 m.p.h. on the road on 70 octane fuel seventeen years back. He considers that with the lessons racing has taught us during the intervening years, and with the improvement in pre-"Pool" fuels, it should be possible to buy, to-day, a comfortable, tractable, reliable sports-car of 3-litre capacity, capable of taking two persons away on a tour and hitting 125 m.p.h. on the straight bits (we had better have the *m.p.h.* in, Mr. Printer). His complaint is that, instead, if he wishes to buy a British car that will exceed the old-fashioned hundred-miles-an-hour he has to have a carriage suitable for taking a revue actress to the Ritz in, weighing, in its splendour, more than 1½ tons. Well, up to this point, I have no reason to quarrel very much with what Tubbs puts over, because the answers are all very clear. The public likes these Ritz-carriages and surely it is all to the credit of British sports-car vendors that their products will exceed 100 m.p.h. in spite of box bodies and heavy construction? They have quite brilliant acceleration, good fuel consumption, are essentially dependable and cost less rather than over £1,000, though maybe the speed-god will disfavour me for bringing that up. Anyway, Tubbs must know the great difference which such bodywork makes, and invariably the 125 m.p.h. cars he mentions (not that he has timed one of them at that figure, I suspect), are open, very high-efficiency jobs, if one excepts the closed Bugatti coupe in which you can scarcely wear a cap, let alone a shapely hat, and which is about the most fabulously expensive means of motoring fast that is imaginable, considering comfort and accommodation in return for expenditure. Incidentally, my personal estimation of the maximum speeds of the cars listed would be: 110 m.p.h., 97 m.p.h., 100 m.p.h., 115 m.p.h., and 125 m.p.h.; one in five, as it were—of course, I've no quarrel about Lycett's Bentley. So far as records go, our little M.G., with out-of-date supercharger, pent-roof head, and normal suspension, has reached over 200 m.p.h. in 1,100 c.c. and 1,500 c.c. forms, and that, for me, is enough to be going on with. Production car speed just cannot be considered in relation to record speeds, the speed of road-racing cars or the speeds attained by purely racing-cars of any period, and that is all there is to it.

It is with Tubbs's further observations that I feel vexed. He sets out the case for the American and the vintage sports-cars in the form of dialogue, doubtless imaginary, at the expense of modern British high-performance cars. Here is what is observed in favour of the Yank:

"The subject is an eight-cylinder drophead coupe, made in the U.S.A. in 1933, where it was referred to, without a trace of irony, as a 'convertible cab' (-riolet). The engine is a perfectly standard eight-cylinder V, of a little under 3½ litres, there are three speeds, two people can sit under cover, and two in the 'rumble seat.' The back axle ratio is 4.1 to 1, I think. The steering on the 1933 cars is higher-geared than the subsequent Ford cars, which largely explains why the owner has kept the car so long. He originally paid £140 for it new, at Detroit. It weighs 24 cwt.

"This Ford is one of the cheapest and most popular cars they buy in the States, and is to be found in every State of the forty-eight. It operates equally well at 120 degrees in the 'shade' in the Mojave Desert, and at 'thirty below' during the Wisconsin winter. It's at home in the streets of New York City, bounding away from traffic lights; it's at home on the prairies, where you may live 120 miles from a movie, and yet call it a two-hour run. If you're on a hunting trip in New Mexico, or fishing in British Columbia, you don't scruple to leave the highway for the sage-brush or the logging trail. She's not exactly vintage, but she certainly has got a lot of what it takes. Limousine or shooting-brake; race-car . . . or flivver. Take your pick!

"My work takes me 25,000 miles a year; I hate trains. So my car had to be closed and comfortable. And it had to be fast and yet reliable. You *can* play racers in a Ford V8; but I'll be damned if you can play Packards in a Velox. *Voila tout!*"

Then the vintagent has his say, thuswise:

"You can keep your three-ring (beg pardon, four-ring) circus. I didn't *buy my* car for catching salmon from, nor for toting a pump-gun across the primitive regions you seem to enjoy so much. And as for aviating across the prairies at an average of 60 miles an hour . . . well. I'm a timid bloke by nature, and I'd rather trust to my steering and double Hartfords, than transverse springs and direction like a steam-roller. I'll take you on, on any trip across the British Isles. But I won't insult a good car by comparing it to a tractor. The '30/98' was designed in the first place to beat the record for Shelsley, which it did. Furthermore, I bought the machine for the sheer fun of driving it. There's nothing in the world like sitting behind four hairy cylinders. There is no fairy wand or 'miracle shift' to wish me into another ratio; the steering ratio is the sort made for corners, and not over-lightened so that Junior finds it easier to park at the drug-store.

"I grant you the Ford has a lot of the right ideas. Like the Vauxhall, she has a big motor and uses it sparingly and she is not too long in the chassis.

"If I were in the trade, and you wanted a good car, I'd take you out in one of the old Lancia 'Dilambdas.' There you had the urge of the Yank, the appeal of the vintage machine, and the comfort of a town carriage. From the look of things now, the Americans are at last finding out that you cannot have the perfect car, till it's comfortable on the corners as well as on the straight . . . look at the new Nash, for example. The British, too, seem to be coming out of the doze they sank into in 1931 or thereabouts.

"When you come to look at it squarely, it is evident that all we have been wrangling about is the problem of suspension. Both our cars are fairly fast, at least, by cheap car standards, which are the only ones that need concern us. We've both got largish, lazy engines, for yours gives about 25 b.h.p. per litre, and my old car is content with around 22. Both the cars are light for their size, and that is the secret of the performance which has made them both famous in their time. Now, thanks to the lessons of modern Grand Prix racing, they are both equally out of date."

This momentous decision about suspension results in the participants shaking each other warmly by the hand and concluding along the following lines:

"The vintage type of car was grand in its way, but like the contemporary racing-cars, it only got road-holding by screwing up its Hartfords till the springs had about two inches of travel to cope with all the bumps. The modern Formula car now has a whole foot of travel, but it holds the road like nothing ever seen before.

DEVELOPING A SENSE OF PROPORTION—continued

"A few manufacturers have already seen the light, and have turned out the right sort of car for 'after the war.' One or two have been with us for some time; the '10/12' Fiat and D.K.W. for example, the B.M.W.s, and other makes of larger car which have had modern racing experience.

"The Americans reserve their hurrying for the straightaways, and go slow on the corners. Which is surely more logical, and certainly more comfortable for the passengers."

And so, having decided that, suspension apart, the vintage sports-car and the cheap Yank are both rather similar in fundamentals, Tubbs asks if we are not sadly lacking in our sense of proportion when we show any respect for our S.S., M.G., Singer, and so on, sports models. I wish humbly to suggest that it may be Tubbs whose sense of proportion is distorted. In the first place, some folk believe good vintage cars to be at any rate superior to indifferent moderns, albeit that greatest of all vintage exponents, Sam Clutton, has never said that *good* modern cars are comparable with vintage equivalents. Tubbs compares a 1933 Ford with a 1924 Vauxhall, finds them about comparable except for suspension variations, and claims that therefore it must follow that the Ford is superior to all those small sports-cars which have been classed as inferior to good vintage sports-cars by certain experts. The "30/98" Vauxhall was an expensive and exceptional vehicle. I suggest it should have been compared with a 1947 Ford. Old British sports-cars, large and small, still work amongst us, whereas the early Fords of around 1933-5, probably far better sellers, are quite a rarity. Incidentally, Tubbs, for all his worship of sheer speed, conveniently forgets the Vauxhall's excess of 15 m.p.h. over the Ford when he perpetrates his dialogue. Even if we grant that the Ford is as good a fast car as the Vauxhall, it just cannot compare with the medium-sized British sports-car. That is obvious, if we keep our sense of proportion, for even under present limited motoring activities the Ford is going to cost quite £27 more per annum in tax and fuel bills alone than the Britisher, which rules the latter right out of the average British motorist's scheme of things. If anyone's sense of proportion is distorted, it is possibly the Chancellor of the Exchequer's, in asking over 2d. a mile in running costs alone from owners of 8 h.p. cars. On the question of road-clinging, I'd rather be in an M.G. or an S.S. or a Singer on ice or slime, to name the British cars slanged by Tubbs, than in a V8, even the higher-geared steering version, and so, I think, would most of us. To go off at a tangent and bring in Italian and German cars has nothing to do with Tubbs's American-and-Vintage-versus-the-Rest argument. The American driver, we are told, reserves his speed for the straightaway. Perhaps the British family motorist does the same, and if he does, why sell him expensive suspension variations that will wear rapidly because he will never grease them and which he will never appreciate anyway? When it comes to British sports-cars, the cheaper models contrive to obviate these i.f.s. shortcomings and yet to handle very well indeed. I grant you that a B.M.W. or a Lancia may feel more remarkable, if you like a car which can be thrown about and feel both floppy and safe at one and the same time, but whether an M.G. or S.S. would be all that much slower round a corner is surely an unproven point. Certainly cars are sold by reason of their characters as well as by measurable performance, but at all events I think that British high performance cars in general handle far and away better than the airship-like Americans; at least, one does not have to make futile efforts to wind them out of slides by little auxiliary handles, thank goodness! . . . When it comes to expensive British sports-cars, three of the finest have highly developed systems of independent front suspension with which even Tubbs will surely not find any fault—and, before he tries, I would remark that one system, at least, seems to owe something to that on the only passable automobile made in the States!

Douglas is too good a sportsman to take offence at this attack on his keenly-expressed theory. And, to show that I respect his views, I will promise not to edit anything he may wish to submit by way of a reply, providing he avoids libel. No one admires the Ford V8 more than I, but I just won't have it, that it, and Yanks in general, are superior to our excellent medium-sized sports-cars. In conclusion, and reverting to Tubbs's criticism of luxury British high-performance cars, I do not know whether he will be in the market for a 100 m.p.h. sports-car after the war, but if he is, I would suggest on behalf of the British Motor Industry, that a "Corniche" Bentley Mark V, the production "Le Mans" edition of the V12 Lagonda which the war sent into abeyance, or an open-body by Charles Follett on the 4.3-litre Alvis chassis, might fill the bill. For there will not be any Alfas or Mercedes or Lancias or B.M.W.s left then.

AN INVITATION WORTH FOLLOWING UP

I was very pleased to read in last month's MOTOR SPORT your suggestion that groups of enthusiasts should organise "War-time Scuderias," and would like to tell you of one to which I belong, run by a group of young enthusiasts in the Purley locality. We are affectionately known as "*L'ecrie de L'elphant Blanc*" and at the moment our "works" consist of two hired lock-ups, behind a service station, though we have greater ambitions and hope at some time to be able to get ourselves a decent place somewhere on its own. There are four of us at the moment, and we are all decidedly "vintage," and are 100 per cent. enthusiasts. Our *equipe* consists of a 1929 ex-Whitney Straight ex-Victor Gillow "Brooklands" Riley, a 1929 "12/40" Lea-Francis and a 1929 350 c.c. Raleigh motor-cycle. On the occasions when we organise high speed runs we rope in friends, who run a J2 M.G., "Monte Carlo" Triumph, 1,100 c.c. Fiat, Singer "Le Mans," 3½-litre Bentley and Type 57 Bugatti, though actual members are requested to have a vintage trend.

At the moment the Riley is the only active *bolide* and is used regularly at week-ends, running on basic rations, and on more than one occasion has had to be pushed the last 200 yards to the lock-up, due to furious ticking on the part of the fuel pumps! The Raleigh is spread all over the place at the moment, waiting to be rebuilt. The Lea-Francis is a comparatively new acquisition and was purchased from a local breaker for a little over the proverbial fiver. The day of collection of the Leaf was a rather wet one, but rain and air-raids have no effect on enthusiasts who have an object in view, and the Riley was called upon to tow our new find back to the "*ecurie*," as there was no one else available. After putting out a jolly little carburetter fire on the Riley, due to a sticking ignition control, we set off for the breaker's. Three up in the Brooklands was just a wee bit tight! Unfortunately, the owner of the Leaf had forgotten to leave us the key to the yard, so not to be outdone we picked the lock in true professional style, with a piece of wire, albeit from the breaker's own fence, and then hitched the Leaf behind the Riley and made for home. Controlling the Leaf proved somewhat exciting due to the absence of seats, but a spare wheel and a cushion sufficed and we arrived back at H.Q. with nothing other than a broken tow rope, due to a misunderstanding when entering the "*ecurie*" garage. Almost immediately work was started on the motor and now the chassis stands resplendent in its nakedness, waiting for its new lightweight body to be made. The engine will be "warmed" slightly and possibly a double carb. head will be fitted, instead of the single now in place, and new manifolds made up. We haven't yet decided when we hope to get the motor on the road, but hope the time won't be very far ahead.

MOTOR SPORT is a regular entrant into the "*ecurie*," and I can assure you that in our little group you have readers who will support you to the very end, for as the pre-war sporting days get farther and farther away MOTOR SPORT becomes appreciated and looked forward to even more, if that is possible.

If anyone should happen to be in the Purley-Croydon district during a week-end and would like to drop in to the "*ecurie*," they can be sure of a welcome. We are to be found behind John Wilson's service station near Sanderstead Southern Railway station, *but we do insist upon them being enthusiasts*!

DENIS S. JENKINSON.

A PIONEER IN THE SCIENTIFIC TESTING OF AUTOMOBILES

Cecil Clutton writes-up a remarkable book, which is of great interest to students of Edwardian performance, and which, even to-day, shows car-testing in a new light.

IT is maddeningly difficult to obtain any definite figures about the performance of early automobiles. Of course, if you don't happen to feel the need of this sort of information the difficulty ceases to be quite so maddening, and you can really do without this article as well.

Such information as I possess (and it is now fairly considerable) was entirely the result of tabulating times and speeds recorded in Edwardian classes at speed trials and races, until I came across a remarkable work entitled "The Scientific Determination of the Merits of Automobiles," by Dr. A. Riedler, of the Royal Technical University at Charlottenburg. The English translation seems to have been published in 1912 and the German original only a trifle earlier.

The doctor starts off by complaining that previous standards and comparisons of performance were entirely subjective; and as his tidy Teutonic brain found this very annoying and unsatisfactory, he set about rectifying it with characteristically Teutonic thoroughness. Apart from sundry excursions into the realms of army lorries and electric broughams the important part of the book records the testing of a 1905 Renault, Prince Henry competition models of Benz and Adler, and a chapter devoted to sleeve-valve motors. He seems to have made about 200 different tests on each machine, and the book is illustrated by 227 figures of which a few are photographs of the cars tested, and over 200 are graphs of their performance. There is every sort of graph—graphs to show the motor power at given revs. and speed; losses from different causes, excess power available for gradients and acceleration, and a host of other things beside. His apparatus was a series of revolving drums, brakes, dynamos and clutches. In fact, Dr. Riedler laid the foundations of scientific automobile testing and the work was evidently of a high order, as his calculations were invariably borne out within a minute proportion on actual test.

For the doctor was sufficient of a motorist to realise that bench tests are not everything, and that the intangible "feel" of a car counts for much as well. He accordingly took each machine tested for a comprehensive road trial as well.

However, the present-day interest of the book lies not so much in the methods of testing as in the tabulated results obtained, and the intention of this article is to record some of the more important examples.

The 1905 Renault was taken as typical of the conservative touring car of the day, and the doctor remarks that it had altered little by 1910, although these are now regarded as amongst the most important years in the evolution of automobile design. It is rather interesting that the engine dimensions of this car are identical with the 4½-litre Bentley, namely 100×140. Running up to a maximum of 1,450 r.p.m. the engine developed 33 b.h.p. with an unobstructed exhaust, which is equivalent to 6.1 b.h.p. per litre, or an m.e.p. of about 50. The three forward gears had ratios of 10.8, 5.83 and 3.14 to 1, and the top speed of the car was 43.75 m.p.h. Top gear would tackle a gradient of 1 in 18, and it may therefore be concluded that the acceleration from 10 to 30 in top would take 18 secs. The best gradient which bottom would surmount was 1 in 5.

In the case of each car there is given what is described as a "Characteristic Speed" which is "to be regarded as that speed at which the greatest car efficiency is obtained, fuel consumption and running times being taken into account." This certainly sounds rather subjective in itself, but I suppose it really amounts to what we call the cruising speed of a car, and in the case of the Renault it is put down at 37½ m.p.h.

The car weighed 31 cwt., of which 15 cwt. rested on the back wheels and 16 on the front.

It is characteristic of the doctor's thoroughness that he calculated the ignition advance and compression ratio separately for each cylinder—and they were all different! The average ignition advance was 10.5° and the mean compression ratio was 4 to 1, although the four compression spaces differed so widely as to contain 360, 380, 346 and 37 cubic cms. respectively! It is even recorded that the back wheels were not truly round.

Next comes a most exciting car in the shape of a "100 h.p." 1910 Prince Henry Competition Benz car. This fine machine had a four-cylinder 7,272 c.c. engine (115×175), weighed 26½ cwt. (12½ front, 14 back), and attained a speed of 83.75 m.p.h. The body was a four-seater torpedo type with fairly ample wings and no windscreen. The back axle ratio was the rather low one of 2.48 to 1 and the compression ratio the surprisingly high one of 4.7 to 1. The engine is described as a "high speed type" and ranged from 500 to 2,400 r.p.m., peaking at 2,050 r.p.m., when it produced 118 h.p. unsilenced or 104 with the silencer attached. This is equivalent to the commendable figure of 14.2 per litre, or 7 per 1,000 r.p.m. per litre, which represents an m.e.p. of 90, and is still the staple figure for modern production cars. Incidentally, it is upon this basis that the R.A.C. formula works, and if no engine exceeded 1,000 r.p.m. (as few did when the formula was devised), it would be remarkably accurate.

The car cannot have been very tractable to drive as the stalling speed on top was 31.3 m.p.h. (800 r.p.m.) It is, however, characteristic of engines of this type that the top gear acceleration curve reached its optimum at 37½ m.p.h.—only 6 m.p.h. above the stalling speed—when it attained the creditable advance of 3 feet per second per second. The maximum gradient to be tackled in top was also the quite steep hill of 1 in 10½.

The engine had the cylinders cast in pairs, with four valves per cylinder (described as "two admission and two exhaust"), but the doctor seemed to regard this as a somewhat unnecessary complication. They are slightly inclined in the head and the inlets are larger than the exhaust and have the characteristic Benz triple seating. The lift on the inlet valves was 8 mm. and on the exhaust 9 mm., the operation being by push-rods with separate camshafts on each side of the engine. The rockers gave a fantastic step-up, as was another habit of Benz, and the lift of the cams themselves cannot have been more than 4 mm.! Why this terrific strain was so unnecessarily imposed on the long push-rods is a mystery.

The dual ignition permitted a maximum advance of 23.5° The copious drawings of this particular item give the impression of being slightly bogus, as they do not always agree, two entirely different back axles (live, by the by, and not chain, as would be anticipated with so large a car at this date) being simultaneously attributed to it.

The Benz may have been magnificent, but the doctor's fancy was clearly taken by his next subject, the 1910 Prince Henry Adler. This he found was much less of a real racer than the Benz, and practically indestructible. Furthermore, despite the rather unfavourable arrangement of inlet over exhaust the Adler attained the same m.e.p. as the Benz. In this connection, however, it does not seem to have struck the doctor that it is not so easy to obtain good m.e.p. in large cylinders as in small, the Adler having the substantially smaller capacity of 5,192 c.c. and cylinders measuring 101×150.

The weight was 21 cwt., almost equally divided between front and rear; the compression ratio was 4.76 to 1 and top gear 2.895 to 1. It is surprising that there were only three forward ratios. The engine peaked at 2,100 r.p.m. when it gave off 76 b.h.p., equal to 14.7 per litre. The most rapid acceleration was 3.2 ft.-sec.^{2} at 25 m.p.h. and the maximum speed was 71 m.p.h. with quite a touring sort of body, but no windscreen.

We now pass to what is grandiloquently described as the "Metabolism and Pathology of Sleeve Valve Motors."

One of the troubles seems to have been that no one would lend a car to test, but eventually Riedler wheedled an engine out of Mercedes, and a complete 1911 40 h.p. car out of the English Daimler

SCIENTIFIC TESTING OF AUTOMOBILES—continued

Company who, as he points out, originally pioneered and popularised the Knight engine—not so much on account of any inherent merit, as by very clever and comprehensive publicity. Other manufacturers were even forced into the sleeve-valve market against their better judgment, to meet the popular demand.

The English car lent had a four-cylinder 101.1×126 engine and the whole outfit weighed 28 cwt. (13 front, 15 rear). The frame was of very light construction, which undoubtedly assisted performance, and the top speed was 53 m.p.h. Top gear would surmount a gradient of 1 in 12½ and bottom 1 in 4. The engine had the creditable m.e.p. of 90 at low and medium revs., although it is observed that the earlier 1909 engines (96×130) had attained 7.6 b.h.p. per 1,000 r.p.m. per litre, or 99 m.e.p. The reduction in efficiency was therefore presumably due to cooling problems in the earlier engines, which were certainly not lacking in smoothness or flexibility. The Mercedes engine, however, was only fractionally less efficient than the 1909 Daimler, and better than either of the English engines at higher revs., the b.h.p. per litre of the 1909 and 1911 Daimler engines and the 1911 Mercedes at 1,900 r.p.m. being 11.2, 9.85 and 11.3 respectively.

Compression ratios were surprisingly high on early sleeve-valve engines—5 to 1 in the case of the 1909 Daimler—and it was doubtless this that gave them their supremacy over contemporary poppet-valve engines. But there was little scope for development in the Knight engine, so that by 1911 the poppet valve had again attained superior efficiency.

Dr. Riedler goes on to remark that he could not make any of the sleeve-valve engines perform with reliability at prolonged high revs., and adds that their limitation is due to cooling difficulties. Thus, the sleeve-valve engine could only be made reliable in one of three ways: (1) by cutting down the choke tube; (2) by deteriorating the mixture to encourage slow turning, or (3) by deliberate over-lubrication. He drily remarks that the first two are the worst—and those adopted by the English Daimler Company. On the other hand, he admits that the third system, which was favoured by Mercedes, leads to oiled plugs, even worse starting and rapid carbonization, although it favours maximum efficiency. In any case, however, it seems doubtful if he deals fairly with the Daimler, which was primarily a luxury carriage, concerned with smoothness and flexibility, as opposed to high speeds; and a small choke is, of course, the easiest way of attaining this end. He does, however, conclude by saying that "The English Daimler car owes its reputation mainly to its good running under light and medium conditions."

Generally speaking, the doctor concluded that upon no single point is the sleeve-valve superior to the poppet-valve engine.

Dr. Riedler then goes on to recapitulate his findings, and here he certainly lays his finger on all essentials of modern design, as the two following passages show:—

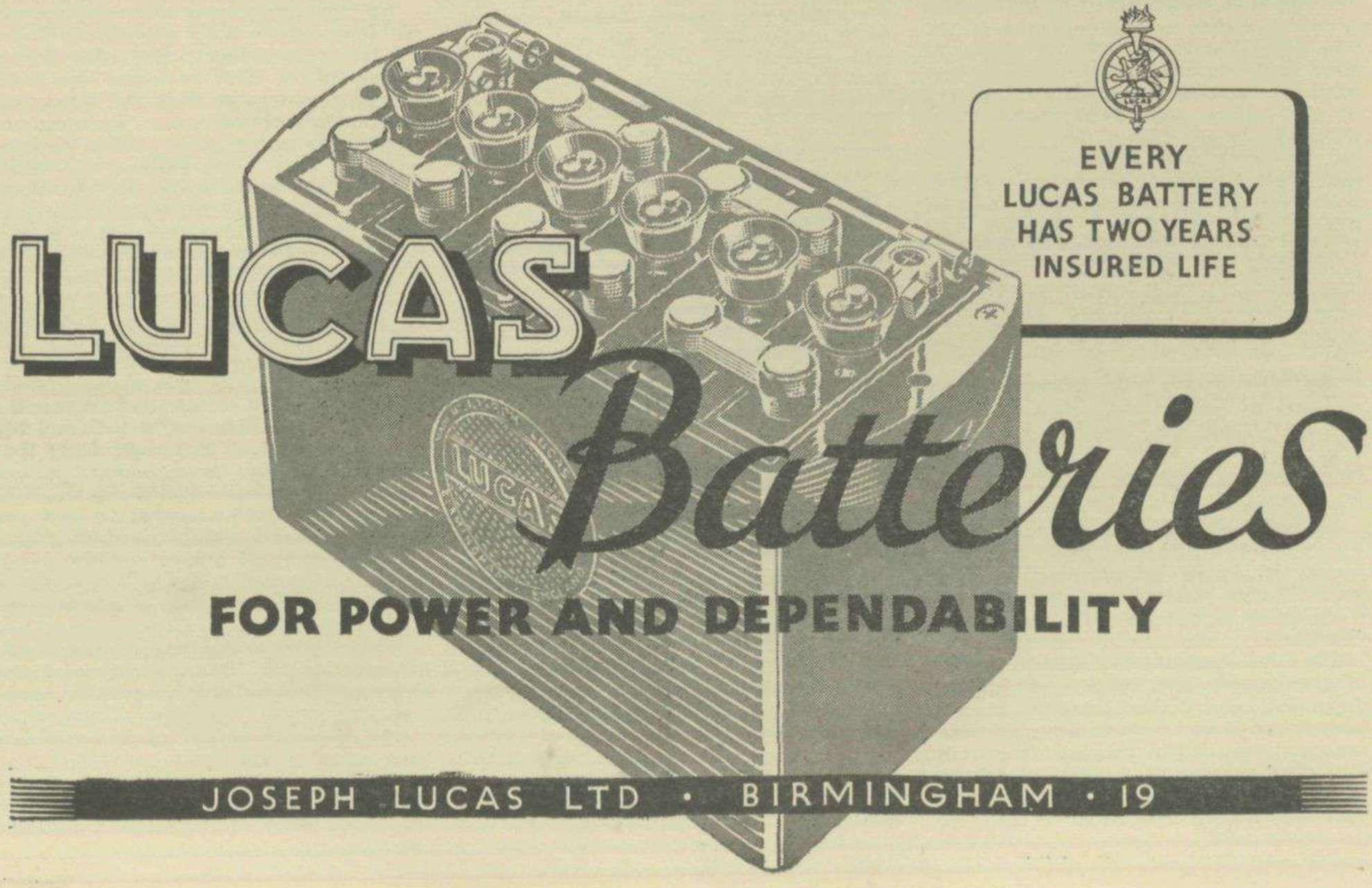
"The widespread view that high-speed motors afford no important specific improvement in power, because at a higher speed of revolution a higher actual loss is unavoidable, is already refuted by these results. . . . In reality, high-speed motors represent the most important progress made in the building of motors and motor vehicles."

And again: "If special cooling for the piston be not provided for, increase of motor speed requires a diminution of the piston diameters."

Curiously enough, in no part of the book is there any mention of the limiting factor of piston speed.

He then goes on to trace how, in the early 80s, the normal steam engine revolutions of 150-200 per minute were increased to 400 or 500, and before 1890, 800-1,000 had been reached (news to me, I confess, and I wonder who did it). Further advance was stopped, mainly owing to trouble arising from improper valve design, and in adhering for many years to maximum r.p.m. of 1,000-1,500, designers were aiming principally at reliability. By 1912, however, 1,600-1,800 r.p.m. had become normal, with permitted increases to 2,100 r.p.m. for short bursts. He names German Daimler, Benz and Adler as pioneers in the development of the high-speed motor, but ignores the late 19th century advances of De Dion, who was already attaining 3,500 r.p.m., and the successful Bugatti light cars (Type 13) of 1910 onwards. He also adds that the high-speed motor had brought about the use of the gears to aid performance, and it is my suggestion that this first became current practice on the advanced Grand Prix cars of 1908.

The book is of the utmost technical and historical interest throughout—I wish I could find a copy to buy for myself.



CIRCUS OR SCIENCE ?

IN an article in "The Autocar" of December 27th last, Mr. Edward Castellain suggested, under the heading "What is Wrong with Motor Racing?" that racing could be made more popular in this country than it is if speeds were reduced so that shorter, more tortuous circuits could be used, and a "circus" atmosphere introduced. He considers that to organise races on lines which place in order of importance first the cars, second the manufacturer, third the driver, and last the spectator, is quite the wrong means of drawing the public, and he urges that race organisers and drivers "play to the gallery." His theme appears to be to slow up racing and turn it into a circus to make it a "national institution like cricket and soccer and horse racing," and then to develop it "on the proper lines." We do not like this theme. There is so much to be said for "the right crowd and no crowding," even if not interpreted in quite the Weybridge manner. Before the war Nazi Germany, Italy and France staged races which most certainly put science before the circus, and often staged them over fast, long circuits at which spectators had to be kept well away from vantage points on account of the speed of the cars, while often only a small field was entirely dominated by one marque. Any individual interest was national and not of the "local partisanship and local patriotism" which Mr. Castellain feels is so sadly lacking in motor racing, while these Grand Prix cars had surprisingly few gory accidents or phenomenal avoidances despite their performances.

Yet tremendous crowds inevitably watched these races. Big crowds attend motor racing in countries in which private motoring is properly fostered. In a country where car owners doodle along at 32 m.p.h. in town and country alike, in the middle of the highways and byways, pondering on having to pay £10 a year in basic taxation alone for the privilege of running the humblest of cars, they are not likely to drive good vehicles, or mend their own punctures out of sheer respect for good machinery temporarily disabled. So they will not universally flock to see better drivers handle very good machinery or enthuse over pit work which gets on a new wheel in half a minute. The "circus element" may appeal to such persons, but if it gives rise to enthusiasm for the sort of thing described in the following extract from an American Midget Racing paper, we may well be thankful that race organisers in this country, while bewailing small "gates," do put science before the circus and adhere to the doctrine that properly-constituted races improve the breed. We would congratulate Mr. E. Hawkesworth, of Derby, on sharing our views and putting his points before Mr. Castellain in a letter published in "The Autocar" on January 10th.

The article suggests the curious outlook which "circus-tactics" appear to encourage, appeared over Bob Bonnie's name in "National Auto-Racing News" of October 17th, 1940, and reads as follows ;—

". . . . The sun shone brightly on Safford Speedway Sunday, Sept. 29, as thousands of speed sport fans assembled to witness one of the most thrilling events ever held at this park. Many of the favorite, topnotch drivers were on hand for what promised to be a real speed feast.

"My trusty camera felt like part of me and was never more in the mood for 'shooting the works.' In the first lap of the second race Earl Horne and Red Page locked wheels and crashed the fence.

"I stayed at the bottom turn despite this, sort of feeling that if I stayed there I'd be rewarded. So I stayed. The next two events went off okey-dokey with thrills, but no spills.

"George Flint, an old acquaintance of mine and also a speedway shutterbug, and I, still stayed on the bottom turn, hoping that we could expose some film to be of interest to you. We were chewing the speed fat when a thundering roar told us that a fourth race was green flagged. About the sixth lap our shutters clicked simultaneously to take in Charlie Anderson bustin' down the inner guard rail in fine style.

"I immediately ran to the smashed car and shot that from several angles and by this time about a 150 crash-crazy fans were surrounding the wrecked car. I decided to snap a shot of this and to get in the clear. I got about 50 feet from the car, next to the inner guard rail, where it still was. I put my camera into action only to hear "Look out!" I spun around and looked straight into the grill of Chet Conklin's No. 7 coming at me, but fast. I don't know how it ever missed me, but I do recall giving a split second dive to the ground and getting covered with dust.

"That wasn't enough—a length of guard rail 'gone with the wind' knocked my camera out of my case. I quickly recovered it and got back in the game from a horizontal position. While lying on my stomach I 'shot' Conklin going right into the center of the crowd, throwing people this way and that and taking some with him for company. He scored a bull's eye by hitting Anderson's car, then slid over and stopped.

"I had all this recorded in my little speed camera. For five long years I spent every Sunday at a speedway, but never got such a lensful as this.

"What interesting pictures these would be! The expression on the faces of the many fans as they saw the speed wagon bearing down on them, then a picture of the crowd flying in all directions at once, falling over one another, screaming, and next the car on top of them before they could avoid it, then the car climbing over the other one, then lastly, the sickening picture of the car being lifted off two children as a third one came crawling out of the side. . . "

If the writer really enjoys sights of this sort, we suggest he could be usefully employed in waging warfare on the Nazi, as young men are doing in this country, whether they like what they experience or not.

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A.C. 2-litre, 16.40 h.p., 3-seater	Oct. 1927
A.C. 2-litre, 16.66 h.p., 2-seater	March 1926
A.C. 2-litre, 16.66 h.p., 4-seater	June 1934
A.C. "Ace" 16/80 h.p.	July 1937
Alfa-Romeo, 1½-litre supercharged 6-cyl. Charles 2-seater (1929)	March 1934
Alfa-Romeo 1½-litre supercharged 8-cyl. "Zagato" 2-seater (1932)	July 1934
Alfa-Romeo 2.3-litre supercharged 8-cyl. "Zagato" 2-seater (1933)	Aug. 1936
Alfa-Romeo 2.3-litre supercharged 8-cyl. 4-seater (1931)	Aug. 1932
Alvis 11.9 h.p., 4-cyl., "Firefly" saloon	Feb. 1933
Alvis 4-cyl., 12.60 h.p., 2-seater	July 1931
Alvis 6-cyl., "Silver Eagle" 4-seater coupe (1929)	Aug. 1931
Alvis 6-cyl., "Silver Eagle" 4-seater	June 1930
Alvis 3½-litre saloon	Feb. 1936
Alvis Speed Twenty Vanden Plas saloon	Feb. 1935
Alvis Speed Twenty Charlesworth saloon	Feb. 1934
Alvis Speed Twenty 4-seater	June 1932
Alvis 12/70 4-door saloon	July 1938
Ansaldo 2-litre, 4-cyl., o.h.c., 4-str.	Sept. 1924
Armstrong-Siddeley 20 h.p., 6-cyl. 4-seater	July 1933
Aston-Martin Mark II, 11.9 h.p., 2-4-seater	Jan. 1935
Aston-Martin Ulster 11.9 h.p., T.T. 2-seater	Oct. 1935
Aston-Martin Le Mans 11.9 h.p., 2-4-seater	June 1933
Aston-Martin International 11.9 h.p., 4-seater	Aug. 1932
Aston-Martin T.T., 11.9 h.p., racing 2-seater	Dec. 1931
Aston-Martin 11.9 h.p., 2-seater	Jan. 1930
Aston-Martin 2-litre Speed model	May 1938
Aston-Martin 1935 Ulster	Aug. 1937
Auburn 30 h.p., 8-cyl., supercharged 2-seater	June 1935
Austin Seven Boyd Carpenter 2-str.	Sept. 1930
Austin Seven "65" 2-seater	Jan. 1934
BENTLEY 3½-litre, 6-cyl., Vanden Plas, 4-seater	Nov. 1933
Bentley 4½-litre, 6-cyl., Park Ward saloon	June 1936
Bentley 6½-litre, 6-cyl., long-chassis saloon (1928)	Dec. 1936
Bentley 4½-litre Vanden Plas coupe	Aug. 1938
Bentley 8-litre sports 2-seater	April 1938
Bugatti 3.3-litre 8-cyl., Type 57 saloon	May 1934
Bugatti 2.3-litre 8-cyl., Type 55, supercharged, 2-seater	July 1932
Bugatti 2.3-litre, 8-cyl., Type 43, supercharged 4-seater (1930)	Dec. 1932
Bugatti 2 3-litre 8-cyl., Type 43, supercharged 4-seater	May 1930
Bugatti 3-litre, 8-cyl., Type 44, saloon	July 1928
CITROEN, Twelve f.w.d. saloon	July 1938
Crossley 20/70 h.p., 4-cyl., s.v. 4-str.	Nov. 1925
Crossley Ten, 1½-litre "Regis" saloon	Jan. 1936
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Fiat "Ardita" 17 h.p., 4-cyl., saloon	Feb. 1934
Fiat "Balilla" 10 h.p., 2-seater	Jan. 1935
Fiat 6 h.p., Type 500, coupe	March 1937
Frazer-Nash 6-cyl., 1½-litre (Blackburn) 2-seater	July 1933
Frazer-Nash 4-cyl., 1½-litre T.T. Replica push-rod o.h.v. 2-3-str.	Nov. 1931
INVICTA 4½-litre low chassis, 4-str.	March 1931
Invicta 4½-litre Weymann saloon	June 1929
Invicta 4½-litre saloon	Dec. 1929
Isotta-Fraschini 45 h.p., 4-seater	Oct. 1926
LAGONDA 2-litre, 4-cyl., twin o.h.c. 4-seater	Jan.-Feb. 1928
Lagonda 2-litre, 4-cyl., twin o.h.c. supercharged 4-seater	Oct. 1930
Lagonda 4½-litre, 4-seater	May 1936
Lagonda 4½-litre Rapide 4-seater	May 1935
Lagonda 4½-litre, 4-seater	Jan. 1934
Lagonda Rapier 10 h.p., 4-seater	Sept. 1934
Lagonda 16.80 h.p., 6-cyl., 4-seater	Jan. 1933
Lagonda 3-litre, 6-cyl., 4-seater	March 1932
Lagonda 2-litre, 4-cyl., twin o.h.c., 4-seater (1928)	March 1931
Lancia Aprilia, Type 238, saloon	June 1938
Lea-Francis 1½-litre supercharged T.T. 2-seater (1929)	June 1934
Lea-Francis 1½-litre supercharged special T.T. 2-seater	Sept. 1933
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Mercedes-Benz Type 500, 5-litre, 8-cyl., supercharged, 2-seater	Nov. 1934
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M.G. Midget "P" 2-seater	Aug. 1934
M.G. Midget "J3" supercharged, 2-seater	May 1933
M.G. Six Mark J, saloon	Aug. 1930
M.G. Midget Double-Twelve racing 2-seater	June 1930 & Aug. 1930
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Riley Nine, 4-seater	June 1931
Riley 16 h.p., Big-four Kestrel saloon	June 1938
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Talbot "105" sports saloon	April 1934
Talbot 3½-litre saloon	March 1936
Talbot Ten "Rally" 4-str.	Oct.-Nov. 1936
Talbot "105" Vanden Plas 4-str.	Nov. 1932
Talbot "90" 4-seater	Nov. 1930
Talbot Ten sports coupe	June 1938
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