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The **Cyclecar**



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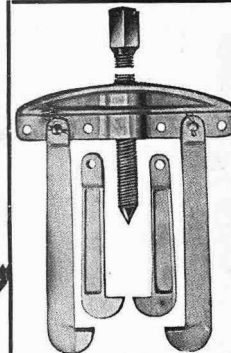
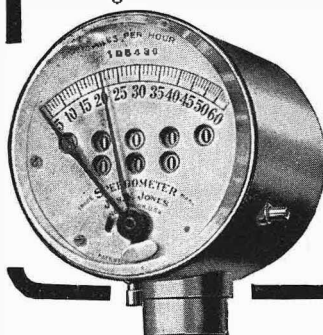
I would strongly advise every motor-cyclist who contemplates competing in reliability trials, and who wishes to put up a good performance, to invest in a "Jones Trip," as no other speedometer will serve him so well.

(Signed) J. BROWNE.
Captain Dublin and Dist. M.C.C.

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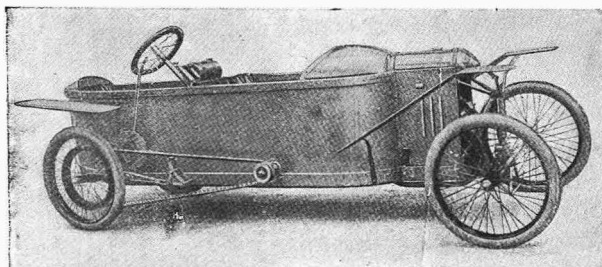
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The Cyclecar



ON BIRDLIP HILL.

THE CALL OF THE ROAD.



TWICE in a week I have dipped in and out of the gorgeous valleys of the Cotswold country, buffeted by gales of wind and storms of rain and snow on the bleak wolds, and coasted down those glorious winding passes revealing views of marvellous extent and beauty, range upon range of oddly-shaped hills leading to the snow-capped mountains of mid-Wales. There are few finer touring districts in England. On the first occasion I set out, in company with others, on an expedition revising the route of the Cyclecar Club trial, and on the second in the trial itself. Each was an expedition against time, which seemed a tremendous waste of misplaced energy, for instead of cramming 160 miles of driving in the day, twice the time would not be too much to expend on exploring this country of beautiful prospects and quaint villages.

My experiences in the two trips were varied and may not be uninteresting to others. The engine had been overhauled, the valves ground in, and the timing of the valves and the magneto altered, the latter being retarded slightly to give more power at slow speeds. A new pair of Pedley's belts had been fitted—not that the Lycetts were done for, after only 1500 miles driving, but with a desire to run a reserve pair in, for new rubber belts have a considerable amount of stretch to be taken out of them. This first stretching of the belts is a drawback of this type of drive. Rubber being what it is, it would be useless for the makers to take out the stretch first, and the only way to do this is on the machine itself and with the fasteners in position. When run in for

THE JOTTINGS OF JOHN GILPIN, JNR.

a few hundred miles they will not regain their elasticity to any extent, and even if they did, this would only make a tighter fit on the pulleys which the act of putting on would overcome.

Before Oxford was reached the belts were very slack, and slipping on the hills. The engine was not run in, and we had to make the ascent of Dashwood on the low gear. Beyond Enstone, following the course of the trial we missed the right road, and dipped down the steepest track, worn by water-courses and strewn with stones, that ever a vehicle of any type ventured to traverse. I was thankful that the brake shoes had been relined with Ferodo, a combination of asbestos and woven wire, the gripping power of which is something wonderful, for the belts were slipping too much for the engine to hold the machine in check. The road out of the valley rose with almost equal abruptness, a gradient, I should say, of 1 in 4, and here the slipping belts were of actual assistance, for we crawled up very slowly with the engine turning over at just sufficient number of "revs." to prevent "conking" out. At the top a plug, of new and untried make, gave out, the central electrode turning round and making too great a gap between the points.

About 80 miles had been covered when the stretch of the belts prevented further progress. This was at the watersplash at Broadwell. Coming upon it suddenly, and not knowing the depth of the water, I slowed down, crawled through it, got very wet, and came to a standstill on the steep rise that followed. Racing the engine until the rubber began to

THE CALL OF THE ROAD (contd.).

burn proved useless, and there was nothing for it but to conclude that no more stretch could be taken out of the belts. We slipped them off and put on the trusty Lycetts, an operation occupying about two minutes, and sailed away at full speed. The Lycett belts had run 1300 miles without stretching after the initial shortening, and are still tight.

The next point of interest of this trip was a trial of the machine up Birdlip, with the Pedleys admirably shortened at West's Garage at Cheltenham. The engine was pulling badly, either from faulty carburation or ignition trouble, missing on one cylinder every now and then, and we "conked" out. On a second try, without the passenger and with new plugs, the ascent was managed quite easily, but it was evident that more tune was required, especially as the gear had been raised in a rather peculiar manner. The Pedley belts are fully $\frac{1}{8}$ in. wider than $1\frac{1}{2}$ in., and consequently take the top of the front pulley, but on the somewhat wider back pulley the belts "bottomed." A rough calculation subsequently showed that the gear was about $\frac{7}{8}$ to 1. No other hills that were tried gave any trouble to ascend, but we omitted Sudeley, where I met my Waterloo the following Saturday in the Cyclecar Club trial.

To cut a long story short, many hours of hard work, assisted by the expert mechanic at Messrs. Coxeter's garage at Oxford, failed to obtain the desired tune. We found the float punctured, but could not detect the leak, nor obtain another float in the city. The magneto persistently cut out one cylinder at low speeds, which also made it difficult to start up. The trouble was not due to a split distributor ring, as previously diagnosed, but failure of the wire earthing the magneto to the frame. The morning of the trial was marked by half-a-dozen trials with alternately starved and flooding jets, but at length, running very irregularly, we got away.

Carburettor troubles were quite a feature of the trial, and I think the very high wind prevalent during the day might have been responsible. It is feasible that with the exposed carburettor position

on air-cooled engines such a blast of air would enter the auxiliary air port as to completely upset the mixture. I was unlucky enough, too, to fill up with petrol containing most decidedly a proportion of paraffin, for the mixture would not dry on the hands, and left them greasy with a strong smell.

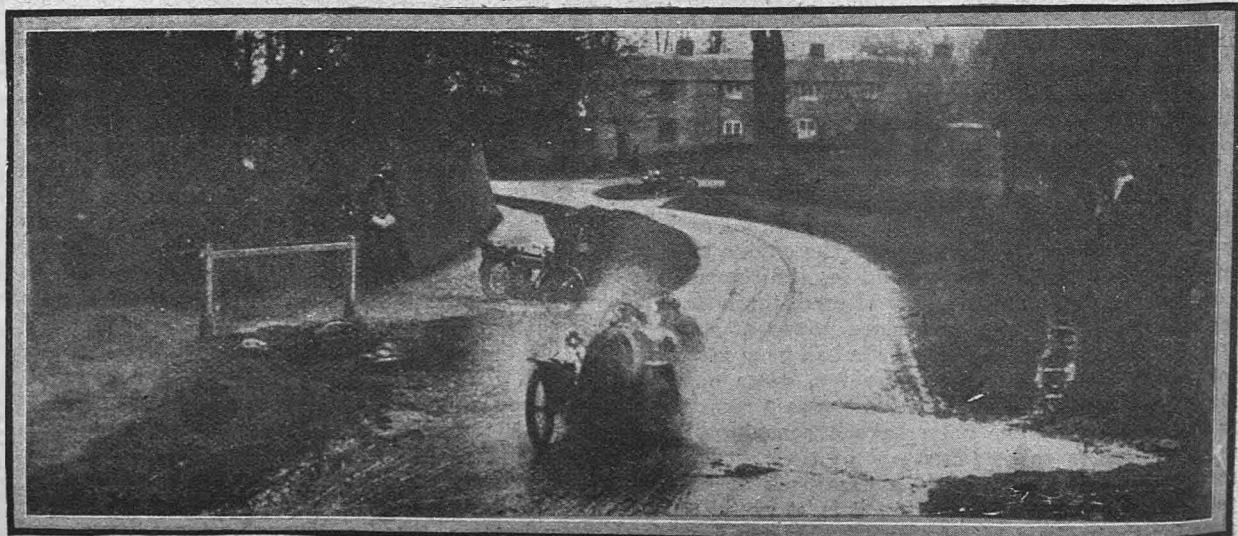
There was ample opportunity for testing belt drive during the trial, for the roads were soaked with rain, and Broadwell watersplash ensured the belts getting still wetter. There was no sign of slipping at any time, nor after 300 miles is there any sign of further stretch. I took the watersplash at full speed, and found that we did not get nearly so wet as when taking the water slowly on the previous occasion.

Except for Sudeley and Birdlip, which were too much for an engine running most irregularly, we had no further trouble on the hills, and the way the machine made up time (one stretch of the magnificent lonely highway between Cheltenham and Oxford being taken at the rate of $1\frac{1}{4}$ minutes for $9\frac{1}{4}$ miles) showed that so long as the "revs." could be maintained there was nothing the matter with the power unit. In fact, we finished the course one minute ahead of schedule after being over half an hour behind leaving Tetbury. High speed on level roads and lack of power on hills also points to over-advance of the ignition. It should be noted that the other G.N., geared 8 to 1 on bottom, made light of hills like Sudeley and Birdlip, while one of the Duos also ran up both at a gear approximately the same, with plenty of power in reserve.

Two ideas in connection with the trial might be mentioned. The scuttle-dash type of body makes it difficult to carry a clock. I got over this difficulty by placing a watch in a transparent celluloid case, and slinging it between two arms of the steering wheel on insulating rubber tape, pieces of which, stretched across the wheel, preventing the watch swinging to and fro with the motion of the springing.

The other idea was in marking out the route on a small scale map, with bold figures denoting schedule time at various points, mounting the map on thick cardboard and waterproofing it with a sheet of transparent celluloid.

JOHN GILPIN, JNR.



The G.N. coming through the watersplash at Broadwell at speed. The back wheels are submerged to the axles.

OBTAINING INCREASED POWER.

How Greater Efficiency may be Obtained from the Engine, Transmission and all Frictional Parts, with More Power on Hills and Greater Flexibility at Slow Speeds.

By A. W. JUDGE, A.R.C.Sc., Wh.Sc.

This is the first instalment of a very interesting and practical article, showing how power is lost and how such losses may be recovered or eliminated by a knowledge of their causes, with suggestions and expedients for obtaining greater efficiency and power.

Part I.—Why We Want Increased Power.

ALTHOUGH the majority of cyclecarists and motorists in general are more or less conversant with some of the advantages of a well-tuned and carefully-maintained machine, many of them do not fully realize the advantages derived, or are prevented in some measure from realizing by a lack of sufficient knowledge upon the subject. These points are fairly evident when one notices the condition and behaviour of some cyclecars and small cars seen upon the public roads, which, to the initiated, are capable of big improvement. Not only are the earlier models and ancient types of car capable of improvement, either through neglect, bad driving, or faulty design and material, but it is somewhat surprising to owners of quite recent makes to learn that their cyclecars are all, in some measure, open to improvement in many respects.

Defective Design.

Unfortunately, a few of the present-day types are designed upon wrong lines; some, again, are turned out to a standard pattern by the makers, and any defects which may develop in these types would prove expensive to rectify owing to alteration in the manufacturing plant, etc. Again, other cars are turned out at such a rate that individual tuning up and attention is out of the question. Finally, faulty design and insufficient testing under lengthy and trying conditions are other reasons why some of the modern types are capable of wide improvement, also the fact that new and inexperienced firms are participating in the present boom.

After a season's use, or misuse, as the case may be, the machine as a whole becomes slightly out of tune and requires attention, so that the present remarks are applicable to practically all cyclecarists in general.

Naturally, the first question asked, when commencing to talk about increasing the power, tuning up, etc., is: why is it necessary to worry about obtaining rather more power and in generally maintaining the whole cyclecar and engine as efficient as possible? There is a vague notion with some that the only effect of greater efficiency is a gain in speed—an advantage of doubtful merit to the careful and considerate driver. That this is a wrong notion in some respects the writer will endeavour to explain and to point out the really marked benefits of an efficient model. In the first place, the effect of increased power in a given machine means a greater reserve for hill-climbing purposes, and will often enable one to just surmount an otherwise insurmountable acclivity instead of performing strenuous acrobatic tricks for the final few yards or so, with attendant discomforts, etc. When traversing bad roads, with gritty and loose surfaces, with due consideration to the tyres a reserve of power will

prove useful under such circumstances for climbing inclines which, with a good surface, could just be surmounted. Further, sooner or later whilst upon the road, hills will be encountered which in themselves necessitate careful driving under good road and weather conditions in order to surmount, but with a high opposing wind, or in a storm, or even at night, when unable to utilize the power to its best advantage, increased power is needed.

There is often an occasion when an extra load in the shape of luggage, spares, petrol, oil, etc., or even an additional passenger, is required to be carried. This overloading does not appear to make much difference upon the level road to average speed, but directly a hill is encountered the need for extra power will be felt, as weight makes all the difference upon hills, but little upon speed. Another benefit of a well-maintained machine is that a hood and wind-screen can be fitted, where otherwise hardly sufficient power would be obtainable to overcome the increased wind resistance, or, further, to utilize a screen and hood under strong opposing winds and rain.

Greater Flexibility.

Other advantages which accrue from increased power are quicker acceleration in traffic, after slowing down, or around corners upon hills, and, generally speaking, more power is obtainable at lower speeds, which is an extremely useful factor. An under-powered machine, or one which has become somewhat degraded in power through inattention, has to be overworked on occasion, and the wear and tear and petrol and oil consumption all increase rapidly as a consequence, and sooner or later trouble is sure to ensue. It is, therefore, fairly obvious that a well-tuned machine will be more economical in petrol and oil, will wear much longer with attention, and will possess a reserve of power for the numerous occasions when it is required.

Another reason might be mentioned before concluding this portion of the subject for urging the owner to obtain the maximum output from his car, and to maintain same, and it is that, when on tour, and at times when journeying for pleasure purposes, one is immune from worry and fatigue and roadside repairs, and the liability of breakdown is reduced to a minimum. Once a machine is made efficient, it is much easier to keep it so.

A Loss of 35 Per Cent.

The next consideration is the limit of improvement, that is, how much a machine is capable of improvement, and whether it is worth while worrying about it, if only of small importance. Of course, the degree of improvement will depend a lot upon the design and condition of the machine as a whole; but, in order to give the reader a general idea of the possible saving of lost power in a small car,

OBTAINING INCREASED POWER (contd.).

Diagram 1 has been drawn, and represents the loss of power in an average cyclecar between the engine and the road wheels. The actual area or space occupied by the rectangles represents to scale the relative amounts of the engine's power absorbed or lost by the various parts of the mechanism mentioned in the diagram. Thus we see that of the whole horsepower developed by the engine, only 65 per cent., or about two-thirds, ever reaches the road wheels for propulsion purposes, the rest being lost in overcoming the friction and other forces in the engine itself, the gears, clutch, drive, etc. It is this lost 35 per cent. of the whole power that is partially recoverable, so that it is easy to understand now that it is quite possible to reduce this lost power, which is over a third of the whole power developed, and so increase the efficiency.

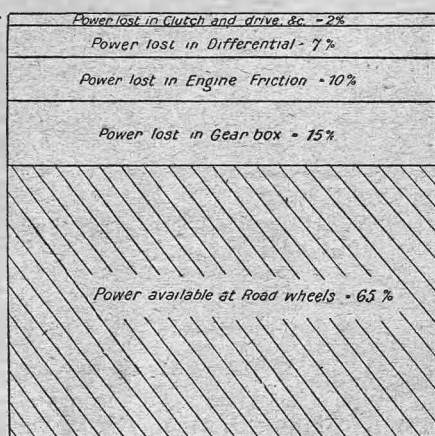


Diagram 1.—Showing how the power developed by the engine of a cyclecar is used up and absorbed.

The case appears even worse, so far as power loss is concerned, when we also consider that, out of the 65 per cent. of useful power delivered to the road wheels, a fairly appreciable amount is lost in overcoming the road resistance, road vibrations, and wind resistance, so that a still smaller surplus is left for hill-climbing and speed purposes.

The Engine.

When considering the question of increased power, it is usual only to mention the engine itself, and to devote attention to its improvement; but it will, perhaps, be a small matter of interest to mention that increased power results from careful attention to such factors as the clutch, transmission, springing, tyres, brakes, wind resistance, and several other items—in fact, to the cyclecar as a whole. The engine, however, being the sole power source, is, perhaps, the most important factor to consider, and, therefore, claims premier attention in these notes, which are written with the object of showing how the losses of power in the various parts may be reduced or eliminated by a knowledge of their causes, and with practical suggestions and expedients for obtaining greater efficiency and power.

It is surprising to learn what a surplus of power can be obtained from the engine itself, knowing exactly how to produce it. Taking the engine or power unit as a whole, when working under bad conditions as it would be when out of tune, misused and wrongly driven, it will be seen from Diagram 2 that, on the average, the engine is only giving out about 50 per cent., or half of its possible power. When, however, a good engine, as sent out from the works, or in the

hands of an experienced and careful driver, is considered, it gives out about half as much power again as a bad engine, working under adverse conditions of carburation, ignition, etc., and, finally, when both are well tuned up and improved to the limit, another 25 per cent. of the power of the bad engine is obtainable. This diagram has been drawn from the results of actual experiments upon motor engines, and is by no means exaggerated. From it, one may conclude that the power of a badly-worked engine can be nearly doubled, and that of an average engine, under ordinary conditions, increased by about a third by skilful alteration and improvement.

Compression.

It is proposed now to deal with the engine itself first, and with its necessary adjuncts, the ignition, carburation, exhaust, etc., afterwards. In the first place, one of the chief essentials of an engine should be a good compression and a proper compression ratio. Dealing with these in turn, the compression pressure in the cylinder should be such that, on cranking the engine around to the top of the compression stroke, the pressure in the cylinder should not gradually leak away, but keep up to its full amount for some minutes. No engine will work well with a poor compression, and so the various places of leakage must be examined and remedied. To ascertain a leak of compression, the valve caps, sparking-plug joint and also the porcelain (as leakage often occurs here),

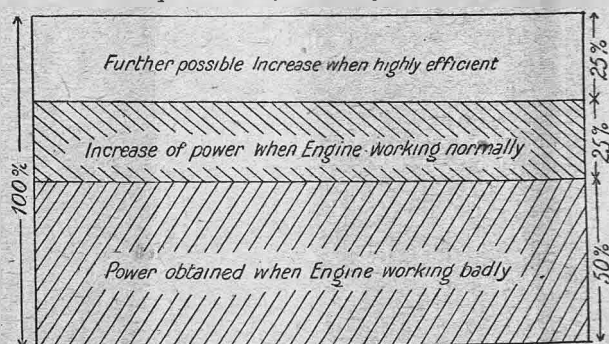


Diagram 2.—Showing to scale the amounts of power developed in an average engine working under different conditions, and the degree by which it is possible to improve its efficiency.

and the compression tap top and joint may be smeared with engine oil or glycerine, or, for fine work, a soapy solution, and where the leaks occur bubbles will appear when the engine is cranked over.

To test the exhaust and inlet valves for leakage, the inlet pipe or exhaust pipe may be placed in a glass of water, and if the valves are a bad fit, air bubbles will appear in the water. The remedy for this is, of course, grinding in. A frequent source of loss of compression is at the seatings of the overhead type of inlet valve, which is generally held down by a dome or cap, so that leakage may occur, not from the valve seating, but from the valve casing seat or joint itself. The only other place at which leakage can occur is past the piston rings, and these are worthy of careful attention. Often a good compression may be mistaken for a tight piston ring, which causes a lot of friction between itself and the cylinder wall, causing increased wear in the walls.

The slots in the piston ring, when it is taken off the piston and tried in the worn part of the cylinder,

OBTAINING INCREASED POWER (contd.)

should very nearly close up (to within about 1-64th in.), and it is well to note that stepped or spiral rings are better, although dearer, than plain, slotted rings. A piston ring wears the piston ring slots mostly at the edges, so that the sides become tapered, as seen in Diagram 3; hence, when fitting a new ring, the slot should be turned parallel, as it is essential that the piston ring should be a good fit side-ways in the groove, and that the slots do not work around into line. The writer is of the opinion that one good, fairly broad step ring, of not too great a spring, and one fairly weak ring, more to act as a guide, are all that is required for a good compression with minimum cylinder friction. It is essential that the top ring, which is subjected to the greatest temperature and wear, should be as gastight as possible, especially in the type of piston with the gudgeon pin between the top and bottom ring, as leakage past the top ring will escape in turn through the gudgeon pin joints into the interior of the piston. The piston itself should be a fairly good fit in the cylinder, with a certain small amount of clearance for expansion, usually about .006 to .009 in.

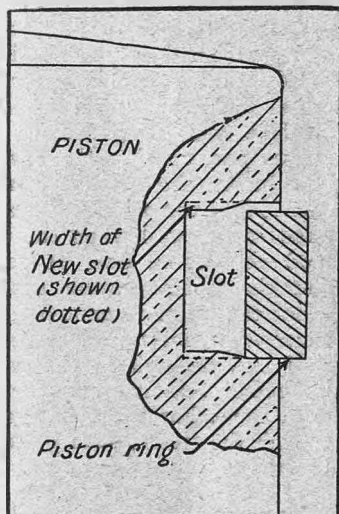


Diagram 3.—Showing how the piston ring slots wear, and how the new slot should be turned for the new piston ring.

Whilst upon the subject of pistons, it might be mentioned that quite appreciable power increase can in most cases be obtained by the use of lighter pistons and connecting rods, such as the welded steel pistons advertised; but one warning is necessary to prospective users of these—the strength of a welded joint is an uncertain quantity, as scientific tests have recently proved, and seldom exceeds more than three-quarters of that of a similar unwelded joint, and so, when subjected to alternating stresses, as in a piston and connecting rod, is apt to break down through metal fatigue, unless carefully made and designed. Also, if lighter parts are fitted, although the engine speed and power go up, the balance of the engine is made incorrect, and, in some cases, will need rebalancing by drilling judiciously a little of the material from the weighted side of the fly-wheels.

Having surveyed the factors inductive to a good compression, we come next to the value of a proper compression ratio. It is well known that the efficiency and power of an engine increase as the compression pressure is raised to a certain limit, which is about 100 lb. per square inch, after which pre-ignition, or fringing of the partially-compressed charge, occurs with air-cooled types of engines. Now, although most makers have experimented with different compressions, and have found, by trial, the best compression which suits their particular engine, yet, in some cases,

it is quite possible, by raising the compression, to obtain more power. For this purpose it is worth while, in cases of doubt, to try, by the simple means suggested in Diagram 4, the effect of variation of the compression, by fitting deeper valve caps, by larger-headed valves, or, as the writer has seen successfully used, aluminium caps upon the piston tops, securely fastened, so that they cannot come loose.

In some cases, however, a lowering of the compression will produce beneficial results upon the power; hence the variable compression device upon the valve cap is suggested as an expedient. In order to test the degree and goodness of the compression more accurately, a pressure gauge, reading to 100 lb., is needed, and, in the case of multi-cylindered engines, it is extremely useful in showing whether all of the cylinders have equal compressions, as they should have, for equal explosion pressures, and for obtaining the same carburation conditions in each cylinder, and other conditions leading to uniformity of the engine turning effort. There are other fairly well-known ways of reducing or increasing the compression, as by fitting a fibre or metal liner between the crankcase and cylinder flange, remembering at the same time to adjust the valve tappets and petrol pipe connection, or by fitting a longer or shorter connect-

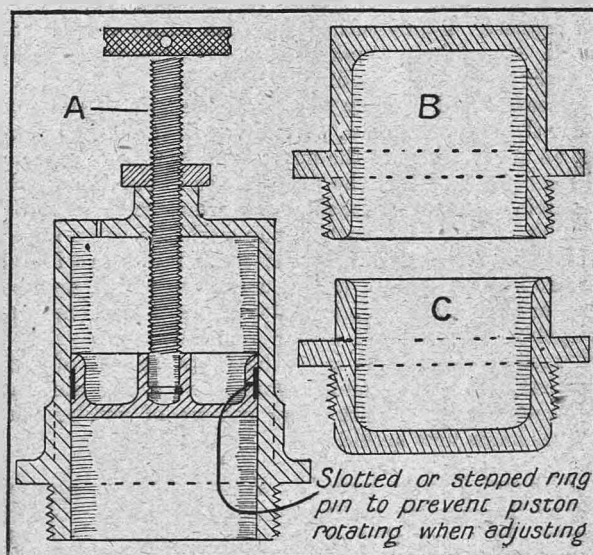


Diagram 4.—Varying the compression. (A) Variable valve cap for raising or reducing the compression at will. (B) Valve cap for reducing the compression and (C) for raising it.

ing rod, which will, however, cause the piston to traverse a small part of the unworn cylinder, or by fitting a longer or shorter piston as measured from the gudgeon pin to the top of the piston. By experimenting upon these lines, it is quite probable that some increase in the power will be obtained, but the range of alteration of the compression space either way should not exceed more than about 30 cubic centimetres for a 500 c.c. cylinder.

(To be continued.)

The next article in this series deals with the operation of the valves, frictional losses in the engine bearings, and the effect of carbon deposit.

CROSS-COUNTRY COMMENTS.

The Blissful Ignorance of the New Motorist—Tyre Creep—Cyclecars in a Watersplash.

THE ignorance of the majority of new motorists is almost beyond the comprehension of those already possessing some smattering of knowledge on these things. When in Coventry the other day, a manufacturer showed me a letter from a customer, who asked him if it did the machine any harm to wheel it backwards when the gear was in neutral position and the engine was not running. This just gives an idea of the kind of people to whom the new motoring is appealing, and for this reason it would be as well if the most explicit instructions were issued in pamphlet form, and given away with each cyclecar. These instructions cannot be written in too simple language, and a pamphlet such as I suggest really would save a great deal of correspondence, and very likely trouble, in the future. I have received such a little booklet from the Morgan Motor Co. It includes a number of useful hints and tips for drivers of machines turned out by this concern, and will be sent free on request. I only wish it was far fuller than it is, and I cannot help thinking that private owners who have had a few thousand miles experience with various cyclecars could, if they possessed the gift of putting their thoughts on paper, write a very interesting booklet on the troubles of the novice and how to overcome them. What is more, the experiences of one man with a particular make of machine are almost certain to be similar to those of another man with the same make of machine, because the same small faults are found to crop up again and again, a remark which applies not only to cyclecars, but also to cars and motor-bicycles. The private owner generally manages to overcome them; that is, if he is possessed of any mechanical instinct, and it would save a vast amount of trouble could he let other owners of similar machines know how he did so.

* * *

Although I run a very fast monocar, I have not yet found it necessary to fit security bolts to any of the tyres. It is true that on the first back cover I used, if I drove all out for five miles, the valve used to assume an oblique angle with the rim, showing that the cover had crept slightly, but it never got so bad as to pull out of the tube. I find, too, that the fit of the covers varies considerably. I am now running a special R.O.M. 26 in. by 3 in., which fits my 26 in. by 2½ in. rim, and inside is a 3 in. tube of very massive proportions. Before fitting these the rim was blacked, and now the cover is as tight as it can be. The maker's instructions are to inflate it dead hard, and I cannot make the valve creep, however fast I drive. The advantages of doing away with security bolts are obvious when one has to repair punctures, for the bolts have a nasty knack of getting in the way and their canvas ends almost invariably shrivel and give trouble. As regards the front tyres, these have done over 2000 miles with but one puncture, and they seem good for another thousand at least. Here again it is wise to blow them up dead tight, as the strain in cornering would otherwise tend to pull

them off the rims. Indeed, this happened on one occasion and caused the solitary puncture to which I have referred. The test for determining the correct pressure of tyres is to see that there is very little give in them as the machine is shaken from side to side. The tyre should stand straight up on its walls, as it were, and there should be no cushioning effect on the ground when the machine is unladen. If the tyre is slack it is quite easy to understand what a tremendous strain there must be on the walls, the rubbing set up by the bumping of the machine over rough roads soon disintegrating the canvas and causing the cover to burst in the wall long before the tread is worn out. In this connection it is a curious thing that many motorcar covers burst in the wall when the tread appears to be perfect, this being due, of course, to under-inflation and the disintegrating action already mentioned. What can be more annoying than to have a non-skid cover apparently perfect in the tread burst at the wall and necessitate the whole being scrapped. I remember that last summer first one back tyre and then the other burst in the wall within ten miles, though the treads were perfect. The funny part was that the tyres had been put on the same day!

* * *

I was one of a little band of spectators which saw all the cyclecars in the recent trial take the watersplash at Broadwell, near Stow-on-the-Wold. Being responsible for the inclusion of the splash, it seemed possible to me that many machines might have come to a standstill on the gradient following the water, but in these pious hopes I was disappointed. The machines one and all made a magnificent show; the belt-driven types, notably the G.N.s and Duos, splashed through the water at 20 and 30 miles an hour, and appeared to have no difficulty on the incline following. Perhaps it was their speed that pulled them through. Mr. W. Cooper on the Humberette I noticed took the splash very gingerly indeed, probably owing to the sharp bank on each side. Even then the back part of his machine seemed to get an uncommonly nasty jar. Two hundred yards above the splash there was a very sharp turning to the left, where the road was banked the wrong way. All the machines appeared to be driven very nearly all out, and the way they sped round this tricky turning was a wonderful testimony to their stability. The most amusing episode at the splash was undoubtedly the performance of the driver of a Morgan, whose passenger, seeing the watery expanse ahead, at once put up the hood and screen, and reminded us all of a sailor manning a ship by putting up the sails. When the last batch of competitors came through, the splash must have been nearly a foot deep in the centre, for we had wickedly put down the sluice gates on the off-side of the splash and allowed the water to back up in the road. However, despite our efforts the cyclecars proved too much for us.

McM.

WEAK POINTS IN CYCLECAR DESIGN.

Official Results and Awards and Judges' Report of the Cyclecar Club Non-stop Reliability Trial.

MARKS LOST AND THE AWARDS.—THE JUDGES' REPORT.

Name.	H.P.	Machine.	Class.	Performance.	Marks Lost.	Remarks and Awards.
J. Munday ...	5-6	A.-C.	750 c.c.	Non-stop	8	Silver plaque.
K. Kreitmeyer ...	6	Zebra		—	47	Filled up with oil; arrived early Oxford.
V. Wilberforce ...	8	G.W.K.	1100 c.c.	Non-stop	0	Silver plaque; made fastest and slowest climbs.
J. T. Wood ...	8			do.	9	Bronze plaque.
H. F. S. Morgan ...	8	Morgan		do.	82	Bronze medal.
H. R. Godfrey ...	8	G.N.		—	51	Petrol pipe broke; ran out of petrol.
R. Bamford ...	8	Humberette		—	53	Failed Sudeley and Birdlip.
A. W. Lambert ...	8	Morgan		—	57	Plug trouble.
Vernon Busby ...	8			—	73	Tyre came off at foot of Upton Hill.
A. C. Armstrong ...	8	G.N.		—	83	Failed on Sudeley, Birdlip; magneto trouble.
J. W. Spencer ...	8	Morgan		—	111	Tyre trouble.
L. Martin ...	10	Singer		—	153	Failed on Sudeley; had carburettor trouble.
A. P. Bradley ...	8	Duo		—	177	Carburettor trouble; ran out of petrol.

The following retired:—H. W. Wilkinson (G.W.K.), mistiming troubles; W. Cooper (Humberette), keyway on-cardan shaft shifted; L. Cass (Gordon), broken ball thrust on clutch; Capt. H. Clarke (Invicta), tyre trouble; J. Averies (Averies), engine trouble.

Conditions. The first trial organized by the Cyclecar Club was run over a course of about 150 miles on Saturday, 15th March. Full particulars of the route and rules have already been issued. Briefly speaking, the course was from Oxford to Cheltenham via Stow-on-the-Wold, Sudeley Hill, Birdlip Hill and back through the outskirts of Gloucester, Stroud, Minchinhampton, Cirencester and Witney to Oxford. The trial was a test of reliability and flexibility on hills, and it was run in two classes for 750 c.c. and 1100 c.c. machines which had to average 17 and 20 m.p.h. respectively. Failure on any hill lost 10 marks, tyre stops 2 marks, driving stops 3 marks, and filling up with oil and water 3 marks. The route chosen was not a severe one, and the roads were in good condition; one water-splash was included, but with the exception of Sudeley, Birdlip and Frocester, and the Nailsworth "W" there were no severe gradients and the surface was excellent. In spite of this there was a large percentage of failures on every hill, due, in many cases, to what can only be attributed to carelessness in construction, as with the exception of a stripped key-way in the Humberette there were no very serious mechanical breakdowns. The slow hill-climb brought out the fact that more than two gears are desirable, for several machines had difficulty in climbing Birdlip, although in the case of the G.N.s they possessed an excellent turn of speed on the level.

Weather. The weather was fairly satisfactory, although a very cold and strong wind was against the cyclecars both out and making the drive very trying. The stopping effect of the wind was very noticeable, and if the weather conditions had necessitated the use of a hood this effect might have become somewhat painfully obvious, for many did not find it easy to keep up to time. The wind may have been responsible for the loss of some arrows, as the marking of the road was not entirely satisfactory, several competitors losing the course, and taking wrong turnings.

Engines. The judges made a very careful study of the engines in the various cyclecars which were entered for trial, and also of all their working conditions, careful notes being taken of their condition and apparent power. These data are quite instructive. In several cases the small capacity machines were well up to the larger machines, and it would appear that many of the latter were influenced by bad fittings, so that their power completely fell off on steep gradients.

Cooling. The cooling of the different types of engines is particularly interesting, and in nearly every case it was not as satisfactory as it might have been. All the water-cooled machines boiled badly on Birdlip Hill, and the observers were noticed holding open the bonnets from which came a great deal of heat, burnt oil, and smell. This cannot be put down to the slow speed, for-although when the wind was with the competitors the cooling was naturally poor, in the case of some of the water-cooled machines at speed the cooling was still insufficient to prevent boiling, and it would appear that the makers have still to learn from cars in this respect. If long, small pipes are used the radiator should be large and the pump effective, but it is distinctly desirable for the pump cooling to be assisted, if possible, by a thermo-syphon which to a great extent increases in efficiency with temperature, and therefore prevents the boiling point being reached if properly arranged. On several occasions machines failed, due to overheating, and if air-cooled engines are too much closed in or are unprovided with fans there is no doubt that the power drops badly on any long gradient. Several drivers added extra oil tanks to their machines, and provision should certainly be made for completing a 150-mile course without any trouble, especially in the case of air-cooled engines, which are far more wasteful in oil.

Fittings. The carelessness in fittings was responsible for most of the failures. On almost any car the existence of the carburettor, petrol pipe, oil pipe, and exhaust pipe can be almost forgotten, but not only in many cases were these details poorly made and the unions badly fixed, but the actual fittings were poor. In a cyclecar the frame and engine support is relatively flexible, and this means that very special care must be taken with the piping arrangements. It is not sufficient to bind the pipes with tape: they should be coiled to assist in springing, and even fitted flexibly where possible. A good filter should be fitted in an accessible position, whilst an easily cleaned or blown-through carburettor would be greatly appreciated.

This was excessively poor. A cyclecar is placed low to the ground, and the driver is in the best position for receiving dirt in his face, and if the road had been wet some of the competitors would have been unrecognizable at the finish. It is far better to use a wide, flat guard than a narrow, curved one, which looks

CYCLECAR TRIAL JUDGES' REPORT (contd.).

smart in fine weather. Best of all is a broad curved wing and valances, which should be fitted as standard, with turn buttons. This also applies to underscreens, which are not strongly enough fixed, and which do not extend far enough back to the rear in the case of the four-wheelers. On the Morgan and other three-wheelers which are capable of good speed, the protection is bad, and one glance at the rear wheel shows the springs and stays covered in mud and the chain well polished, indicating friction and how much work there is in keeping them free from dirt. Detachable chain cases of leather and detachable mudguards and mudflaps would be an improvement, as it is not hopeful to see competitors smear their chains with lumps of grease. On many cyclecars a hood is really not necessary, but a small curved windscreen is a great comfort and also protects the seats.

Engine Protection.

In cyclecars where the engines are exposed in front there is no possible excuse for their being placed open to rain, grit and mud. This causes wear of overhead valve gear, and is very liable to jam carburettor slides. If the engine is closed in it also helps to supply the carburettor with air at a more or less equable temperature, and this is far more easily done in the case of water cooling, which also enables a small engine to run satisfactorily at a higher compression and at a more constant output.

Ignition Appliances.

These should be enclosed with the engine, and it is very bad to place the magneto right in front, open to wet and dirt, to protect it against which it is covered in grease as an attempt at waterproofing. If the magneto drive is also exposed, there is nothing to prevent bevels or chains being utterly ruined and all adjustments spoilt by the access of grit and dirt.

Carburation.

A great many competitors put down failure to carburation, but much of this can be ascribed to overheating, as it was very noticeable that failures due to this cause gave no indication of incorrect mixture when the speed was more than 20 m.p.h. It is far more difficult for an air-cooled engine under these conditions to maintain its power.

Springs.

The question of springing is exceedingly important, and in this respect, with the exception of the G.W.K. machines, the three-wheelers were distinctly best. A great many of the public are under the impression that a light vehicle will necessarily wear badly, but the reverse is the case if sufficient care is taken in the design. It is very important to use springs which have not a very definite period, and if long springs are used to separate out heavy road shocks, it must be remembered that, being light, the vehicle will be subject to high-speed vibration, which can only be damped by quick-acting springs which are supplied by shock absorbers. One very obvious way out of this difficulty is to fit larger tyres, and this applies to the majority of the machines. The seats should be well padded, or if of the hammock variety this is not so important. It would appear that security bolts are necessary if the spokes are properly tied, and discs are rather liable to upset steering. Several machines have no proper axle-cap protection for the rear wheels, and this is very important. A lipped hub over the front wheels was noticed on some machines, an example worth following.

Steering.

Direct steering, as used on most machines, is perfectly satisfactory, and, although slightly more shock is felt than with bobbin steering, it is, perhaps, less tiring on a long drive, especially if a castor effect is obtained and the wheels sufficiently canting to give centrepont steering hubs.

B18

Brakes.

On many machines these are not good, and, unless periodically examined, their exposed position is a source of great danger. Machines should have two quite separate brakes, and these are best operated by rods, hand adjustable, and with joints either covered or carried inside the frame.

Luggage Carriers.

Every cyclecar was deficient in this respect with the exception of the Singer, Gordon and Invicta. It must be remembered that the user of a cyclecar has gone in for it greatly because he wishes to tour in comfort with a friend, and, therefore, space should be made for a good size suit case.

Driving.

The practice of snaking on hills is to be condemned. The driving, in many cases, was rather poor, and competitors scarcely seems to realize the advisability of completing the preparations before the event, whilst several competitors failed to take sufficient care that their engines should be reasonably cooled before a hill, and here again water cooling scores.

Carburettors.

A special note should be made of the fact that it is not sufficient to hang a carburettor at the end of a very insecure and thin inlet pipe. A far better plan would be to secure the engine firmly, secure the carburettor firmly, and then to realize that on any light vehicle there will be a considerable amount of relative movement. A flexible inlet pipe will allow for this, and the same applies to exhaust pipes. No cyclecar and no car is rigid, and it is absurd not to grasp this and to make provision for motion. Cars of many years ago had often flexible exhaust pipes, and this would prevent them falling off through vibration. They also had open gearboxes, but that is no reason why open transmissions should be expected to nowdays without any guarding.

Transmissions.

This very important question is impossible to discuss on the results of a short trial. No transmission was "best," and it may be said that friction, belt and chain transmissions are all satisfactory, if well made. In the miniature car type, for example, which did not show to advantage on account chiefly of inefficient engines and lack of rigidity, the engine, unless perfectly balanced, vibrates badly, and if this type of engine is used the drive should not be solid, as it leads to pieces falling off and general trouble. The belt drive on the Duo machines and the G.N. is quite efficient, and, perhaps, absorbs even less power than that taken by a friction drive with a pressure often exceeding 150 lb. per square inch for a lengthy contact distance to secure reasonable wear. The friction-driven machines put up a very fine performance, although it must be remembered that they are fitted with water-cooled engines, which are, of course, very powerful, and possibly capable of quite 20 h.p. on the brake when in good order. The judges are of opinion that it is not desirable to attempt any close comparison, for one type of transmission as fitted to a particular engine may be suited to it, as already mentioned. The mental effect of the softness of belts, for example, is also great, and, therefore, no direct instances can be quoted where one drive is superior to another.

Price.

The question of price should, in the opinion of the judges, receive prominence. Two of the machines making non-stops are more expensive than a small car, and, therefore, one expects better finish and work. The owner of a cyclecar is willing to put up with a little trouble, and is willing to have a more sporting vehicle than the car owner, and attention is drawn to the fact that even these relatively high-priced machines are not designed on ordinary car lines, so that cyclecar

CYCLECAR TRIAL JUDGES' REPORT (contd.).

designers, it would appear, must look elsewhere for perfection than to the motorcar. Many of the machines were priced at under £100, and much more credit is due to them. The three-wheelers deserve praise on these grounds, but, on the other hand, are very troublesome for tyre repairing, and are not really very comfortable or steady. On corners every three-wheeler demonstrated the fact that the back wheel cants over to 10 or 12 degrees, and neither the tyre nor the springs and chains can be expected to stand this strain indefinitely. The performance of the A.-C. in the small class, which was excellently driven, deserves notice; it kept to schedule, and its engine and body were perfectly clean at the finish, whereas the engine and whole condition of most of the other machines were very bad, which also points to the fact that better protection is necessary, and if air cooling must be used, a fan is desirable, and should be properly fitted on ball bearings.

Gears.

The gears on many of the machines were scarcely low enough, especially with air cooling, and a low gear of 10 to 1 is not too low, for, with a heavy passenger, the small engines have a good weight to pull. Three-speed gears are a great advantage, and on this point the variable-pulley machines showed up very well.

Noise.

This, taken as a whole, was bad. On one of the G.N. machines there was no silencer, and this is strongly to be condemned. A large expansion box close to the engine, and a long pipe from it is the best arrangement for the exhaust. Provision should also be made for enclosing the valves, as a most unfavourable impression is given by racing rattling engines with small bearings and big clearances. If water cooling is used, and also in the case of air cooling, valve covers should be fitted, also supplementary springs; large fly-wheels should be standard. Forced lubrication is also a help in this direction, not to mention its advantages in general running, cleanliness and avoidance of carbonizing.

Nuts and Washers.

The temporary expedient of taping nuts is not sufficient, and a lesson might be taken from two of the competing cars—a G.W.K. and a Duo—on which every nut had a fast-nut or spring washer. This greatly adds to one's personal comfort—an important detail.

Weight.

The weight question is of great importance, as it is closely associated with price and durability. It was not the heaviest cars that were the most comfortable, neither were the lightest the most capable of speed. More attention should be given to the local strains in frame design. The ordinary type of frame is very liable to twisting, and, to take a little example, the judges noticed that some starting handle brackets were very weak, although they have to bear a great side strain; whilst some of the engine bearers, to go to the other extreme, were quite unnecessarily heavy.

Controls and Accessories.

The majority of accessories fitted are good, and, with the exception of one or two lamps, which were fastened on very clumsily, there is not much to be said, although many drivers appear to attach little importance to their secure fastening. Such details as compression cocks and sparking-plug terminals should receive attention, as they are inferior to those on most cars, and the same applies to the wing supports, which should be stronger to avoid dithering.

Bodywork.

The use of rubber as a packing material does not receive sufficient attention. Most car body makers appreciate the fact that even a car chassis is not rigid, and the

cyclecar is still more prone to stretching, although the judges are pleased to see that the value of the quarter-elliptic or flat spring is receiving attention. If a very high body is used, a small step might be incorporated in the wings to enable a lady passenger to enter without the use of a ladder. The positioning of tanks in the body seems to cause trouble. They should not be too close to the engine, or they become very hot, and it is not advisable that they should be placed so that there is a likelihood of fire from the lamps when filling up. The oil tank is, with advantage, placed out of view, as it is not often that they are quite tight, and these should also be increased in size on most machines.

General Comments.

The trial was in every way a success, and, although its severity was not great, it has brought out in a very convincing manner the points included in the above report. Competitors should realize that more protection is needed for body, steering gear and engine, and that, if the engine is allowed to vibrate, its fastenings must be secure, and its fittings must not be expected to remain rigid. The use of larger tyres would help, and this applies also to petrol tanks, and, in some of the three-wheelers, to the control levers. All pipes should be deliberately sprung and made flexible where possible, whilst the clutches of gearbox cyclecars ought to be appreciably larger than is the case. Facilities for starting from the seat are valuable. Provision for reverse should be made wherever possible, as it is undoubtedly a great convenience. The number of those who finished, apart from slight troubles, was quite good, and, in many cases, owing to lack of personal comfort, the machines were in better condition than the drivers. As an example of poor mudguarding, the judges would draw attention to the fact that few of the official numbers were visible, and as an example of the general lack of balance, few machines finished without losing some parts. The trial amply proved that the cyclecar can be a very serious rival to the car for two people, both as regards speed and the possibility of comfort and reliability. The course was rather far from town, but was well attended, as will be seen from the detailed results accompanying the judges' report.

A. M. LOW, A.C.G.I., D.Sc., etc.
GLYNN ROWDEN.

The Only Authoritative Report.

As readers may be wondering at the discrepancy between the report of the Cyclecar Trial published in *THE CYCLECAR* and that appearing in another quarter, it may be pointed out that our report was written from first-hand information. Two members of the staff competed, and went right through the trial, and three others acted in official capacities or accompanied the competitors. We note the following points, which were accurately stated in *THE CYCLECAR*:—Four competitors gained non-stop awards (not three); there were 19 starters (not 20); the competitors did not take the watersplash carefully, but mostly at speed; Mr. Bradley (Duo) made a clean ascent of Sudeley, one of the best of the day, and did not make two attempts as stated; it was the Singer that had trouble from dirt and water in the carburettor, not the Gordon; Mr. Kreitmeyer filled up with oil, not petrol (this makes a difference of 7 marks in the marking); Mr. Busby competed in the 1100 c.c. (not 750 c.c.) class; Mr. Munday did not "fetch up" opposite a police inspector, and he had no trouble with the police. After which, a concluding statement that "the noise of many of the competing vehicles, their flimsy fittings and generally poor performances, call for severe comment," may be taken for what it is worth.

THE CYCLECAR WORLD.

Notes, News and Gossip of The New Motoring.

FORTHCOMING EVENTS AND FIXTURES.

March
29th ... B.M.C.R.C. 100 Miles High Speed Reliability Trial, Brooklands.

April.
5th, 6th Cyclecar Club Week-end Rally in Midlands. Saturday to Banbury (Red Lion), Sunday to Stratford-on-Avon (Swans' Nest).

April.
12th ... Birmingham M.C.C. Trial.
19th ... Cyclecar Club Fuel-consumption Trial.
27th ... Cyclecar Club Afternoon Run to Brooklands.

Lighting up time for 29th March 7.25 p.m.

Spring at last!

Now we can look forward to delightful driving experiences.

For accurate reports of cyclecar events see **THE CYCLECAR**.

The judges' report of the Cyclecar Club Trial, published in this issue, makes very interesting reading. We comment upon it editorially.

A special trials sub-committee of the Cyclecar Club has been formed, those elected to serve being Dr. A. M. Low, Messrs. Glynn Rowden, L. F. de Peyrecave, W. G. McMinnies and A. C. Armstrong.

If it is suspected that a tyre has punctured, a stop is advisable in order to make certain. Running on a flat tyre is neither good for the cover and tube nor for the chassis itself, but it is difficult to detect a puncture.

It seems to be a fact that such animals as horses and sheep take unkindly to cyclecars. In the course of time, no doubt, they will become accustomed to them, but in the meanwhile it is advisable to pass them with extreme caution.

It is surprising how many small cars there are which were never designed to meet the requirements of cyclecarists, but are now termed cyclecars because the engine capacity and weight limit comply with the definition of a cyclecar.

The low speed at which Mr. V. Wilberforce surmounted Birdlip in the Cyclecar Club trial was remarkable. It would be interesting to know what machine can go the slowest on the level without any clutch slipping. The laurels at present seem to rest with the G.W.K.

In not losing a single mark, in making both the fastest and slowest hill-climbs and a non-stop run, Mr. Victor Wilberforce, of Messrs. Cyril Patteson, Wilberforce and Co., of Caterham Valley, easily wins the Cyclecar Club Trial in the 1100 c.c. class, and takes the silver plaque to attach to the machine.

The front cover this week depicts the famous winding ascent known as the Nailsworth "W," which formed part of the Cyclecar Club trial last Saturday week. The cyclecar in the foreground is Mr. Lionel Martin's Singer. The hill is found by taking the extreme right-hand road in the centre of Nailsworth, approaching the village from Cirencester and Tetbury. It rises immediately with a sharp bend to the right, and thereafter follows a series of very steep hairpin bends to the summit.

An open trial for passenger machines in which cyclecars will compete against sidecar combinations will be held by the Birmingham Motorcycle Club on Saturday, 12th April. There will be several non-stop sections, and the competitors' times will be checked at different points en route. For non-members the entry fee is £1 1s., and for members 10s. 6d. Entries at ordinary fees close on 31st March, and at double fees on 5th April. The trials hon. sec. is Mr. S. Chas. Perryman, 67, Wood End Lane, Erdington, Birmingham.

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Have you taken delivery yet? If not on order, no time should be lost if the machine is wanted this summer.

The high-speed reliability trial at Brooklands next Saturday should be a most interesting event. The meeting starts at 2 p.m.

It will be interesting to see how many cyclecars will be able to keep up a high average speed in the 100 miles high speed reliability trial next Saturday at Brooklands.

An enthusiastic mechanic, working in a cyclecar factory, is constructing a machine, buying the parts at intervals from his employers, and assembling them in his spare time.

When the hood on the cyclecar is put up to keep the rain off the occupants, the engine and transmission system appear to emit an abnormal amount of noise. The hood intensifies the sound.

In "The Motor" this week appears an interesting illustrated article describing some of the latest American self-starting devices. There is also a very instructive article entitled "Driving Hints," which will appeal to all new motorists.

Mr. Armstrong's G.N., having had the magneto put right (the trouble proved to be faulty earthing), was taken up Swain's Lane, Hampstead (1 in 4) and Netherhall Gardens (1 in 7) last week, starting from a standstill on the latter. There was a considerable reserve of power.

All the cyclecars in the first Cyclecar Club trial climbed the Nailsworth "W" successfully. Close by there is an acclivity which is 200 yds. long, and has an average gradient of 1 in 2½. No cyclecar has yet made a successful climb. This "pimple" rejoices in the name of the Nailsworth Ladder.

A cyclecar is being built in North London the power unit of which is a 2½ h.p. De Dion engine. It has a fixed drive throughout, so that, to start the engine, one has to push the machine. The vehicle is so light that one man can easily lift it off the ground, while the speed attainable is remarkable. We hope to give full particulars in a future issue of **THE CYCLECAR**.

The non-appearance of the Super cyclecar, a French tandem machine, in the Cyclecar Club Trial, was very disappointing, the explanation being that Mr. J. M. Barratt, the entrant, was laid up with "flu." This malady also attacked Mr. Parnacott, the advent in a trial of whose 3½ h.p. four-cylinder F.N.-engined cyclecar was eagerly looked forward to, and Mr. Jones, a Morgan entrant.

One prominent member of the Cyclecar Club has recently been acting the part of the Good Samaritan. One one occasion near Hindhead he met, at the bottom of a hill, an invalid lady whose bath-chair had been wrecked by a runaway pony. He gallantly conveyed the stranded lady to the top of the hill in his machine. Coming from Oxford to Henley the other day, he came across a lady who was in a fainting condition and, as usual, he drove back to Oxford with her and a friend. His machine is now unofficially named "The Ambulance."

NEW CYCLECARS WITH INTERESTING FEATURES.

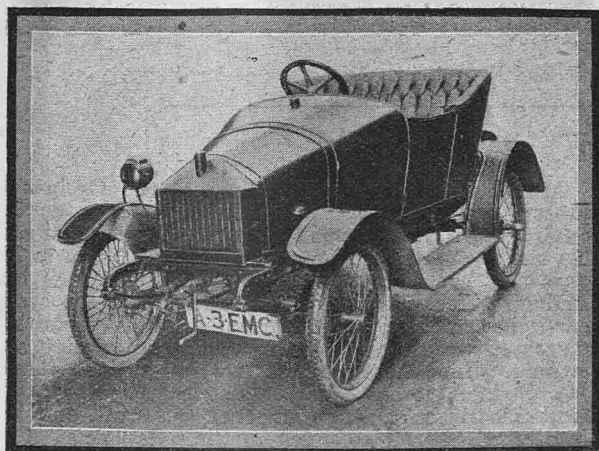
TWO NEW EAGLE FOUR-WHEELERS.

TWO cyclecars, a lightweight machine for speed and a heavier touring model, are being produced by the Eagle Motor Manufacturing Co., Ltd., 1, Shepherd's Bush Road, London, W. The heavier machine is the standard model, having a pressed-steel frame mounted on half-elliptic springs, fore and aft. Behind the gilled-tube radiator is mounted the 8-10 h.p. Eagle engine, set transversely across the frame and drawing its mixture from a Claudel-Hobson carburetter, controlled by a small pedal. The engine, the dimensions of which are 85 mm. bore by 88 mm. stroke, giving a capacity of 998 c.c. and developing 8 h.p. at 1000 revs. per min., appears to be very soundly designed and built, overhead inlet valves and ball bearings to the crankshaft being provided. Within the extra flywheel, carried on the continuation of the crankshaft, is mounted a leather-to-metal cone clutch, held in engagement by three spiral springs. The drive then passes through a leather disc form of universal joint to the three-speed and reverse gearbox, the gear lever working in an or-

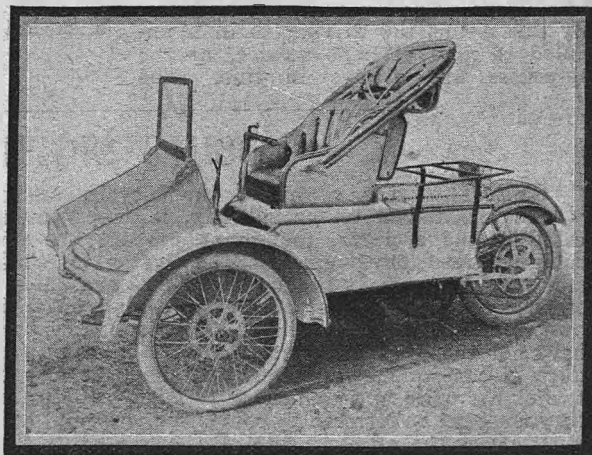
dinary quadrant. The cardan shaft, having two universal joints, transmits the power to a worm-driven rear axle, containing a bevel differential gear, and the rear hubs contain internal-expanding brakes, operated by pedal, whilst the side lever brake operates on the rear end of the propeller shaft. The steering is by worm and sector, and a comfortable two-seater body, with scuttle dash and side doors, is provided. With a wheelbase of 7 ft., a track of 3 ft. 8 in., and a total weight of 7 cwt., the price is £125.

The second model is provided with a tubular frame, and is more lightly built. The top gear has a ratio of 3 to 1, as compared with $4\frac{1}{2}$ to 1 on the other model, and the total weight is $4\frac{1}{4}$ cwt., but in all other respects the two models are identical.

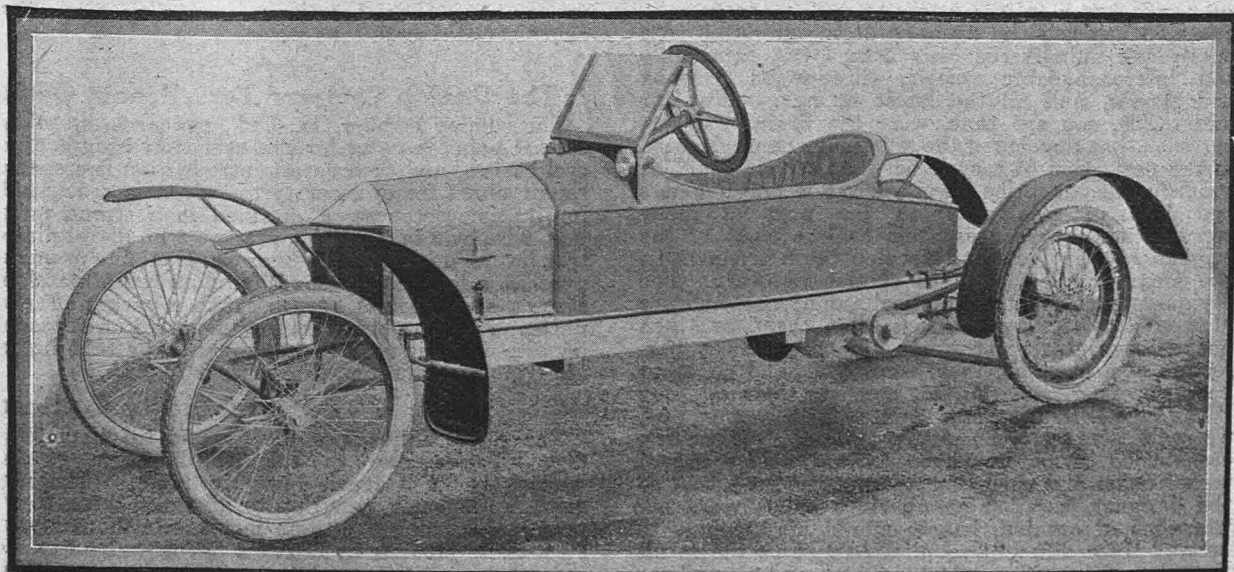
On this page will be found an illustration of the Lester monocar, described in a recent issue. The 8 h.p. J.A.P. air-cooled engine is set under the tapered bonnet and drives the countershaft by friction discs, while the final drive is by rubber belts.



The new Eagle cyclecar, a shaft-driven miniature car.



A single-seater A.C. for use in Australia.

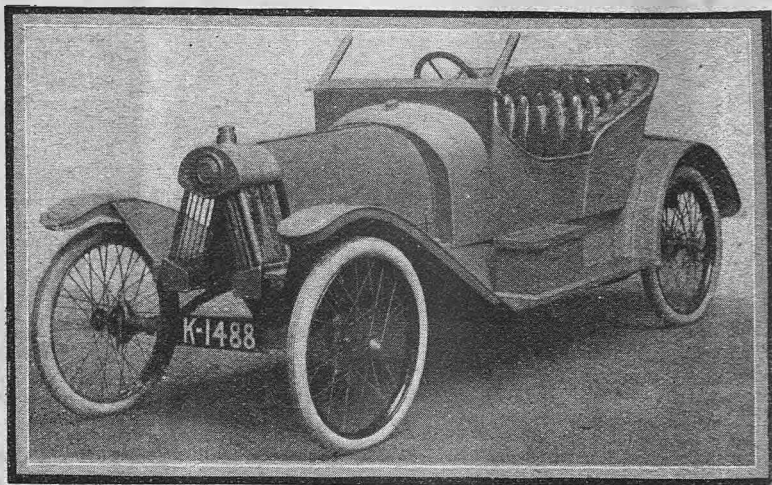


The Lester monocar, a belt-driven single-seater of pleasing appearance and long wheelbase.

THE R. AND P. CYCLECAR.

In the issue of *THE CYCLECAR* dated 12th February we gave the first published description of the Robinson and Price cyclecar, and we are now enabled to reproduce a photograph of the first machine put through the works. There are several distinctive features in its design, the most novel being the radiator, which is illustrated. The engine drives the countershaft by means of a specially-made V-type belt, which is composed of a Hans Renold chain with leather blocks fixed on at short intervals, and is $1\frac{1}{2}$ in. wide and 11 in. deep. By means of variable pulleys, one mounted on the engine shaft and the other on the countershaft, a large range of gears is obtained. The final drive to the differential back axle is by chain. A reverse is fitted, the necessary gearing being mounted on the countershaft in the same casing as the disc clutch. The back axle, the two torque and radius rods are connected up together in one unit, the countershaft being housed in ball bearings on the torque tubes. By this means the driving chain is enabled to give efficient service, as the sprockets are always in line. The

differential is constructed on the peg-and-hole principle, and the casing serves for a brake drum. The manufacturers of the machine are Messrs. Robinson and Price, 43, Pembroke Place, Liverpool.



The R. and P. cyclecar. Note the novel radiator.

LOSING SIGHT OF THE IDEAL.

COVENTRY, the centre of the bicycle, motor-bicycle and motorcar industry, is deeply interested in the cyclecar, though at present but few manufacturers have entered the trade in these miniature motors. It is true that there are quite a number of smaller manufacturers working on their own restricted premises who have the right idea, but have not the experience necessary actually to produce, in consequence, a simple and cheap vehicle for two at the price approximating to £100. To do this they must not be fettered by conventionality, but they must attack the problem with all the originality that they possess, and frame, engine, transmission and body must be designed and produced with the main idea always in view—the £100 two-seater. Some may say that this proposition is an impossibility, but anyone who inspects the up-to-date sidecar outfit with luxuriously upholstered body, 3 in. tyres, detachable and interchangeable wheels, three-speed gearbox and starter, and all the latest fittings, selling for under £90, can see that, were the brains and experience that developed the sidecar machine devoted to the perfection of a cyclecar, that vehicle could be produced at the price specified. It is only laziness and lack of originality on the part of many constructors that causes them to lose sight of the original idea in view and develop their products on the already well-tried lines of the motorcar. The designers have not the practical experience, and the idea of a cyclecar was thrust upon them, and was not their original conception. Hence, for the perfection of a machine, they have to depend on other people's experience. Agents come to them and say: "If you will fit a reverse or a water-cooled engine, we will give you so many orders." Directors, accustomed to motorcars, condemn simple forms of transmission and springing as unsatisfactory, and so the designer, assailed on all sides by contrary expressions of opinion, has to mould his machine to suit all these different requirements, with the result that the original idea is lost sight of, and a small car is produced as the easiest means of attaining a practical machine.

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As Mr. Bednell, the secretary of the Cycle and Motor Cycle Manufacturers Union, said to us the other day, it is the small man, working in perhaps his stable or local garage, who is more likely to hit on a real cyclecar than any big manufacturer. Mr. Bednell agrees with us that the future of the cyclecar is in the cheap simple machine, and regrets that more serious attempts are not made to develop air-cooling, which he considers has great possibilities. Mr. Bednell, it must be remembered, has had considerable practical experience of cyclecars, and has interested himself so much in their development as to take frequent trial runs in the very latest types. At present he informs us it is too early for a cyclecar section to be formed in his union, but there is no doubt that, when the movement becomes more organized, this will take place.

The Dunlop Cyclecar Tyre Repair Outfit.

The Dunlop Rubber Co., Ltd., appear to be taking special pains to cater for the ever-increasing body of cyclecarists, and their latest introduction is a special repair outfit for cyclecar tyres, which is remarkable for its completeness. Contained in a strong metal box, 9 in. by 3 in. by 2½ in., are two 9 in. nickel plated tyre levers, one tube of rubber solution, five prepared patches, a large inside cover patch, a roll of patching canvas, a cylinder of French chalk, a packet of valve parts, and a wire brush scraper mounted on a wooden handle, which is used for roughening the tube before applying the solution. The price is 3s. 9d.

Powerful Singer Cyclecar.

The recent failures of the Singers to climb freak test hills is due to the unwillingness of the makers to fit a freak low-gear ratio. The new engines are being tuned up to give still more horsepower, this being due to an increase in the compression, made possible by fitting a deeper valve cap. A special competition model may make its appearance shortly, the engine of which is actually being tested to give on the brake 26 h.p.

THE CYCLECAR WORLD (contd.).

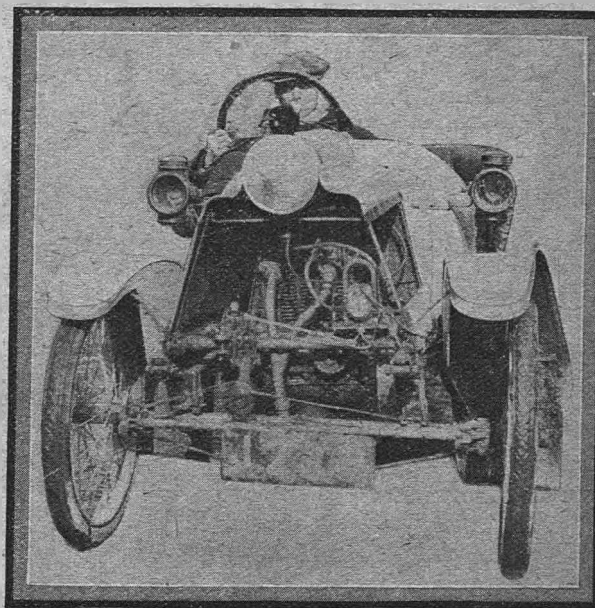
The Circuit de Paris.

Only four cyclecars, namely, three Bedelias and one Automobilette, competed in this year's Circuit de Paris, a two-day reliability contest round Paris. A new feature in connection with the competition was the dividing of the total distance into "free," "non-stop," "controlled," and "framed" stages. On the "free" stages the competitors had to get through at the average speed of 18.6 miles an hour. On the "controlled" stages an official car followed the competitors at the speed of 18½ miles an hour, and any rider overtaken by this car was penalized. Finally, in the "framed" stages there was an official car both in front and behind, it being forbidden to get ahead of the leading car or fall behind the following car without loss of points. Weather conditions were very satisfactory during the morning, but during the afternoon a rain storm greeted the competitors while passing through the forest of Rambouillet. It was at this point that Pernette, driving an Automobilette, disappeared from the run, without it being possible to find out what was the cause of his trouble. For various reasons many left the course unknowingly at several points, but discovered their mistakes before they lost much time. The next morning there was a starting competition at the outset, the competitors being obliged to get over a line 50 yds. ahead, with the engine running properly, within an interval of 30 sec. Failure to start in this time entailed the loss of one mark. Two of the Bedelias were penalized under this score. The second day's run was free from incident. Some little surprise was created by the re-appearance of M. Pernette's Automobilette, which had failed to report the previous evening. The driver declared that he had lost his way, but even this disqualifies him. The three Bedelias completed the course, whilst that driven by M. Bourbeau ran a considerable distance on only three tyres.

Although this week's issue of THE CYCLECAR is published on Thursday, the ordinary publishing day, it should be noted, is Wednesday, the delay being due to the Easter holidays. Next week's issue will contain some very interesting features.

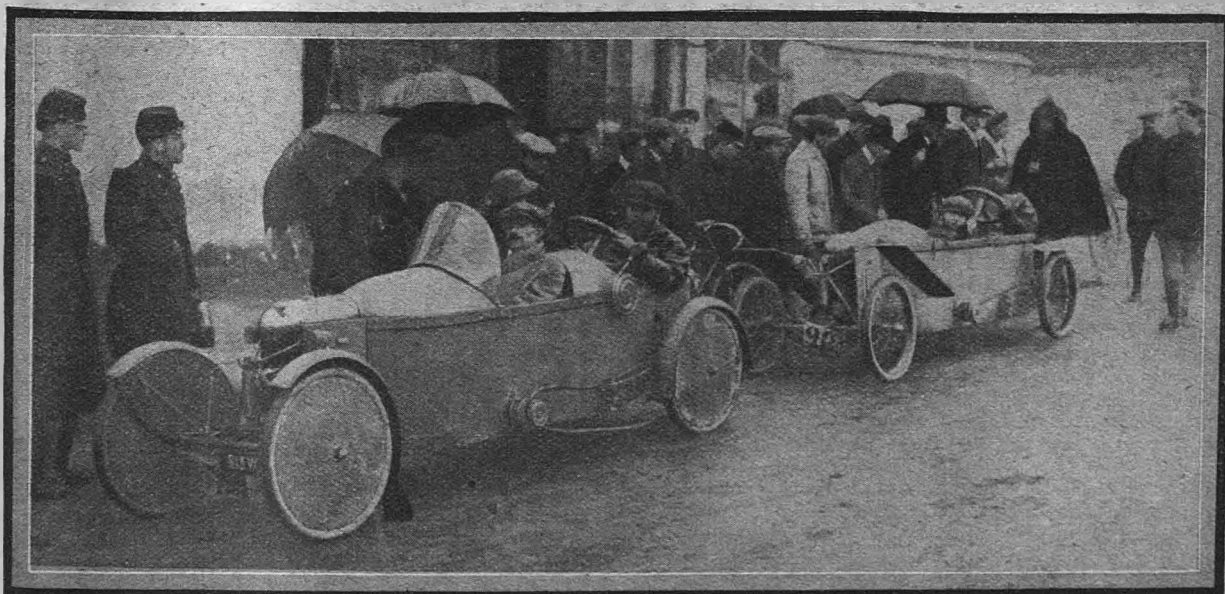
Wednesday—and THE CYCLECAR sold out! Have a copy sent by post at 6s. 6d. per annum.

In the results of the recent Cyclecar Club trial which are published on page 469, no mention is made of Mr. L. F. de Peyrecave (Duo). He made stops to mend a tyre and fill up with petrol, but completed the course.



A novel cyclecar, seen at the Richmond meet at Easter. It is made by Mr. W. H. G. Thompson, of Durham, and is fitted with a twin-cylinder De Dion engine and chain drive to the back axle.

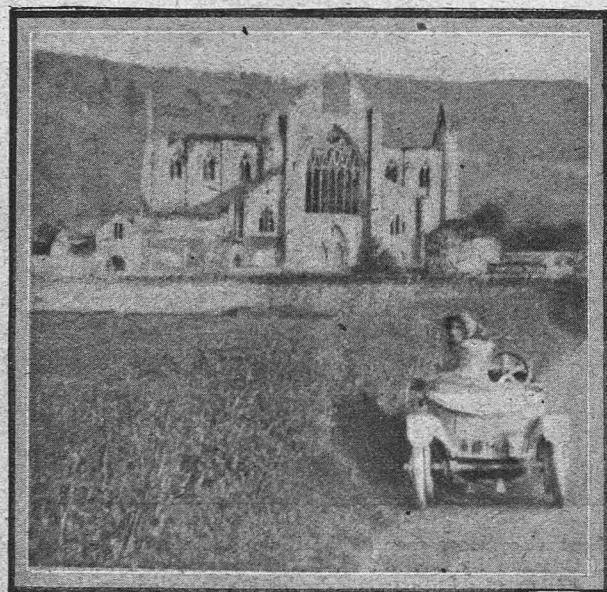
We know of what is apparently a very sound investment for capital—a going cyclecar concern, making a good machine, with many of them running, and having plenty of orders, which is now ripe for launching out in modern works for building in quantity. Inquiries can be addressed to THE CYCLECAR (Ref. I.).



The two Bedelias, driven by MM. Bourbeau and Bouville in the Circuit de Paris, a French reliability trial, arrive at Versailles. Note the windscreen on M. Bourbeau's machine.

EVERYTHING conspired to limit the success of the Cyclecar Club's first Easter tour. To begin with, the heavy storms of rain and hail on Good Friday caused several members of the party to "scratch" at the last moment, while others were unable to stay the course and returned. Several took two days to reach the headquarters, the British Camp Hotel, on the Malvern Hills, owing to the weather.

Carburettors can play strange tricks, and all the party, individually and collectively, had carburation troubles during the holidays.



In the Wye Valley, Tintern Abbey.

Somewhere about 12 o'clock on Good Friday, various members of the Cyclecar Club could have been seen on the Oxford road, with bonnets off, and carburettors, too. "Tête Rouge," "John Gilpin's" flying steed, had been stopped by a party of anxious on-lookers, who observed tongues of fire streaming from the bonnet. The carburettor had caught fire, but fortunately extinguished itself before any damage was done. The cause was due to flooding, a split pin

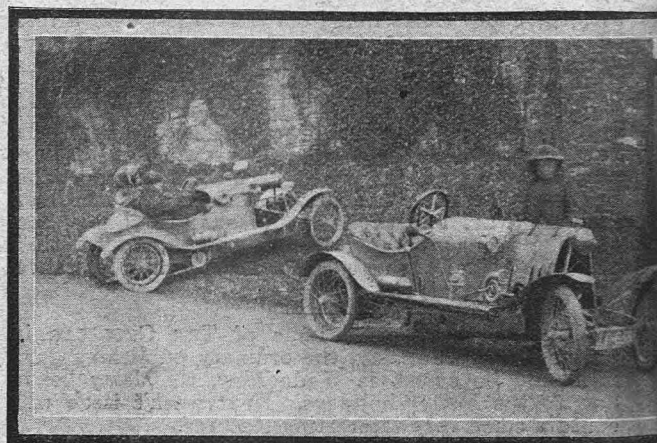
EASTER WITH CYCLECAR CLUB.

having come out of one of the rockers. The petrol pipe union had also come unsoldered. Temporary repairs were executed, and the pipe re-soldered on, with only half-an-hour's delay, at Oxford, the work being expertly carried out by Messrs. Coxeter.

The worthy secretary of the Club could have been discerned, somewhere much nearer town, making a soap and insulating rubber tape connection between his carburettor and the petrol pipe union. This was not his only trouble, all efforts to get the proper mixture in the carburettor failing. The result was a red-hot cylinder every half-hour or so.

Mr. and Mrs. Paul, on a three-wheeler, were in like difficulties, with broken chains and flooding carburettor alternating. Mr. Godfrey was also passed, going back to town for repairs.

The finish of the day was that two-thirds of the party reached Chipping Norton in drenching storms, wet through, and decided to stop there, while the remainder struggled through to Malvern. It was an experience to be remembered, bitterly cold, with heavy storms that almost blocked out a view of the road—such was the first day of spring.



Why have a reverse? How the hon. secretary of the Cyclecar Club reverses, by running up a bank and then running back.

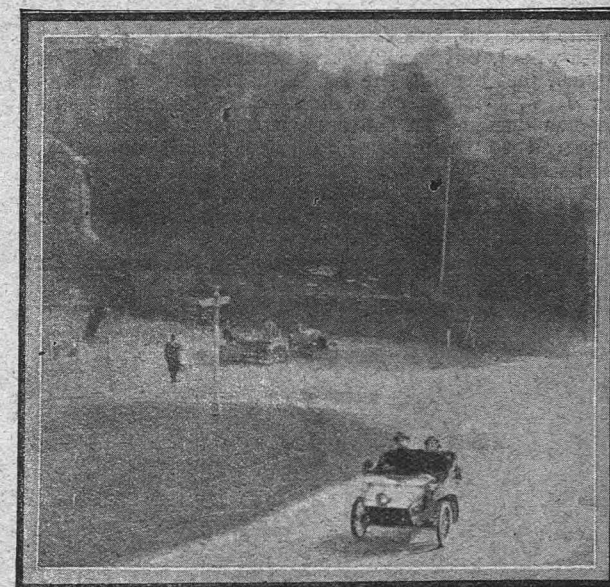
Saturday was no better, and, except for straggling units of the party getting through to the British Camp Hotel, was devoid of incident. But a jovial party gathered in the smokeroom after dinner, and many were the tales of doughty deeds.

On Easter Sunday the Wye Valley was visited, although a P.M.C. driver decided to spend most of the day tuning up. The Wye Valley never looked lovelier, while above Ross splendid peeps of the Welsh mountains were obtained flashing white in the sunlight, for their tops were covered in snow.

The return journey was made on Easter Monday, which turned out gloriously fine. The route taken was by Upton-on-Severn, Pershore, Broadway, Oxford and Beaconsfield. In the Severn Valley many miles of fields were flooded and part of the road. The machines were all running well, and fast ascents up Fish Hill, Broadway, after lunch, were made. "Tête Rouge" broke an exhaust valve near Beaconsfield, the hon. sec. broke the inlet valve seating, and the finale was Mr. Thomas's G.N. towing its stable companion back to town, where the tour officially terminated at 1 a.m.

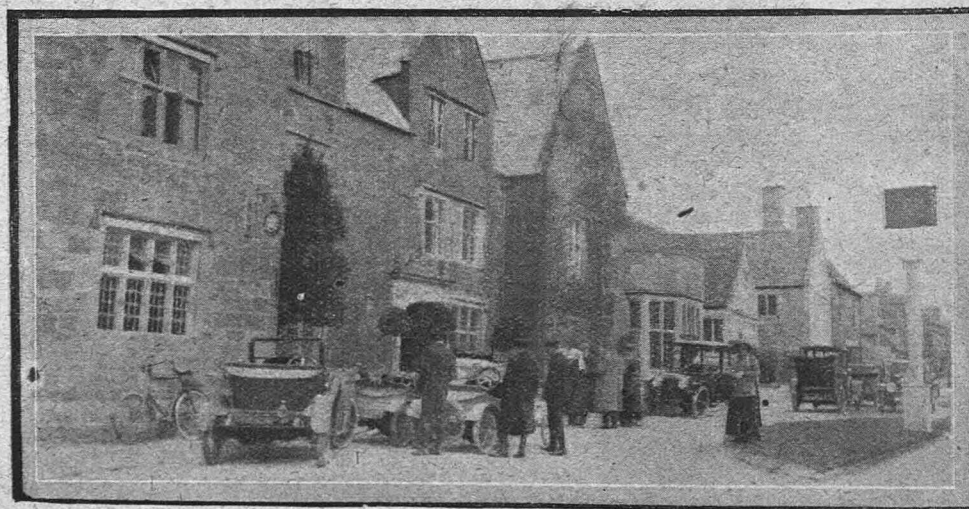
Some men, dressed up as suffragettes, were the prime cause of a great demonstration at Beaconsfield on Easter Monday, but when Mr. Frank Thomas, acting the part of a good Samaritan, collected two ladies from derelict cyclecars and brought them to the White Hart, the crowd thought the real thing had arrived. They were mobbed, and the police had some trouble in dispersing the multitude.

The hon. secretary of the Cyclecar Club was busy tuning up his G.N. with the inevitable gossip giving gratuitous advice, for he knew all about cyclecars. "And how do you like driving a Bedelia?" was his concluding remark.

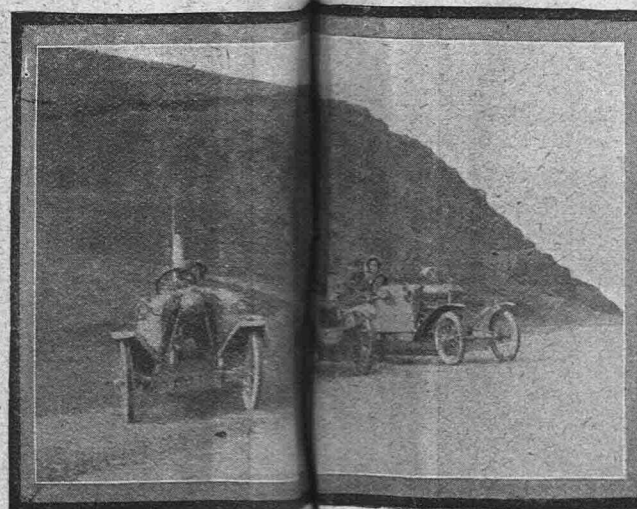


The P.M.C. makes an early start for home.

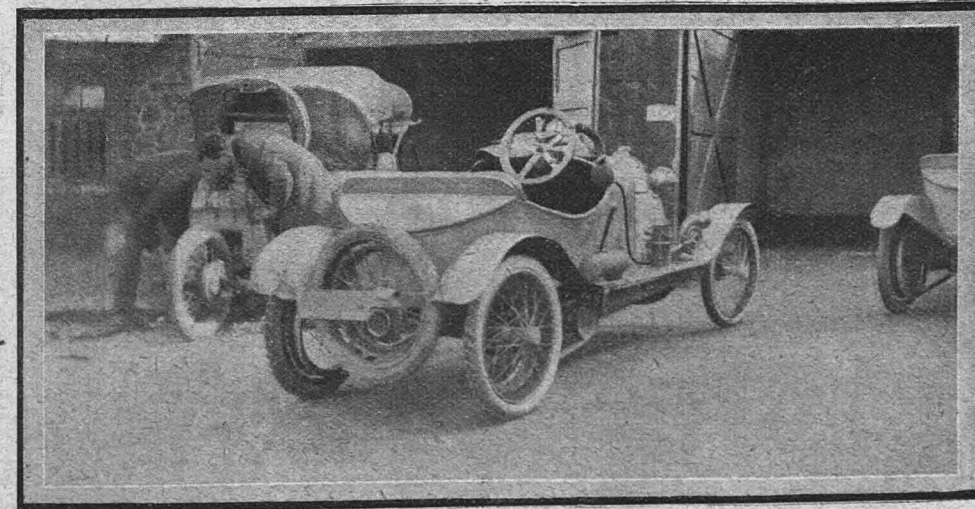
Naturally, as the home of the Morgan, we saw quite a lot of these popular three-wheelers in the Malverns at Easter, but the only other cyclecars seen, not those belonging to the party, were a G.W.K., in which Mr. Cyril Patterson was driving, a G.N., several A.C. Sociables, and another P.M.C.



Outside the Lygon Arms, Broadway, where the rearguard had lunch. The discerning reader may observe a member protruding from the back of his G.N., only his boots being visible. This is the expert's method of tuning up.



At the foot of the British Camp, motorcyclists carried out hill-climbing tests on the hill, a feat emulated by Thomas with his G.N. He had to return as the road was not wide enough.



Tuning up in the garage on Easter Sunday. This turned out a lovely day, and a run down the Wye Valley was carried out, but the P.M.C. member preferred to extract more tune from his engine to following the official tour.

AN EXCITING FINISH AND A NEW SINGLE-SEATER AT BROOKLANDS.

Mr. Wood's G.W.K. Beats the Zenith Sidecar Combination.

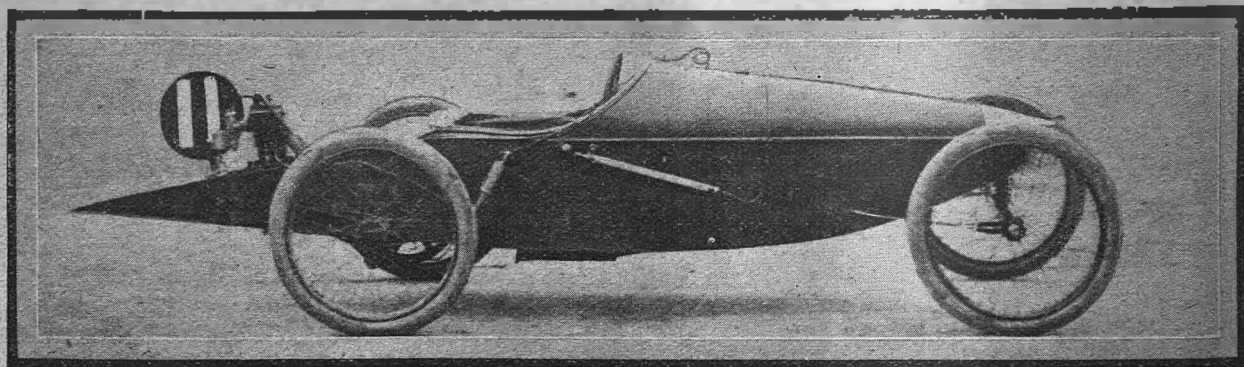
At the Easter meeting of the B.A.R.C. cyclecars finished first, third, and fourth in the First Sidecar and Cyclecar Handicap. The race, which was over a distance of five-and-three-quarter miles, provided one of the finest finishes of the day. Mr. J. T. Wood, on a G.W.K., just beating Mr. F. W. Barnes, on an 8 h.p. Zenith and sidecar, on the tape. Mr. A. W. Lambert, on a Morgan, was third, having entered the finishing straight first. He was, however, outpaced by the G.W.K. and the Zenith. The two latter raced up the straight, the Zenith getting a lead of about half-a-wheel, but the G.W.K. accelerated in the last 50 yds., just beating the Zenith. The limit man was Mr. J. V. Carden, on a single-cylinder machine of his own design. In the early stages of the race he appeared to be making full use of his handicap, but he stopped for some reason in the second round. This machine is very light and racy, having a 4 h.p. J.A.P. engine, driving direct to the back axle, there

being no change-speed gear or clutch. Thus, to start the machine, the driver had to run alongside it and then vault in, as with a motor-bicycle.

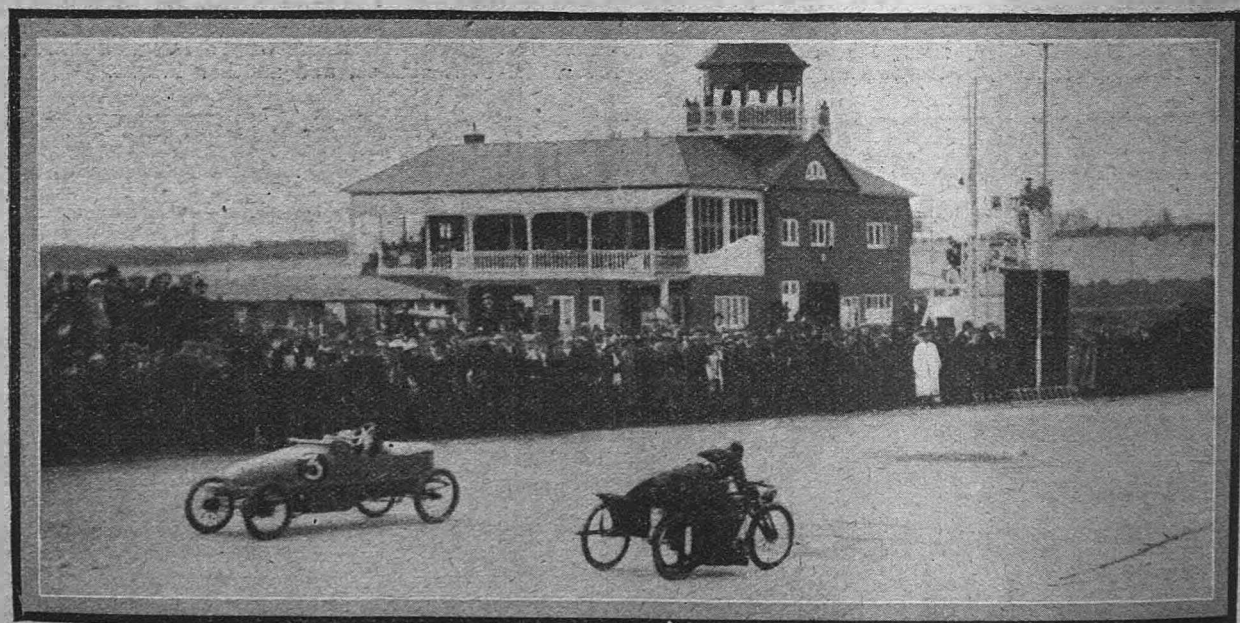
There were 11 entries, comprising five cyclecars and six sidecar combinations, and it is interesting to note that of the first four, three were cyclecars, Mr. V. Wilberforce taking fourth place on a G.W.K.

For the Grand Prix cyclecar race, Mr. Jack Woodhouse is entering a Morgan. Another well-known amateur will also drive a Morgan. Mr. Fraser Nash and Mr. C. Whitehead are also entering G.N.s. We shall be pleased to forward particulars of the race and entry forms on request.

A punctured float and the fact that the machine was too highly geared for the hilly course, are the reasons assigned by the manufacturers of the Averies for their failure in the Cyclecar Club trial.



Mr. J. V. Carden's single-seater cyclecar, as seen at Brooklands. The 4 h.p. single-cylinder J.A.P. engine is placed behind the back axle and drives it direct by a chain, without gearbox, clutch or differential.



The exciting finish of the cyclecar and sidecar race at Brooklands on Easter Monday. There was quite a good entry for the event, which was won on the tape by Mr. J. T. Wood's G.W.K., just beating Mr. F. W. Barnes's Zenith.

HOW HILLS IN THE CYCLECAR TRIAL WERE ASCENDED.

The Zebra Low Gear.

On reading through the account of the cyclecar reliability trials last Saturday we note the following paragraph:—"His machine and Mr. Armstrong's were the highest geared in the trial, no attempt having been made to fit specially low gears, as with the miniature cars." We would like to point out that our 6 h.p. Zebra car, which is a miniature car, was an absolutely standard car, and was not fitted with any special low gear.

F. B. GOODCHILD and Co., LTD.

[On receipt of the above letter, we telephoned Messrs. Goodchild, and asked them what were the gears used by Mr. Kreitmeyer. They reply that they were 5-1, 8-1 and 16-1. They may be standard gears, but the bottom gear is undoubtedly very low.—ED. THE CYCLECAR.]

How the G.W.K. Ascended Birdlip.

I notice in your report of the slow hill-climb on Birdlip, in the Cyclecar Club's Trial, you say that, judging from the beat of my engine, I was slipping the disc. So far as I can remember, I did not slip the disc once during the climb, the variation in the beat being solely due to my accelerating and decelerating the engine during the whole of the climb. I am only pointing this out as it is a very bad prac-

tice with a friction-driven car to keep slipping the clutch for any length of time, and your report might lead G.W.K. owners to adopt this bad practice. I do not mean to say that the clutch may not be slipped occasionally, but it is not a practice to be resorted to often or for long periods, as a friction disc, like any other clutch, is certain to resent it.

J. TALFOURD WOOD.

The Gear Ratio of the A.-C.

In an account of the Cyclecar Club Trial in your issue of the 19th March, amongst the list of starters, in the 750 c.c. class you give only the A.-C. and the Zebra, whereas we understood that Mr. Busby's Morgan was also in this class. On page 451 you state that the A.-C. and the Morgans made light of the hills on their special low gears. Standard gears are fitted to our machines in trials, the standard ratios being $4\frac{1}{2}$ -1 and 5-1. The particular machine driven by Mr. Munday was a 5-1, with ordinary reduction, no special gear being fitted for this trial, as was implied by your article.

AUTO-CARRIERS (1911), LTD.

[On telephoning Messrs. Auto-Carriers, Ltd., we were informed that the bottom gear of the A.-C. driven by Mr. Munday was $12\frac{1}{2}$ to 1, which is not very low.—ED. THE CYCLECAR.]



On Sudeley Hill in the Cyclecar Club Trial. The machine is Mr. Godfrey's G.N., which made a clean ascent on a bottom gear of 8 to 1. A remarkable performance.

Irish Cyclecar Race Abandoned.

We have been informed by the committee of the Irish Automobile Club that they have been obliged to abandon the cyclecar race over the Gordon-Bennett course in Ireland. They have come to this decision owing to the almost total lack of support from the manufacturers. We were afraid, when the proposal was first put forward, that the manufacturers would not support the race, for two reasons. Firstly, on account of the French Grand Prix, which had been announced previously, and, secondly, because the proposal was made too late, making it almost impossible for intending competitors to complete their plans.

In this week's "Motor Cycling" practical experiences with several automatic carburetters are given. The information is of interest to cyclecarists.

High-speed Reliability Trial.

There are 13 entries for the 100-mile High-speed Cyclecar Reliability Trial, which is to be held at the B.M.C.R.C. meeting on 29th March, at Brooklands. The following have entered:—H. Martin (Morgan), N. F. Holder (Morgan), H. G. Fraser-Nash (G.N.), C. M. Whitehead (G.N.), G. W. Hands (Cal-thorpe), A. W. Lambert (Morgan), J. T. Wood (G.W.K.), J. W. Woodhouse (Morgan), J. Munday (A.-C.), V. Busby (Morgan), R. P. Aldersey (Carlette), J. L. Edwards (Edwards) and L. F. de Peyrecave (Duo).

Roadside Advertisements.

By the decision of the Michelin Tyre Co. to remove their placards from the roadside, the way is clear for a wholesale dismantling of these disfiguring boards. Other tyre companies, we hear, are following suit.

Topics of the Day

CYCLECARISTS are indebted to the judges, Dr. A. M. Low and Mr. Glynn Rowden, for a painstaking analytical report of the machines driven in the Cyclecar Club trial. At the conclusion of the event the judges inspected each machine, and the results of their investigations make very interesting reading. There is one fault in an examination of this kind, however, that may be commented upon, in that while great stress is laid upon unmechanical features of design, many excellent features are overlooked. Of course it is the duty of the judges to criticise rather than to praise, and it must be admitted that their criticisms are of a constructive nature, offering very valuable suggestions for future improvement of design. At the same time, it should not be forgotten that what may seem very unmechanical to the expert engineer, who would not be satisfied with anything short of the finest car practice, is really quite suitable for a movement in which cheapness of production is the prime factor. Any cyclecar could be turned out beautifully finished, splendidly constructed and scientifically designed, if it were not for the fact that the cost must be kept down. Many of these machines are produced roughly finished and undoubtedly faulty in design, but they go, and that is the main thing, and in general are giving their owners a good deal of pleasure. With one or two exceptions, the lower-priced and more roughly-finished machines are giving greater satisfaction than the more expensive and elaborately finished cyclecars. Those contemplating the purchase of a cyclecar should not expect too much in the way of mechanical perfection, but be content with the fact that the cyclecar is a vehicle which will provide them with more enjoyment than any other form of motoring, and at a minimum expense.

THREE separate high-speed cyclecar races have been contemplated this year. A race in the Isle of Man, in connection with the motorcycle Tourist Trophy Races, was suggested by us, but so far as this season is concerned it is unlikely that it will be proceeded with, and it has been left to France to take the lead in organizing the first high-speed road trial of cyclecars. There is no doubt that the Grand Prix cyclecar road race will be well supported by both French and English manufacturers, especially as a rival attraction in an Irish race has now been abandoned. We should like to see a very good entry from this country, because undoubtedly the English machine is achieving a reputation for greater stability and reliability than the average cyclecar made abroad, and the race is not always to the swift. The winner will probably be the man who drives carefully, and the losers will be those who attempt to drive at top speed throughout. We trust that the event will be well supported, and shall be pleased to forward entry forms.

ELSEWHERE in this issue we refer to the disappointing manner in which the motor and motorcycle trades have tackled the problem of the cyclecar. Few attempts have been made by these manufacturers to produce a machine designed on original lines to meet the demand for an ultra-light, handy, low-priced, reliable, and economical motor for one or two persons. Instead, an ordinary small car has been evolved, having cheapened features of bigger cars, with the disadvantages of an over-light chassis for the type of transmission adopted, an overweighted body and an underpowered engine. These machines certainly will give satisfaction to their users, but the big manufacturers, with their resources, could turn out something better—a machine on four wheels that is superior to a sidecar combination, offering greater comfort, not costing more to purchase and more economical to run. At present the cyclecar built on original lines, in sympathy with the movement, is the product of the smaller works.

The Cyclecar

Wednesdays—1d.

Conducted by EDMUND DANGER, LTD.

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"VETTING A SECOND- HAND :: :: CYCLECAR.

This interesting article, unavoidably crowded out this week, will be included in the contents of "The Cyclecar" next Wednesday. It deals with simple methods of recognizing faults in cyclecars offered for sale second-hand.

EVERY WEDNESDAY - 1d.

NOTICES.

Letters.

EDITORIAL Communications should be addressed to The Editor, "The Cyclecar," 7, 9, 11, 13 and 15, Rosebery Avenue, London, E.C.

Letters relating to ADVERTISEMENT and PUBLISHING Departments should be addressed to The Manager. SUBSCRIPTIONS should be forwarded to the Manager (rate, 6s. 6d. per annum, or pro rata).

Press Times.

IMPORTANT LATE NEWS and Photographs can be accepted up to first post Monday morning for insertion in the following Wednesday's issue.

ADVERTISEMENT COPY, Blocks, &c., should come to hand by Wednesday morning to ensure careful attention and allow time to submit proofs, except when an earlier time is specified.

Return of MSS., &c.

Drawings, Photographs and MSS. not suitable for publication will be returned if sufficient stamps are enclosed for this purpose, but the Publishers cannot hold themselves responsible for the safe keeping or return of contributions.

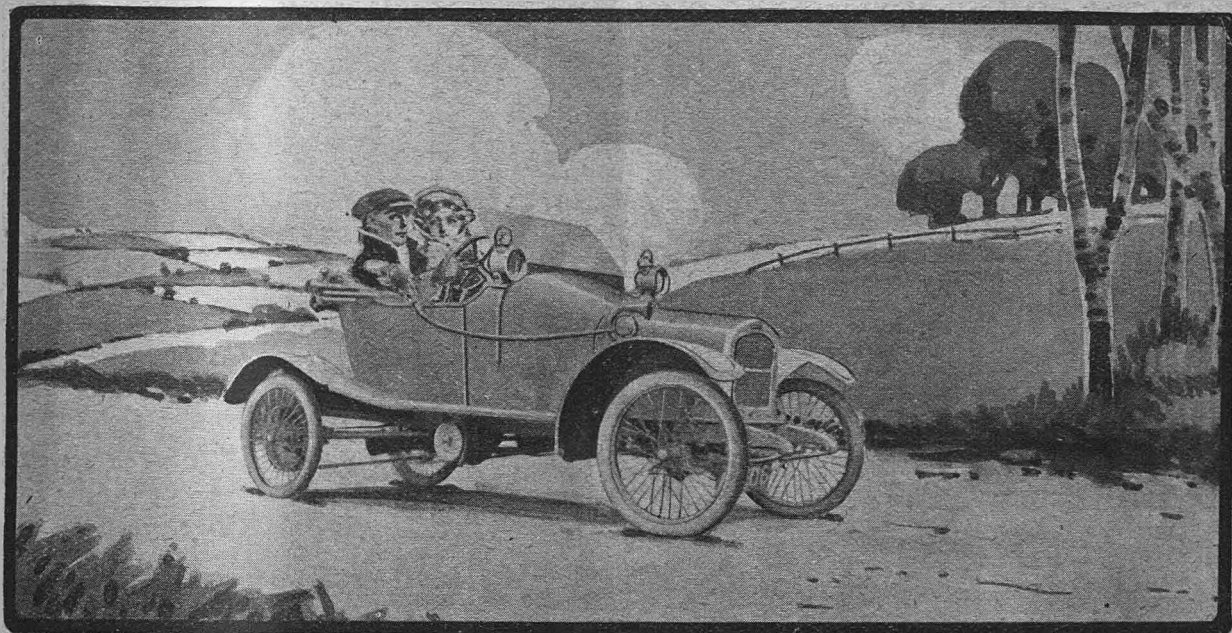
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Advertisements of Cyclecars for Sale, new or second-hand, Sundry Announcements, and Rates for Advertisements, will be found amongst the end pages.

TRIAL OF A WARNE CYCLECAR.

Interesting Belt-driven Machine with Well-sprung Comfortable Coach-built Body.



ONE recent week-end we had an opportunity of putting a Warner through its paces, covering in all about 160 miles. The particular machine we tested was provided with a hood, which was luckily never required, and an extremely neat adjustable windscreen, which contributed considerably to the comfort of the passengers. The body, finished in cream, with brass fittings, was extremely handsome, and we would particularly draw attention to the manner in which the detail work was carried out. The long steps on either side were neatly covered with rubber matting, held in place by brass beading, and the mudguard had filling pieces fitted on the inside between the wing and the frame. The sloping footboard accommodates two small cupboards, which are extremely useful for storing small tools, such as pliers, petrol injector, etc., and beneath the scuttle dash is fitted a shelf. When we took over the machine, there had not been sufficient time for the Binks's carburetter to be adjusted for slow running, and thus the engine tended to race when in the free position, but when under load it would pull steadily on top gear at very low speeds, and at the same time would accelerate rapidly when pressure was applied to the left pedal. The right pedal operates hand brakes on the back wheels, which acted satisfactorily throughout our trial.

When the belt-tensioning lever is placed in its rearmost position, it operates internal-expanding brakes in the rear hubs, which have a magnificent grip. The J.A.P. engine runs smoothly at all speeds, the belt-driven fan operating perfectly. The petrol consumption averages about 35 miles to the gallon, and the oil consumption about 200 miles per gallon, but as the engine was new we erred on the side of over-lubrication. The hill-climbing propensities on top gear are well marked, it being rarely necessary to change down. We experienced some difficulty in tightening the belts on our machine, but this was due to the operating arm having moved on the tube, and we had no difficulty on a sister car. The pedal operating the exhaust valve lifter was out of action

on the machine we tried, and thus traffic driving was not so easy as it might have been, yet we drove the car straight across London through the Saturday afternoon traffic without stopping the engine. The maximum speed was just on 40 m.p.h., and as top gear runs we may mention Luton to London and Dorking to London. The only involuntary stop was due to a small bolt dropping out of the left-hand expanding pulley, which put it out of action, but the bolt was soon replaced.

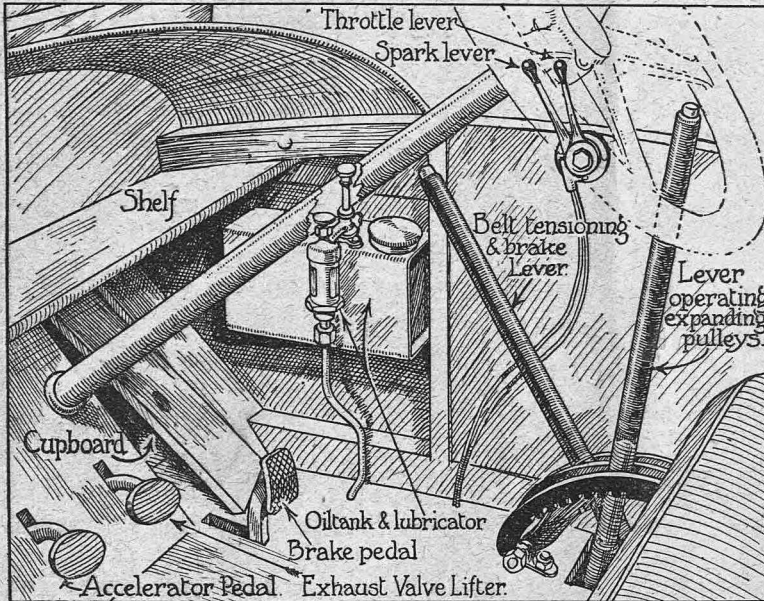
We started out one morning, our objective being Biggleswade, where the Cyclecar Club was meeting for lunch. Although the machine had been standing all night, the engine started quite easily, although, as with air-cooled engines in general, we injected petrol into each cylinder. The main road through Barnet was taken, and the bumpy roads in this neighbourhood revealed the extreme suppleness of the Warner springing. Once out on the open road the accelerator pedal was depressed, and the speed increased. For a considerable distance we kept pace with a powerful Daimler car, but were finally compelled to drop behind, owing to an air lock in the petrol pipe. We had experienced this trouble on the previous day, and had found that the best remedy was to have plenty of petrol in the tank. We therefore filled up at Stevenage, and the trouble disappeared. After lunch, a number of the club members had friendly dust-ups on the greasy lanes between Biggleswade and Luton, and the high speed and greasy surfaces demonstrated the stability of the Warner. We were the first to arrive at the tea stop at Redbourn, other members arriving later with tales of tinkering on the road, a thing which we had found unnecessary on the Warner, as it was running well.

The transmission is on standard lines, the 8 h.p. J.A.P. fan-cooled engine driving the countershaft carrying the expanding pulleys by means of an ordinary roller chain, having a ready means of adjustment. The back axle moves backwards to tighten the belts but the rear springs are rigidly fixed to the frame, the back axle moving independently.

TRIAL OF A WARNE (contd.).

The steering is by a single cable wrapped round a large drum at the base of the well-raked steering column. This cable is rigidly attached to one steering arm, while between the other end of the cable and the steering arm is interposed a spring, which serves the double purpose of keeping the cable under tension and allowing for the vertical motion of the front axle. The H-section axle itself is of massive propor-

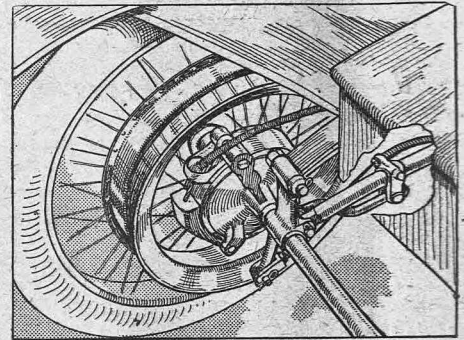
the fore part which is so common to a large number of cyclecars. Beneath the seat is a large locker, divided into compartments, and beneath the sloping back is another shallow locker, access to which is at the rear, so the provision for carrying tools and spares is ample. Luggage can be carried



The disposition of the control levers on the Warne, showing one of the small cupboards in the footboards.

tions, and the 650 mm. by 65 mm. wire wheels are mounted on large ball bearings.

The smart tapered bonnet is hinged to the dashboard and carries a dummy radiator at the front, so that there is not that unfinished appearance about



The arrangement of brakes on the Warne rear-wheels.

very conveniently on the rubber-covered space behind the seats. The starting handle is connected to the countershaft, and is provided with four dogs instead of the usual two, so that it can be adjusted to the most convenient position for pulling the engine over compression. The arrangement of the throttle and spark levers on the side of the body is most convenient. When starting the machine with the right hand, these levers can be altered with the left, until the engine starts. The lubrication is simple and efficient.

Taking into account the price, £99, we would consider that the Warne is one of the best-finished machines we have tested on the road. The comfort of the body, the ease of control, and the general liveliness combine to make the driving of a Warne a pleasure. The makers are Messrs. Pearsall-Warne, Ltd., 152, Shaftesbury Avenue, London, W.C.



In the watersplash at Broadwell. Note the waves. When the Humberette went through the water was 2 ft. deep.

THOUGHTS AND OPINIONS.



*"The suggestions of to-day may
be the realities of to-morrow."*



Theories of Engine Knocking.

Dr. Low's Interesting Experiments.

With reference to your correspondent's remarks on the difference of opinion with regard to the cause of engine knocking, in which I hold that the noise is a metallic one, allow me to draw attention to some interesting experiments. During these experiments, I had high-compression engines running on the bench, with large glass windows in the crankcase and an inspection window in the combustion chamber, which enables the colour of the flame to be seen to check, roughly, measurements of speed and rise of pressure. I insulated the big end of an engine by means of two non-conducting couplings connected by six rubbing contacts, to eliminate unintentional variations of resistance, to the crankshaft and to the connecting rod an oscillograph. Upon passing a current through this strange device while the engine was running normally, one could note the variation in resistance due to the oil film varying. The webs of the shaft were held away from the big-end cheeks by insulating washers. If, now, the engine was run knocking continuously the resistance became infinitely less, and surely this would tend to show that at each knock the big end actually or very nearly touches the crankpin, a state of affairs which, of course, should never occur, as seemed to be borne out by the excessive wear which took place during this mechanical contact with scarcely any oil film for the first time.

A. M. Low, A.C.G.I., D.Sc., etc.

Is the Gas Liquefied?

The explanation of engine knock appears to me to be in the fact that when a gas is compressed beyond a certain stage it liquefies and then becomes solid. When the engine knocks the spark takes place before the piston has reached the top of the compression stroke. The explosion of the gas in itself creates a tremendous pressure, and when this is further increased by the travel of the piston to the end of its stroke, it seems to me possible that the gas may be compressed to a solid. Of course the piston hitting this would cause a metallic knock. When the spark is retarded, the explosion no longer takes place before the dead centre, the pressure falls, and the solid gradually evaporates.

J. H. PARRY.

Derby.

Experiences with a Swift Cyclecar.

It was with keen delight I received an invitation to witness the cyclecar reliability trial test in the Ootswold country from a seat in a Swift cyclecar. I left Evesham shortly before 11 o'clock, and did not reach Sudeley Hill until after most of the competitors had attempted the climb. A good many had failed to make the ascent, and this was not surprising. The condition of the hill was deplorable: the gradient reaches 1 in 6 in places, and the hill is well over a mile in length, with deep ruts and greasy surface. The little Swift, however, made a magnificent climb, despite the fact that the hind wheels many times failed to get a grip. It never faltered, but sailed away up to the top, much to the admiration of all who saw it. No fuss was made about it, there was no smoke, and the engine was cool at the summit. From Sudeley we traversed awful roads, through ploughed fields, without diminishing speed, and experienced shower-baths of muddy water which was lying inches deep in the ruts. Through Andoversford I went on to Birdlip and up this hill, which, after Sudeley, was child's play. At the top a small crowd of enthusiastic motorists had assembled, who congratulated us on our excellent performance. We made our way through magnificent scenery to Stroud and Nailsworth, with its famous "W" hill, which, in addition to its steep gradient, has a number of hairpin bends. Coming upon the hill unexpectedly from the quaint old village street, the Swift made a marvellous climb. It ascended the whole on second gear, and negotiated the corners magnificently. We were very proud of this climb, but, nevertheless, thought we could do better on a second attempt. This proved true, for we came up at a high speed all the way, and left an air-cooled competitor as though he were standing.

(Mrs.) M. HARTLEY-SMITH.

[This running over a course and competing against those participating in a trial by non-competitors is much to be deplored. Performances of machines that have not previously had a severe grueling are of little value. On the Nailsworth "W," one competitor was badly baulked by a descending car, and had to come to almost a standstill at a point where a restart would have been difficult, although we do not think it was the Swift car referred to that was responsible.—ED. THE CYCLECAR.]



A big and a little Swift on the course in the Cyclecar Club trial. See letter from Mrs. Hartley-Smith.

TOURING NOTES AND SUGGESTIONS

Ferry Rates.

Allow me to suggest that something should be done for cyclecar owners in this district who patronize the ferry steamers and the Runcorn transporter bridge. The charges for a three-wheeled cyclecar over these are outrageous. I crossed the transporter bridge at Runcorn a week ago, and when I asked for a ticket the collector said it would be 4d., but after receiving

steamer, and when I asked for tickets the collector came out of his office and inspected the Morgan carefully before they could be issued. He finally decided that it was a small car and could only issue tickets for a motor-tricycle and one person. He charged me 8d. for the two tickets, and my passenger had to pay his fare separately. Naturally, I consider the matter is very unfair when an 8 h.p. motorcycle and a heavy sidecar with two passengers passed for 5d.

A. J. JENKINS.

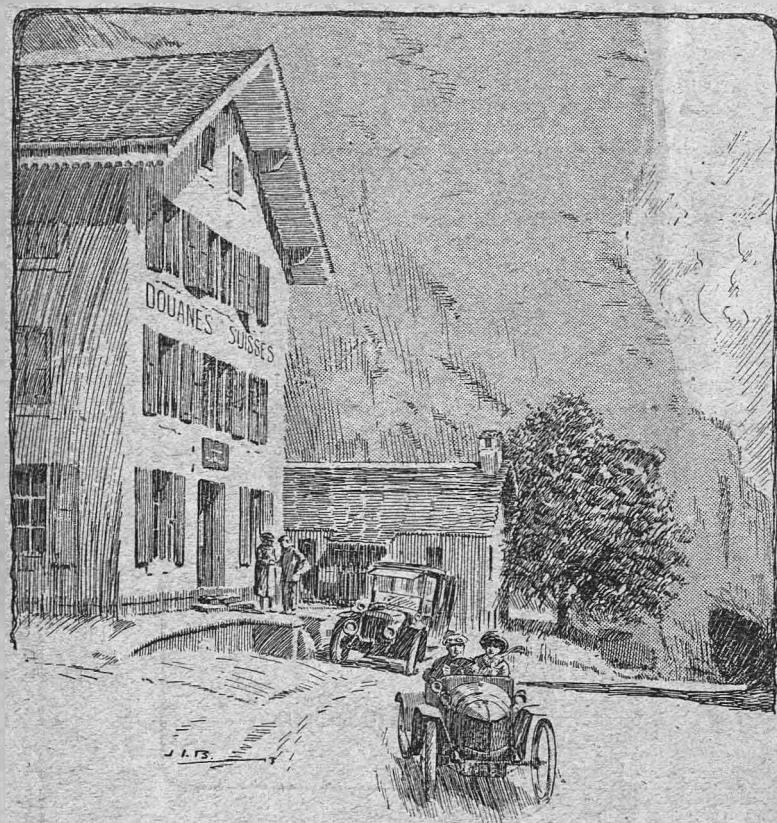
Liverpool.

Holidays in Wales.

The article on "Wales for Easter" in THE CYCLECAR of 12th March was very interesting to me, as I usually spend my holidays at Bettws-y-coed. Probably the best way to avoid the awful roads from Corwen to Cerrig-y-Druidion is to take that for Festiniog at Bala, as recommended, but instead of going right on, turn to the right up a narrow road leading to Cerrig-y-Druidion. The finger-post is in the hedge on the left, and, unless the driver is on the look-out for it, it is easily missed. The road is narrow, but has a fair surface, and there are no very bad hills. If freak hills are required, however, I can recommend the road opposite the path to the Miner's Bridge at Bettws-y-coed, where is situated a lovely triple U bend on a 1-in-4 gradient, which puts any S bend I have seen in the shade. A close examination of the $\frac{1}{2}$ in. Ordnance map will show a number of old roads and tracks among the mountains round Bettws-y-coed, but with a powerful mount these can be explored and will prove a revelation to those who have only seen North Wales from the main roads. For instance, the moorland road from Pentre-Voelas to Llanwrst gives a grand view from a height of about 1000 ft. of the Conway Valley, with the entire Snowdon range in the distance. Continuing over the bridge at Llanwrst, the old road to Capel Curig can be followed, and the mountain lakes Geniennydd and Crafnant may be seen after a short walk instead of a laborious climb. In fact, there is probably no better district in the United Kingdom for fine and I may say grand scenery.

R. MEESON.

London, N.



In the Alps. The Swiss Customs at Gondo, in the Simplon Pass.

this he altered his opinion of my Morgan and charged me still another 4d. Yet only 4d. was charged for a motorcycle and sidecar that was crossing at the same time, although its weight, I am sure, was greater than that of my machine. I crossed to Birkenhead by

mountain lakes Geniennydd and Crafnant may be seen after a short walk instead of a laborious climb. In fact, there is probably no better district in the United Kingdom for fine and I may say grand scenery.

DOES THE THREE WHEELER SKID?

A Business Man's View.

It may be that the pessimistic attitude of your correspondent, Mr. J. Ayres, towards three-wheeled cyclecars has been justified by his own experiments, although my experience of running an A.-C. Sociable has been quite the reverse; therefore it gives me the greatest pleasure to add my testimony as to the general comfort and reliability of these little machines. A few days ago I had occasion to visit Tunbridge Wells to keep an important appointment. The journey from Ashford is no mean run, but I had no trouble of any kind. The skidding complained of so much by your correspondent was in my case practically non-existent. Personally, I have not the slightest doubt that Mr. Ayres's forecast of the disappearance of this type of car will be wrong.

Ashford, Middlesex.

W.H.A.

Daily Use on Tramlines.

Does Mr. J. Ayres speak from experience, or is his letter in THE CYCLECAR, 12th March, all surmise? I have had 10,000 miles experience with an A.-C., used daily on Kingston's greasy tramlines, and can flatly contradict his remark as to the skidding propensities of three-wheelers. The first back tyre, which never punctured and scarcely required pumping all the time, was taken off after 6000 miles and sent to be retreaded. The running cost is 1½d. a mile, calculated on a year's mileage of 7559 miles. What more does Mr. Ayres want? Can he do better on his "simple belt-driven four-wheeler"?

BERNARD HOWLETT, M.R.C.S.

A new edition of "The Cyclecar Manual" will be ready shortly. Price, in paper covers, 1s.; in cloth, 1s. 6d.

THE PROBLEM OF OBTAINING EASY STARTING.

Easy Starting and Slow Running.

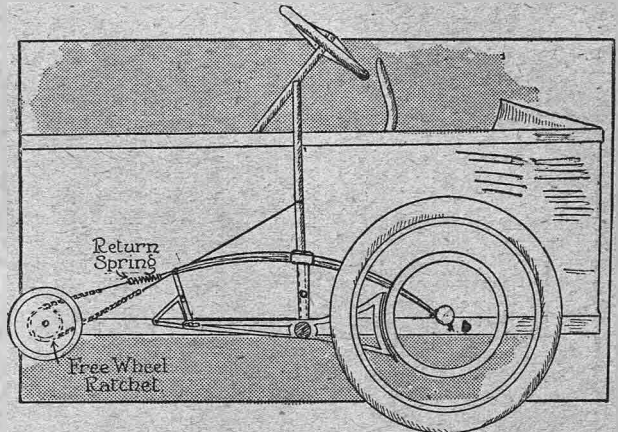
By means of so many wearisome experiments and occasional accidental discoveries, I have obtained on my A.-C. Sociable a setting of the B. and B. (variable jet) carburetter which gives a certain start with one (or at most two) turns of the handle, and dead slow running without any worry as to the position of the levers. By means of the little screw cap, through which passes the Bowden wire controlling the throttle slide, the wire can be raised so that the slide never quite closes; that is to say, when the lever is in the "closed" position the slide is still raised about $\frac{1}{8}$ in., and therefore allows a small quantity of gas to pass to the cylinder. Having performed this operation, the owner should start up the engine with his usual lever settings, close two of the bottom air holes by means of the rotating ring, and then see if the engine will run slowly and steadily with both levers closed. If not, this result can soon be obtained by altering the variable jet while the engine is running, until with both levers closed, it runs quite slowly, but with a business-like air which indicates that it continues to do so as long as desired. This is worth a little trouble, for the benefits are enormous. First of all, to stop the engine, open the air lever. To start, close the air lever and slightly open the throttle and give the handle a sharp pull up. When stopping or slowing up in traffic, it is only necessary to close both levers and pull out the clutch, when the engine immediately dies down to a slow and regular beat. This, to my mind, is the greatest advantage of all, for it entirely does away with the necessity for that racing of the engine which I have so frequently heard when the driver of an A.-C. pulls out his clutch and then has to slow down the engine by manipulating the throttle and air levers.

London, S.W.

J.H.G.

A Cheap Engine Starter.

Many cyclecar engines have to be started by a strap, but a hand starter operated from the driving seat sometimes can be installed. The following is a method by which this may be accomplished on a belt-driven machine. A bicycle free wheel is fitted to the counter-



A suggestion for an easy starter on a Bedelia.

shaft between the pulleys and the frame. A suitable length of chain is engaged with the sprocket, one end being connected to a hand lever which is pivoted to the spring shackle bolt by a length of stranded cable, whilst the other end is attached to a 9 in. coil spring, which, in turn, is fixed to any convenient part of the frame. By pulling the lever, the engine is easily started, and the coil spring returns it to its normal position.

S.C.H.

THE EFFICIENCY OF THE CYCLECAR.

The Percentage Losses.

I have read with much interest the report of Mr. A. E. Parnacott's lecture on "Efficiency the Keynote of Design," and it seems to me that the cyclecar has a great many problems peculiar to itself, which will have to be solved promptly if the movement is to fulfil the promise it gives at the present time. With regard to the diagram showing the power lost, I regret that I cannot follow the figures given. The percentage losses do not seem to tally—the figures I refer to are for the rear universal joints and the bevel gear. This, however, is a minor matter. I do entirely disagree with the author's showing of an indirect gearbox drive with its consequent loss of 10 per cent. on 1.3d. I also wish to point out that both bevel and worm drive should give much better efficiencies than shown on the diagram. Moreover, with a straight drive, such as is obtained by an overhead worm gear or a straight-line drive from the engine to the bevel gear, along with the proper sort of radius and torque connections, there should be practically no loss of power due to the universal joints. The maximum loss in the final reduction should not exceed 5 per cent. One interesting thing about this diagram is the fact that from 21d. worth of petrol only 2d. worth of energy is obtained at the flywheel, and after deducting 14d. worth for the thermal losses we find 5d. loss in engine mechanism, or 23.8 per cent. of the original 1s. 9d. Mr. Parnacott's figures show a loss on the 2d. worth of energy at the flywheel as $\frac{1}{2}$ d., or a 37.5 per cent. loss in transmitting the power generated. The loss in power transmission is, however, only 3.57 per cent. of the original 1s. 9d.; the moral being to cut your losses at the power end of the machine.

Birmingham.

FRANK G. WOOLLARD.

In Competition with Sidecars.

At club meetings and in the Press the relative merits of the cyclecar and sidecar combination have been discussed lately, very much to the disadvantage of the cyclecar. But may I suggest that the official reports of the A.-C.U. Spring Trial afford a fairly reliable basis of comparison? In that event both classes were well represented. Forty-eight passenger machines started, of which 15 were cyclecars and the rest sidecars. Of the cyclecars, 33 per cent obtained first-class awards; of the sidecars 13 per cent. only. It is true that four out of five awards to the former were gained by Morgans and G.W.K.s (two by each), and this may suggest that whereas a good number of sidecars are reliable, there are at present only a few reliable cyclecars. Some makers of cyclecars are still unaccountably slack in putting their machines to the test of public trials. But the fact remains that the cyclecars did at least twice as well as the sidecar combinations. It seems a pity that the first cyclecar and sidecar race at Brooklands should be run under handicap, which makes it impossible to judge their relative merits on the track. So far, the sidecars have much the best of the short-distance records, but they have been beaten by the Morgan and the G.W.K. for the 50 miles and the hour.

E. S. B. SYDNEY.

Ludlow.

[The disqualification of a number of machines for trivial reasons, such as inefficient silencers, oily engines, passengers not normally seated, tyre trouble, and arrivals ahead or behind schedule time somewhat discounts the value of the results when used in the comparisons made by Mr. Sydney. ED. THE CYCLECAR.]

NOTES AND QUERIES.

Selected Replies to Interesting Questions.

Readers are asked to write on one side of the paper only, and to use a separate slip for each question. All queries are answered by post, and a stamped addressed envelope for the reply should be enclosed.

NOW that we occasionally get some fine weather, the question of dust-raising assumes importance. So far as it is possible to judge at present cyclecars, as a class, are not great dust-raisers, and for this reason the ordinary public should take kindly to them. No doubt, as summer approaches, the number of machines on the roads will greatly increase, and if they were all bad offenders in this respect, the outcry against them would have been serious. There are, of course, some machines which are invariably accompanied in dry weather by a perfect cloud of dust, and it would be interesting to discover why some are a nuisance and others are not. How is dust raised by a machine? The governing factor is undoubtedly the eddy currents set up by the passage of the machine through the air. The dust disturbed by the tyres is scattered broadcast by these air currents, and it therefore follows that to minimize the dust-raising qualities of a vehicle it is advisable to reduce these eddy currents. With a streamline body they are practically non-existent, with the result that the disturbed dust resettles on the road immediately. If a streamline body is an impossibility, then the nearest approximation to one is desirable. The first thing to do is to remove all projections, and when this is accomplished, if the result is not satisfactory, the tyres should have attention. Some covers raise dust much more than others, and I had this brought home to me recently while following an acquaintance who was mounted on a motorcycle. The cloud of dust which his back tyre raised was extraordinary, and as I travelled in it for 50 miles it was most unpleasant. Therefore choose tyres which are not great dust raisers.

AIR LOCKS

A COMMON cause of an involuntary stop is an air lock in the petrol pipe, and judging by the symptoms which "W.S." (Southport) has described to me it is possible that his trouble is due to this cause. Unfortunately some makers allow their machines to be sold to the public with abrupt bends in the petrol pipe, and at these places air collects, thus preventing the regular flow of petrol. Another likely cause of trouble is a low-placed petrol tank, resulting in a small head of spirit above the carburetter. On hills it is possible even for the level of the petrol in the tank to fall below the carburetter level, so that petrol would not find its way to the jet, thus causing a stoppage. It is also probable, should petrol not run freely to the carburetter, that the pipe conducting it is placed close to an exhaust pipe so that the spirit vaporizes and prevents the petrol flowing through to the carburetter. To make certain that there is no air lock in the tank itself a small hole should be drilled in the filler cap, and if one is there already it should be periodically cleaned, as it may for some reason or

other get clogged. Of course, any dirt in the carburetter passages, or in the petrol pipe, would prevent petrol flowing freely, but if none is found the cause must be looked for amongst those mentioned in the preceding remarks.

TYRE PRESERVATIVES.

It is a well-known fact that tyres deteriorate in time although they may not be used—in other words they perish. A novice might not notice when buying a cover or tube whether it was in a perished state or not, but after a little experience it becomes quite an easy matter

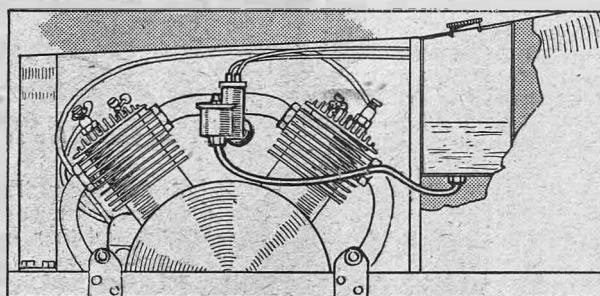
to detect such a tube or cover. The rubber appears to lose its resilient qualities, and, if a cut be made in it, it extends alarmingly instead of resisting any further enlargement of the slit. Its outward appearance, however, practically remains unchanged. "C.A.C."

(Woburn Sands) is troubled because he only occasionally uses his machine, and his tyres continue to deteriorate in spite of this fact. He suggests painting the covers. Most of the special tyre paints do preserve rubber

to a certain extent, by virtue of the fact that the rays of light, which are destructive to rubber, are prevented from reaching the tyre. Heat is another agent which has a deteriorating effect, so that tyres when off a machine should be stored in a cool, dark place. If they are still in position on the cyclecar they should be pumped up to normal pressure, and the wheels jacked up. Then the machine should be well covered up so as to exclude any light.

AIR-COOLED ENGINES.

DOUBT still lingers in the minds of some people as to the efficiency of air-cooled engines. After the successful performances in the various trials of cyclecars which are fitted with air-cooled engines, it seems that a certain section of the public will never be convinced. Considering that various Morgans and other air-cooled cyclecars emerge from these trials with flying colours, and some are not even fitted with a fan, "C.B." (Lancaster) need have no doubts as to the ability of an air-cooled engine to perform the work for which he requires it, arduous though it be. Personally I know of an air-cooled engine that has never overheated during 3000 miles, except when the fan belt had broken, although a more or less massive bonnet encloses it, and restricts the free passage of cold air. The machine has not been nursed in any way, and the whole mileage has been covered at an average speed, well up to the legal limit. On another cyclecar there is no fan at all, and yet the engine has never overheated, not even on very long, steep hills. Proper provision should be made for a free current of air to pass round the cylinders. All makers allow a current of air to enter the bonnet, but some of them omit to give an unrestricted egress to the heated air, which is more important.



Bad arrangement of the petrol supply pipe, causing vapour locks, owing to the hot exhaust pipe vaporizing the spirit. The low level of the petrol tank would also cut off the supply going up hill.