SATURDAY, APRIL 5TH, 1913.

THE AUTOCAR

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EDITED BY H. WALTER STANER.

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Notes.

The Position of the Steering Wheel.

When any change is required which necessitates an alteration in the position of some of the main members of the chassis, it is advisable to give good notice of it so that the makers may consider it when setting out their new designs. A change which strikes us as being desirable is in regard to the position of the steering wheel, not its angle or its height above the chassis, but its position laterally. Owing to the widening of the front seats, which is now so general, and the fitting of high side doors which enclose both the change-speed and brake levers in the majority of instances, it will be found that the driver's seat is not central with the steering wheel. The steering is almost always placed from two to four inches too far to the left, *i.e.*, too near the centre of the car. As a matter of fact, this criticism applies not only to the steering wheel, but usually to the clutch, brake, and throttle pedals. It practically amounts to this—that all the control of the car, with the exception of the change-speed gear and brake levers, is too far to the left. The consequence is that the driver has to sit sideways, and, of course, the more the driving seat is widened, the more inconvenient does this arrangement become.

Discomfort of the Present Arrangement.

It appears to us that the difficulty has largely developed through the designers regarding the chassis from the test body toolbox point of view rather than from the driving seat of a finished car. That is to say, as a chassis the position of the steering and pedals looks, and is, perfectly correct, but, directly a front seat of only reasonable width is fitted, it is found in the majority of cases that the wheel and pedals are too far to the left. The effect of this is not only uncomfortable for the driver, but also uncomfortable for his companion on the front seat, because the driver is bound to move a bit more to the left and, even if he sits quite at an angle, his elbow more or less projects over the passenger's space, so that the passenger in his turn has to huddle to the left, and is more or less cramped for room.

We have had a number of complaints about this from our readers, and we call attention to the matter publicly so that, as changes are made for new models or for revising old ones, the point may be duly considered. The alteration is really more difficult to carry out than many would imagine, inasmuch as the steering and control generally must be kept within chassis width, and it must be borne in mind that the modern body is much wider than the chassis. Incidentally, the matter is considerably simplified by the introduction of the taper bonnet, *i.e.*, a bonnet which is wider at the back than the front, as nothing looks worse than a bonnet with one or more projections on the off side to cover up the steering box and other parts of the control. However, the matter does not end here, and in a good many cases very considerable ingenuity will be required before the steering wheel and the three control pedals can be moved to the right as much as is necessary for ideal comfort and convenience.

Lighting Dynamo and Speedometer Drives.

Two other matters calling for attention on the part of designers are: (1) The provision of a proper drive for a lighting dynamo. (2) The provision of a proper drive for a speedometer. We are aware that, so far as the provision of a convenient drive for the lighting dynamo is concerned, there are conspicuous examples in which this provision is made in the best possible manner, but these cases are in the minority, and the great bulk of the cars being made to-day have no accommodation for a lighting dynamo, which has to be schemed by the electricians, who have to put it in

Notes.

all sorts of out-of-the-way places before it is possible to drive it at all, as some chassis are so designed that, if the aim of the manufacturer had been to make it difficult to fit electric lighting, he could hardly have been more successful.

The Several Alternative Positions for the Dynamo.

It is not our intention at the moment to enter into the question of which is the best place for the lighting dynamo, because that must depend to a large extent upon the design of the chassis as a whole. There is no doubt that with many cars the best place for it is in the bonnet, and it is quite possible to fit it there without in any way "blanketing" any part of the engine which requires occasional attention, and at the same time to have the dynamo accessible. Other chassis carry the dynamo better on the dashboard, but for either of these positions it is almost invariably necessary to design the chassis for the carrying and driving of the dynamo machine. When it comes to fitting the lighting dynamo on chassis where no provision has been made for it it is usually necessary to put it somewhere beneath the floorboards and drive it from the clutchshaft. This often makes an excellent position when it so happens that the chassis design lends itself to it. Sometimes it may be necessary to invert the dynamo, but this does not matter, as alternative patterns are made for running in this position. Nevertheless, beneath the floorboards is not the best position, as the machine is not very accessible under good conditions, and it may be very inaccessible indeed on some chassis. Last, and worst of all, there is the propeller-shaft drive, which is actually necessary in a few cases where there is no possibility of carrying the dynamo in the bonnet or of driving it from the clutchshaft, and, therefore, the only thing to do is to drive it from the propeller-shaft. Quite apart from the fact that the dynamo cannot be run when the car is standing, the great objection to the propeller-shaft position is that in most cases it is quite out of the question to render the dynamo even moderately accessible.

We should say for the benefit of those who have not experienced the advantages of electric lighting that the reason the lighting dynamo should be get-at-able is that it has a couple of bearings which require lubrication from time to time, the armature may require an occasional wipe, and at still longer intervals the brushes may need some little attention. All these operations are easily performed if the machine is get-at-able, but, if it is only to be approached by taking off the under-shield or putting the car over a pit, it is, to say the least of it, a very grave inconvenience indeed. Electric lighting is not such a novelty that so many chassis makers should have failed to recognise that it should have been provided for in this year's models.

Standardised Provision for the Speedometer Drive.

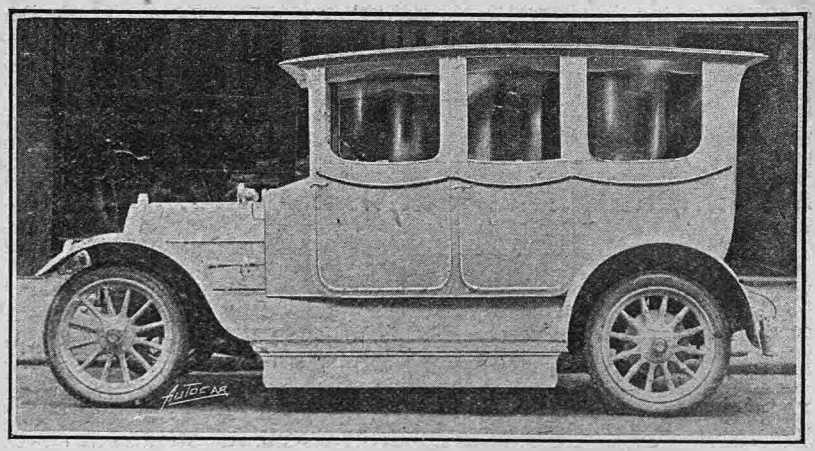
As to a speedometer drive being included in the design of the chassis, no argument is necessary, as anyone who has tried fitting a speedometer to the average car will know to his cost. All things considered, we have found the propeller-shaft and belt drive the best, but, of course, it is out of the question with cars having enclosed propeller-shafts, though easy enough to provide for even with enclosed propeller-shafts if the matter be dealt with in design and manufacture and not left to the ingenuity and patience of the owner.

We have mentioned these matters as well as the position of the steering wheel early in the year because, although they are not each of equal importance, they do affect design and manufacture very considerably, and as it is necessary to get out new designs so many months before they are actually marketed it is none too early to consider the necessary variations for 1914 models.

Body Design and Construction.

An Elaborately Fitted Enclosed Car for India.

The accompanying illustration is from a photograph of a 35 h.p. rotary valve Itala chassis carrying a special limousine body, built by Messrs. Mulliners, of Long Acre, London, and Northampton. The car is finished throughout in a very pale shade of lavender, with the mouldings and roof picked out in a darker shade of the same colour. The whole of the interior upholstery is in lavender-coloured leather, the carpets and laces used being specially woven to match. The seating accommodation is ample for four persons in the interior, and in order to admit as much light as possible the partition is fitted with a pair of curved glasses to slide past one another, and by this means the window extends the full width of the carriage. The interior fittings are in mother of pearl, and all metal work is silver. A specially ingenious arrangement is made for carrying the Stepney wheel beneath the chassis frame, but this is indistinguishable in the photograph. A complete C.A.V. dynamo outfit is fitted and J.M. shock absorbers are provided to the rear springs. This car has been produced to the order of Mr. K. D. Wadia, of Bombay.



The 35 h.p. Itala car referred to in the accompanying description.

Useful Hints and Tips.

The Fitting and Treatment of Clutch Leathers.

IN spite of numerous patterns of metal-to-metal clutches having been put on the market by manufacturers, there is still a large number of firms who retain the leather cone type. Its simplicity and efficiency are sufficient reason for this conservatism. With a little care in use, clutches of the leather cone type are wonderfully efficient and free from trouble. Properly fitted in the first instance and kept well lubricated, they may be depended on for useful service for many years. The fitting of a new clutch leather is a comparatively simple job, but one or two points may be mentioned to guide the user when replacement becomes necessary.

In fig. 1 is shown a purely diagrammatic view in section of a common type of clutch. What follows will refer equally to those which, acting on the same principle, differ in having the male portion of the clutch facing the other direction.

Aside from the question of a worn, hardened, or glazed leather face, slipping of the clutch may be due

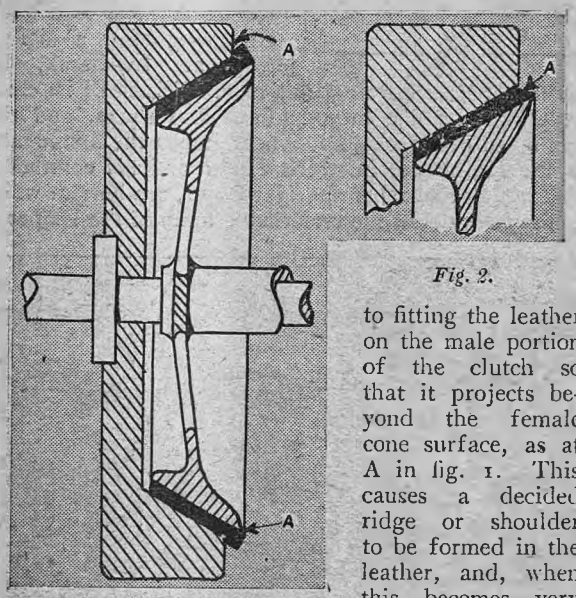


Fig. 1.

Fig. 2.

to fitting the leather on the male portion of the clutch so that it projects beyond the female cone surface, as at A in fig. 1. This causes a decided ridge or shoulder to be formed in the leather, and, when this becomes very pronounced, it may cause the clutch to slip.

It may be obviated in the first instance by "flaring" the mouth of the flywheel. That is to say, curving back the edge at A. To do this after the clutch has been manufactured means putting it in a lathe—a job out of the question for the user. The trouble may be obviated by chamfering off the edge of the leather, as shown in fig. 2. Here the whole clutch surface is effective, but the trouble of a ridge forming is non-existent. A clutch leather should be cut at the join as shown in fig. 3, provided the direction of rotation of the engine is clockwise, for then the friction of the flywheel against the leather at starting does not tend to lift up the facing edge to any great extent.

A clutch leather must be cut out of the best thick well tanned hide and fixed with the rough side outward. A new leather can be cut by using the old as a pattern. It will approximate in shape to fig. 4. Sometimes the old leather becomes distorted in removing it from the clutch cone. In such cases the new leather can be marked out for cutting by first making a template or pattern of thick brown paper; this can be temporarily secured to the cone, to be certain of its correct shape, by gum, or even by moistening it with water. The leather when cut to shape should be soaked in water for some hours to soften it before stretching it on to the cone. It should then be drilled for the end rivets, and the other holes marked off as it is stretched round the cone. The other holes may then be cut, and the face of the leather countersunk, so that the copper rivet or screw heads will sink well below the leather surface.

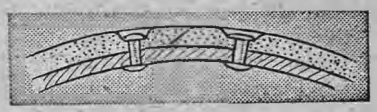


Fig. 3.

When in place the sharp edges should be trimmed back with a knife, as shown in fig. 2, and when dry the leather will be found to be a good tight fit on the cone. It should then be prepared for use by frequent and liberal dressings of castor or collan oil, and kept in good condition by the same means.

If the leather becomes glazed or sticky in use, or if some inexperienced person has treated it with a dose of resin, as some inexperienced people do in the case of a slipping clutch, it must be thoroughly scraped and cleaned with petrol, dried, and finally treated with castor oil. Some experienced fitters use hot water and soda for the removal of grease, but care must be taken when this practice is followed not to have the water too hot; it should not be boiling. If the cone with the leather on it can be warmed previously to dressing with castor oil so much the better, as the oil will sink in quicker and deeper.

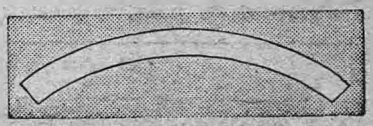


Fig. 4.

If these precautions be followed, and the clutch periodically treated with the oil, slipping or fierceness should be obviated. It is a good plan with leather cone clutches to wedge the clutch open when the car is to stand for any considerable time, and to brush on a liberal coating of castor oil.—X.Y.Z.

An Engine Knock.

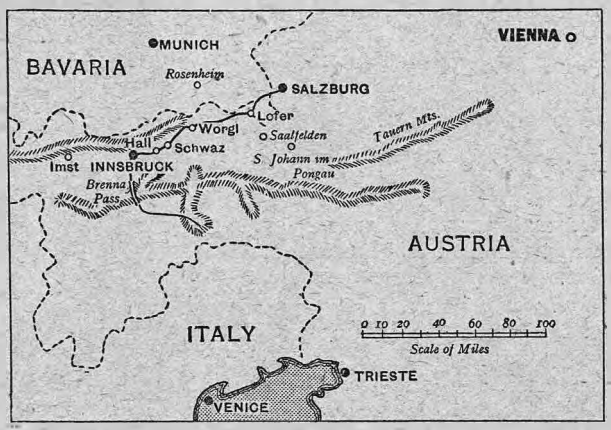
I had a knock in the engine of my car till lately which had been going on a long time and quite beat me, perhaps because it was so simple. It appeared only in the cylinder nearest the dashboard, and was much more pronounced with full throttle. Anyone would have said it was a big end; the big ends were a little loose, certainly, but nothing much, and were taken up. A new gudgeon pin and bush were also fitted, but apparently the knock was then worse. Eventually it turned out to be the bottom of the piston was just touching the top of the crank case at the bottom of the stroke. There is a groove in the crank case into which the piston comes down. Naturally, taking up the big end merely slightly lowered the piston as a whole and made the knock worse. Filing $\frac{1}{16}$in. off the bottom of the piston cured the trouble. This must be a frequent occurrence in old cars, particularly with bronze bearings instead of white metal lined ones, as I can imagine the latter being renewed completely when fairly old, whereas my bronze ones had been in the car four years.—G.D.B.

A Corner of Tyrol.*

From Innsbruck to Lofer. A Pleasant Run through Mountain-bordered Valleys.

By Chas. L. Freeston, F.R.G.S., Author of "The High-roads of the Alps," "The Passes of the Pyrenees," etc.

THERE are countless people who know Innsbruck, the capital of Tyrol, but have neither tasted nor dreamed of the superabundant joys of Alpine travel by road. For this handsome town lies at the junction of the Arlberg-Vienna and the Brenner railways, and is passed through or halted at by nearly every visitor to Austria. Splendidly surrounded by striking peaks, it is attractive at all seasons of the year; for, while it unfolds the charms of nature in liberal measure in spring, summer, and autumn, in winter it is a busy centre for ski-ing, tobogganning, and kindred sports.



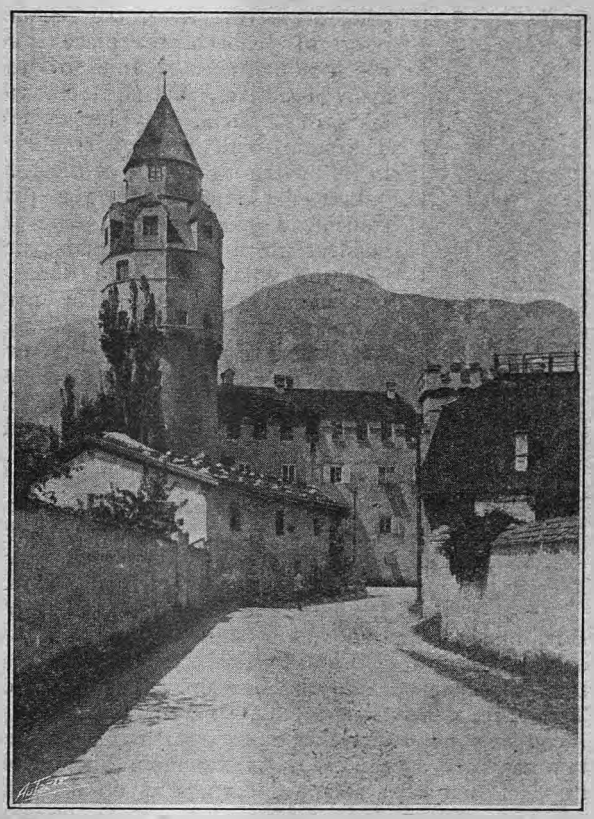
To the motorist it is no less important than to the train traveller, and few who tour in Austria will fail, from necessity or choice, to visit the "Key of Tyrol." Besides being the focal point of innumerable routes, the place never palls, so pleasant is its climate at all times, so varied are the walks and drives in the immediate vicinity, and so interesting its public buildings and institutions. Historically, it is a study in itself, but even those who are willing to delve no further back than the Patriotic War of 1809 may well read the stirring narrative of the heroic exploits of Andreas Hofer, whose statue surmounts the wooded hill, known as Berg Isel, a short distance from the town. It was on this eminence that Hofer and his peasant army thrice fought the Bavarians and French, and recaptured the capital.

However tempted the tourist may be to set his car going after a night's rest at Innsbruck, he should at least devote a day to the visiting of its chief buildings, its fine thoroughfares and shops, and the run up to Berg Isel. Prominent among the first-named is the Hofkirche, in which Hofer and his comrades-in-arms, Speckbacher and Haspinger, are buried, while in the nave stands the remarkable tomb of the Emperor

The finely posted Castle Amras, in the neighbourhood of Innsbruck.

Maximilian, surrounded by twenty-eight statues of his ancestors. One of these, and the best in artistic merit, represents King Arthur of England in full armour, and one may travel a long way without meeting its rival among bronze sculptures.

The Museum Ferdinandeum is also worthy a visit, especially by the traveller who is making his first acquaintance with Tyrol, for it is a national reposi-



The Munzer-Thurm, or Mint Tower, at Hall, a busy town of Roman origin, famous for its salt baths and salt works.

tory of relics, armour, sculpture, pictures, metal work, and everything which can illustrate effectively the history of the country and the characteristics of its people. Other buildings of note are the Hofburg, or Imperial Palace, the University, the Theatre, the St. Jakobs-Pfarrkirche, or Parish Church of St. James, and the Technical Schools, while the Goldenes Dachl, and the Helblinghaus, immediately opposite, arrest attention, the former by its tiles of gilded bronze and the latter by its richly decorated windows.

It is with regret that one leaves a town so charming as Innsbruck, but the call of the itinerary is insistent. Probably nine motorists out of every ten, however, betake themselves forthwith to the Brenner Pass, on the south, in order to attain as quickly as possible, and feast upon, the rare joys which are offered by the unrivalled mountain roads of Tyrol; but for the present we are considering the eastward route to Vienna. The initial stages of this journey pass through the north-eastern limits of Tyrol, along the valleys of the Inn and the Ache successively, and there is not a single height of any consequence to be crossed at any point between Innsbruck and the border line between Tyrol and the province of Salzburg.

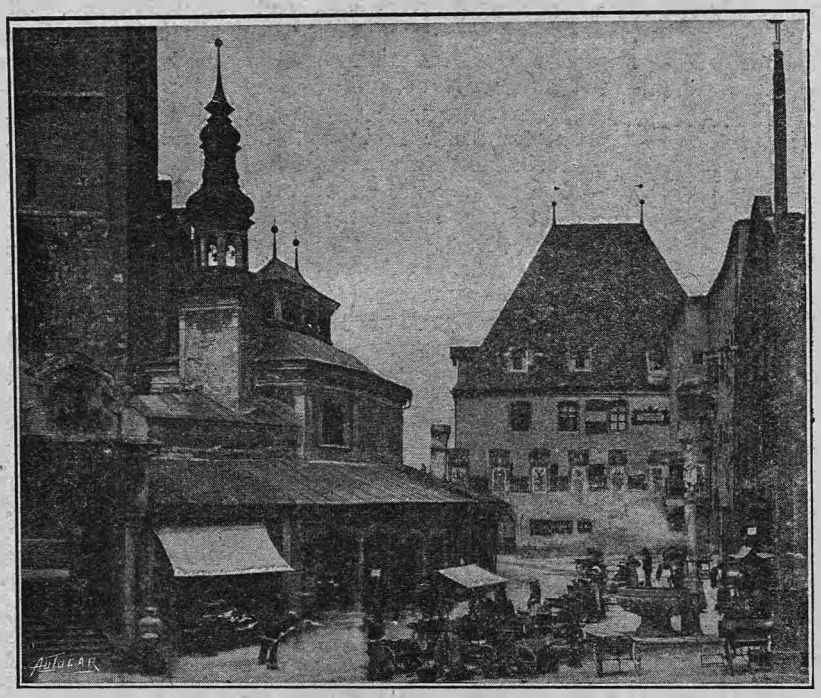
The Tyrolean capital stands at an elevation of 1,885 feet, and the highest point of the route, at Elmau, is only 2,690 feet, while the difference between the two is spread over a distance of eighty-four kilometres. But, if it does not afford the opportunity of climbing a pass, the road is none the less picturesque throughout, for it is in close touch with a line of mountains on either side, with a river almost always in attendance. It is practically unknown, moreover, to the ordinary tourist, and would be worth exploring for its own sake, even if it did not form a necessary portion of the route to Vienna, and incidentally lead up to the beautiful city of Salzburg and the galaxy of lakes in the Salzkammergut beyond.

One thing, however, must be premised at the outset, and that is that the roads at comparatively low levels do not present the superb quality which so signally enhances the attractions of the lofty passes. It is so in all mountainous districts; for, not only is less engineering skill displayed in the construction of the valley highways, but they have also to bear the brunt of local traffic between town and town. At the same time, the motoring tourist who is prepared to take a certain amount of rough with the smooth need enter on the journey in question with no misgiving; all that he has to realise in advance is the fact that he must not estimate his probable progress by kilometre figures. In some places he may bowl along as merrily as the scenery will let him; but in others, either from the nature of the surface or the presence of sharp corners, he must moderate his pace.

The Parish Church at Hall, an interesting building dating from the year 1371.

This stipulation applies, nevertheless, to the final stages of the journey along the fringe of Tyrol, and even more particularly to the crossing of Salzburg. It is a fine enough road from Innsbruck—which must be left by the Falkstrasse—to Hall, with mountain views on every side, not forgetting those which lie

behind Innsbruck itself, and which are worth more than one retrospective glance; they are, in fact, in every way inspiring. Some five kilometres out one may note the old castle of Amras, standing on a well-wooded spur of the Mittelgebirge. Once a Roman fort, the castle is now a rich storehouse of armour and weapons, frescoed ceilings, and beautiful doorways. Though the property of the Austrian Emperor, it is thrown open to the public, and is well worth a passing visit, but tickets must be obtained at the Hofburg before leaving Innsbruck.



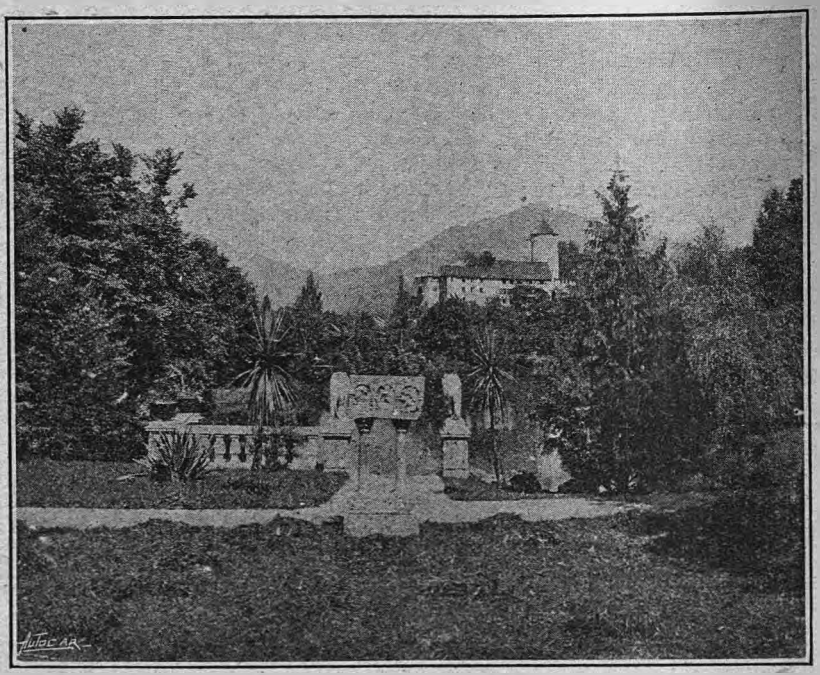
An interesting scene in the Market Place at Hall.

Hall itself is a busy town of Roman origin, famous for its salt baths and works, and also for its associations with the Tyrolese patriot, Andreas Hofer. It was here, in the quaint red-roofed Münzer-Thurm, or mint tower, that Hofer coined his 20-kreuzer pieces, while the town was the scene of several of his conflicts with the French. The Pfarrkirche, or Parish Church, is an interesting building, dating from 1271, with a fine Gothic portal, while the mediæval Rathhaus is also worthy of attention. The mines from which brine is brought into the town are situate about ten kilometres away.

Beyond Hall the road crosses the Inn, and leads through a succession of villages to another interesting town—that of Schwaz. The copper roof of the church explains itself when it is mentioned that copper-smelting is carried on here, as at various other places along the valley. Schwaz is also the scene of a large tobacco factory belonging to the Government, while of less modern interest are the finely posted castle of Freundsberg and the château of Friedheim.

Still driving with the river on our left, we soon come to a break in the line of mountains on the north-west, which discloses a sort of cañon, with three tiers of peaks. The effect is very striking from the road, and one can readily believe that actual exploration of the gorge, which is known as the Wolfsklamm, would prove an enjoyable experience. A little further on one may note, across the river, the summer resort of Jenbach, the place from which the Achensee, one of the many beautiful, but little-known, lakes of Austria, may be visited. The main road, however, continues to follow the right bank of the Inn.

Lest the feature may be permanent, I must mention here an incident which befell me at a point near the village of Büch when I last passed this way. The road narrowed suddenly, being strewn, for some reason or other, with *débris*, leaving only just room for a single vehicle. As luck would have it, when right in the middle of the gangway, I met another car coming at a good pace. There was a bend at each end of the choked section of road, while the outlook was also obscured by trees. The driver of the other car had perforce to charge the bank of *débris* on his side, and we had to follow suit on ours, and not only escaped a collision by inches, but were considerably bumped into the bargain. The roads of Tyrol are, generally speaking, so well managed that I can only hope that this lapse from grace was due to temporary causes. This is the more likely from the fact that such awkward corners as do occur in this line of route are mostly indicated by warning



An Englishman's residence in Tyrol. Castle Matzen, Brixlegg, the seat of Captain W. A. Baillie-Grohmann.

A Corner of Tyrol

signs erected by the Automobile Club of Tyrol, and had this dangerous obstruction been of a lasting character its presence would probably have been indicated in advance.

After descending to Rathholz and passing through Strass, one sees the twin-towered ruined castle of Kropfsberg, and then the beautifully situated Schloss Matzen comes into view at Brixlegg. This castle is the home of Captain W. A. Baillie-Grohmann, an English sportsman who was among the first to call attention by his writings to the manifold attractions of Tyrol; and it is not in human nature to avoid envying him his enjoyment of life in such picturesque surroundings. Brixlegg itself, though one of the villages where copper-smelting is carried on, is an attractive summer resort in which patriotic plays are performed every year, with a decennial representation of the Passion Play as well.

Only a mile further on the road runs under a railway arch and enters Rattenberg, where there is a ruined castle the square tower of which is reminiscent of the more famous one of Landeck. The little town is left by an archway, beyond which one passes under a railway bridge and enters upon a stretch of road along which it is desirable to proceed carefully, by reason of the presence of much waggon traffic during the hay-making season. Occasionally the road may be practically blocked by a stationary vehicle which is being loaded from the adjoining fields. Before the next village is reached, moreover, a "donkey-back" must be looked out for. For a short time the road becomes narrow, but after a descent from a wood and a short steep rise, fast travelling becomes possible.

Beyond Wörgl there is a right-angled junction. The road to the left leads up to Kufstein, a much-frequented resort for railway tourists, with a fine environment. We leave the Inn, however, which now accompanies the road to Kufstein, and swing to the right for Söll, Elmau, and S. Johann-in-Tirol, along the right bank of the Brixentaler Ache. The road is broad and level, with a good surface, for some distance, and then, after a slight fall, ascends to Söll. It then undulates, but with a rising tendency, to Elmau, a pretty village which is dominated by the Wilde Kaiser, and represents, as has been mentioned, the highest point of the route. A couple of kilometres further there is a village with the curious name of Going. The road soon comes within sight of, and then runs alongside, the Reither Ache, and is flanked on the left by the Kaiser-Gebirge, the imposing outlines of which are strongly suggestive of the Dolomites. Two more villages—Rettenbach and Spital—are passed, and then, after crossing the Grosse Ache, the little town of S. Johann-in-Tirol is entered. It lies pleasantly in the broad Leuken-Thal, beneath the Kitzbühler-Horn, and at the junction of three roads. The one to the left leads to Lofer; straight forward one may proceed to Saalfelden; while the road to the south runs up to Kitzbühel which is eleven kilometres distant.

A choice from these alternatives is somewhat difficult, but the direct road to Saalfelden may be rejected by reason of its narrowness. Preferably one would go south to Kitzbühel and thence over the Pass Thurn to Mittersill, from where the straight road to Bruch, Taxenbach, etc., is available, and on to S. Johann-im-Pongau and Salzburg. Unfortunately, however, the valley in the neighbourhood of Mittersill is subject to inundations, and it is inadvisable to steer in that direction without careful preliminary enquiry. If the reports are favourable I should certainly recommend the taking of this route; but otherwise the tourist must content himself with a run up to Kitzbühel and retrace his wheel-tracks to S. Johann-in-Tirol.

Kitzbühel lies in an attractive setting on the Kitzbühel Ache; and, though it has for some time past been a favourite summer station to those familiar with the charms of North Tyrol, it has only recently been heard of in England by reason of the fact that it is

Kitzbuhel, a beautifully-situated Austrian village which is being developed as a winter sports resort.

one of the places in Austria which are being developed as winter sports resorts. There is a liberal array of hotels for so small a town, and in summer and winter alike it is in every way a charming spot.

To the Pass Thurn is a good run, by way of Jochberg—the summit of the pass being only 4,206 feet—first on the left and then on the right bank of the Ache. The pass represents the boundary between Tyrol and Salzburg. On the descent to Mittersill there are glorious views of the Tauern mountains. Thenceforward the road runs eastwards along the Salzach to Bruch, the junction for Zell-am-see, of which more later.

Returning, however, to a consideration of the Lofer route, I may say that it offers a very pleasant run to Erpfendorpf, and on to Waidring, rising gradually the while. The valley of the Strubache, through which it continues, then grows narrower and narrower, and the road at length descends to the Pass Strub, a picturesque ravine with massive, lofty crags on the left and a turbulent river below. An obelisk here was erected in 1887 to commemorate three defences by Tyrolese peasants in the conflicts of the first decade of the last century. Here, too, we reach the border

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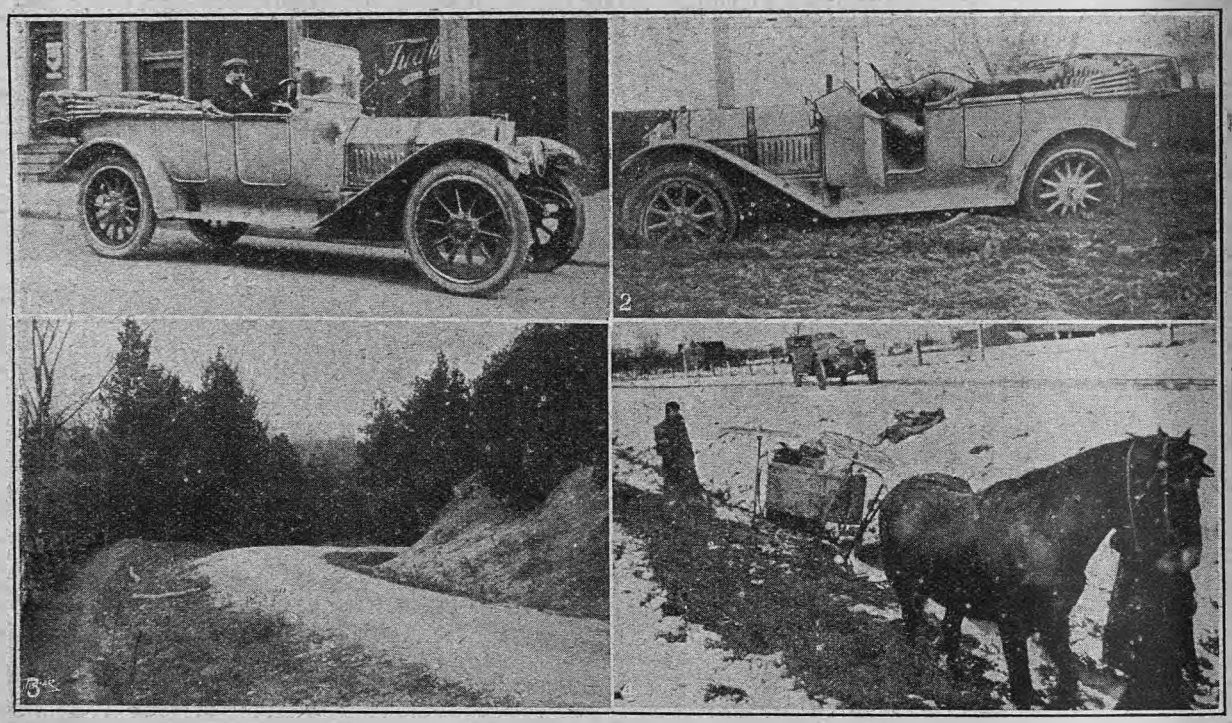
line of Tyrol and Salzburg, and a signpost bearing the words *Rechts-fahren* and *Links-fahren*, according to the direction in which it points, affords a useful reminder of the change of the rule of the road, which, in Tyrol, is akin to that which obtains in this country, and is almost unique on the Continent in that respect.

It is now only a short distance to Lofer, which is finely situated beneath a wooded mountain slope, with splendid prospects of snow-capped peaks in the distance. Motor diligencies, it may be mentioned, ply between this summer resort and S. Johann-in-Tirol, and I met a squad of four of them in a bunch on the road to the Pass Strub.



MOTORING IN CANADA. A six-cylinder 1913 model Tudhope, a car of Canadian manufacture. It is built in Orillia, Ontario, and the one shown was recently driven from Orillia to Detroit and back, a distance of over 1,000 miles, on a test run without mechanical or tyre trouble. No. 1.—At Toronto. The driver is Mr. Frank Lewes, who was prominent in several of the Scottish and Irish trials and who was the only driver to finish with a four-passenger car in the Hereford Small Car Trials of 1904. No. 2.—A bad road. No. 3.—A well engineered road between Guelph and Toronto. No. 4.—An overturned buggy.

Flexible Propeller-shafts.

An Old Idea Rediscussed for Dispensing with Universal and Sliding Joints.

WHILE recently discussing the question of wear of universal joints, a member of our staff made a suggestion, by no means new, but nevertheless interesting, that might have possibilities, and therefore we give it here for what it may be worth. "Why not," said he, "have a flexible propeller-shaft similar in principle to the Stow flexible shafts or to those employed by dentists for starting toothache and stopping teeth?" Such a shaft for car work would, of course, have to be double; that is to say, there would have to be two concentrically-arranged shafts, the one wound in one direction to take the forward drive, while the shaft for transmitting the reverse would, of course, have to be wound in the opposite way. As each winding would be so arranged that any driving strain would tighten up the coils of the flexible shafts, the inner shaft would support the outer when the latter is under load, and that each coil may the better support its neighbour, a square section of winding—like the wire winding of a big gun—would be best.

One of the least easily overcome difficulties would lie in attachment of such a shaft at its ends, but this is hardly likely to prove insurmountable, for already considerable powers are transmitted by flexible shafts. For driving a car, however, comparatively heavy shafting would have to be employed, and it is doubtful whether the work, lost in the coils as the shaft bends, would not more than counterbalance any advantages over the universally-jointed shaft. Still, the suggestion may be of interest. Perhaps some of our readers have already experimented in this direction. If so, we should like to hear their views.

Personally, we have had no experience with shafting of this kind except for very small powers, but it appears to us that the great difficulty would be to balance the shaft, as there must be a certain degree of slackness in it, and it would behave more or less like a skipping-rope; this would set up a considerable unbalanced force which would disturb the running of the car. It must be borne in mind that the propeller-shaft is running at crankshaft speed on the direct drive, so that any serious lack of balance due to the skipping-rope like action would be quite noticeable, as the shaft would be revolving up to 2,000 r.p.m. on some cars with high-speed engines. Further, we have doubt as to how the weights would compare. It is possible that a sufficiently strong construction of flexible shafting would weigh considerably more than the ordinary arrangement of sliding joint and universals.

Timken Roller Bearings.

The Theory and Method of Their Construction. Radial Load and Lateral Thrust.

THE vast majority of people nowadays, owing to the wide spread of automobilism, have become very familiar indeed with engineering terms and expressions, and one hears them talking glibly about ball bearings, roller bearings, and the like. Whereas if the truth were told few enough of them could show on demand anything more than the most trivial and superficial knowledge of these things. Still less would they be able to compare the values of the two types. It is in the hope that a little enlightenment upon this subject may prove interesting as well as instructive that this article on the Timken roller bearings has been written.

In discussing bearings, it is difficult to avoid arriving at the conclusion that ball bearings or roller bearings ought really to have been invented thousands and thousands of years ago; they ought, in fact, to have been contemporaneous with the discovery of the wheel. In far-off and ancient times, if a man wanted to move any small property from place to place, he put it on a sort of sledge and dragged it over the rough ground, dissipating a very large proportion of the energy required for the job in the friction between the two surfaces. By and by some genius hit upon the idea of putting rollers between the sledge and the ground, but as this method of transport was necessarily slow, and required the services of a man to pick up the roller the sledge had just left, and to run round and pop it down in front, no doubt the wheel, obviating this difficulty, whilst retaining the roller idea, was hailed as a very great and valuable invention, which indeed it was. The old-fashioned wheel had, of course, not eliminated sliding friction, because this occurred none the less between the hub of the wheel and the axle. The important point was, however, that at this point suitable materials could be used, so that the total friction was considerably less than that in the case of the sledge. It was possible to reduce this loss even further by lubrication. This type of wheel, viz., the plain bearing type wheel, exists in very large quantities, and has existed for almost countless years.

To us who look at these matters from the end of the period and not from the beginning, it seems almost inexplicable that the same man who used the big wheel to avoid rubbing contact between the sledge and the ground surface, did not realise that in the same manner he could use a series of small wheels to get rid of the sliding friction between the wheel hub and the axle pin. Both ideas are really exactly the same, and it is only the application that is different. In the ball bearing and the plain roller bearing there is no sliding friction whatever, because the motion is in each case purely a rotating one, of course provided that the components are perfectly symmetrical in shape. Unfortunately, both these types of bearing suffer from disadvantages. The plain roller bearing is provided with no means of adjustment, which means that it steadily decreases in efficiency from the first moment of its use, and in the case of the ball bearing there is only an extremely small contact surface. This means that the pressure at the point at which the ball is in contact with the inner and outer race is exceedingly high. Therefore the load that can be sustained by this type of bearing is relatively small. The question of wear is, however, of even greater importance. It would not matter in the least if materials could be devised which would be everlasting in substance and quality. But since in the present state of the Arts we have to admit that we know of no motion that does not involve a dissipation of energy by friction, and consequently results in the wearing out of the material, the only thing that can be done is to make allowance for the inevitable and provide means for meeting it. In the case of bearings using cylindrical rollers, a very little consideration will show that any method of adjustment is impossible, because all the movement takes place in a certain plane. With the ball bearing the fact that any section of a sphere is a circle allows one to make these balls rotate, if necessary, in another plane, and by this means the wear can be taken up, and this principle is used in the well-known cup and cone type of ball bearing which is in general use in cycles, etc. Unfortunately, the balls in this case cease to have a truly rotary motion, but have a spinning motion in addition, so that considerable increase of wear takes place. This necessitates larger balls than would ordinarily have to be used to withstand it. If the ball bearing is of the more usual annular form, in which no wear can be taken up, it is necessary to have the balls of a larger diameter still. And in this case it must be remembered that as soon as a certain amount of wear has taken place it is necessary to use slightly larger balls to take up the slack, but this, of course, does not provide a progressive adjustment.

Another point, and a more important one, is that in nearly all cases the bearing is required to withstand at one and the same time both a radial load and end thrust. In the case, for instance, of the road wheel of a car, during the whole of the time this is working its bearings will be subjected to the radial load due to the weight of the car, but in turning corners an additional lateral thrust is imposed. This need not be necessarily high, but its tendency in the case of the ball bearing would be very greatly to shorten the life of the bearings, because it is followed essentially by a spinning motion. This means that if an ordinary ball bearing is required to sustain a certain amount of occasional thrust load it must be unduly strong relative to its radial load-carrying capacity. Otherwise the wear will be rapid and its efficiency will be quickly and severely impaired. The cup and cone bearing is one that is generally regarded as being capable of withstanding both radial and thrust loads equally well, but a little consideration will show that the moment wear begins to take place the balls lose their truly rotating motion.

Fig. 1 shows one of these bearings. The dotted line indicates the plane in which the balls have to revolve. From this it is clear that wear takes place at the points A and B.

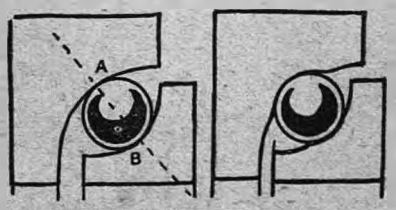


Fig. 1. *Fig. 2.*

Fig. 2 shows, with a certain amount of exaggeration, what happens when this wear takes place. The ball wears channels or grooves partially circular in section both in the cup and in the cone. At

Timken Roller Bearings.

first sight it might appear as though this were actually an advantage instead of a difficulty, inasmuch as what was previously a point of contact is now converted into a line of contact.

But a little thought will show that this is not really the case at all, but that if the ball is to roll along these channels a certain amount of slip must take place between its surface and the surface of the groove. It is easily shown by a consideration of fig. 3, which illustrates the cup part of the bearing in large size. The ball is in contact with the cup between the points X and Y. As these points are equidistant from the central point of the ball's rotation, it follows that at X and Y the peripheral speed of the ball will be the same, *i.e.*, in feet per sec. But the point Y on the cup is at a greater diameter than X, and therefore the circumferential speed at this point is different, that of the point Y being greater than that of the point X in proportion to their respective diameters. Hence if the ball is to roll on the cone at X it must do a certain amount of slipping on the point Y, and, of course, the same holds good for any other two points taken along the line of contact between these two.

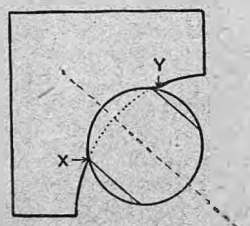


Fig. 3.

The Timken roller bearing is, as it were, the analogue of the cup and the cone ball bearing, having the same relation to this as the plain roller bearing has to the annular ball bearing, *i.e.*, to say it enjoys an increased load-carrying capacity by virtue of its line contact, whilst perhaps more important still it possesses the valuable property of being adjustable.

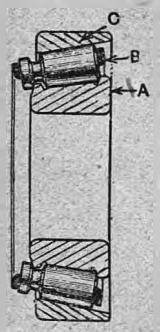


Fig. 4.

Fig. 4 shows a section of the Timken bearing, of which A is the inner race or cone, B the tapered roller, and C the outer race or cup. By the use of a tapered roller, the bearing is given the means of sustaining the end thrust load as well as the radial load, whilst at the same time it is ensured that a perfect rolling contact is established between the surfaces of the races and the roller. This is arranged by fixing the roller in such a position and the bearing at such an angle that the lines which represent this taper, if produced, would meet in the centre line of the bearing, as shown in fig. 5. This means that the diameter of the cone, at the point A, bears the same proportion to the diameter of the cup at the point B as it does at the respective points C and D, and, further, that the diameter A B of the roller bears the same proportion to the diameter C D as the diameter of the cone at A bears to the diameter of the cup at C. A little thought will show that, this being the case, the relative motions are symmetrical, all through the scale, no matter how long the taper bearing is made.

It will be noticed from fig. 4 that the roller is furnished with a sort of waist adapted to fit the rib on the inner side of the cone, whilst at the other end of the roller, viz., at its largest diameter, its edge is chamfered so as to engage against the side of a second rib. These ribs, it must be particularly pointed out, are not for the purpose of sustaining the thrust load of the bearing, which is taken purely and simply by the roller being squashed, as it were, between the two conical faces. The function of the ribs is purely and simply to act as guides to the rollers and to keep them equidistant from one another, and with their axes always lying parallel to the axis of the revolving shaft. For instance, it is conceivable that a particle of grit might get into the bearing, and if these ribs were not in position this would cause one, or perhaps two, rollers to get out of line with one another, and tend not only to create additional friction, but to throw an irregular and unusual load upon the whole bearing.

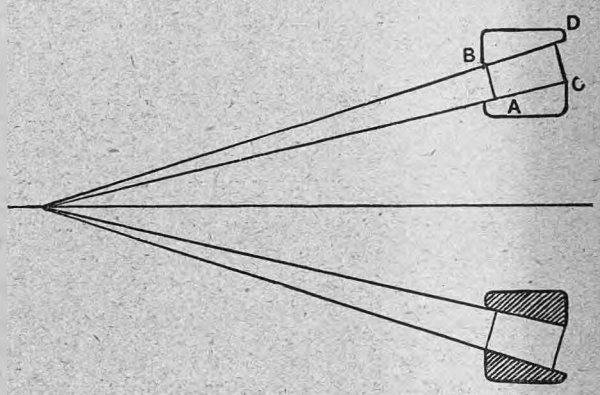
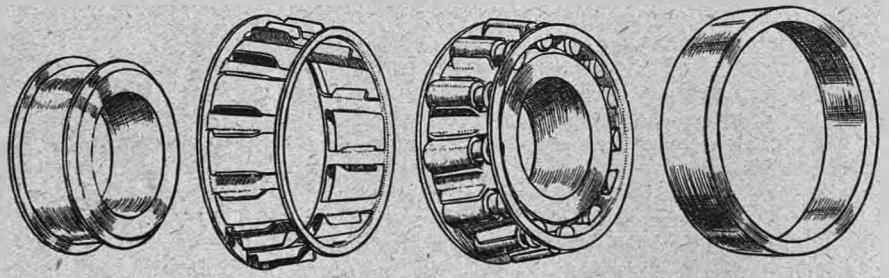


Fig. 5.—Diagram showing how the tapers of the rollers meet at the centre line.

From what has already been said in regard to the ball in the cup and cone bearing it will readily be perceived that the true relative motion cannot exist between the ribs of the cone and the working edges of the roller. At these points, therefore, a certain amount of slip must inevitably take place, but it occurs between the surfaces upon which there is practically no load whatever, and therefore its tendency to cause wear is very slight. This is proved by the fact that in the Timken bearing the friction loss is reduced to somewhere between one-eighth and one-quarter per cent., a quantity which is practically negligible in this connection.

One of the chief advantages of the Timken bearing is the perfect ease wherewith it is capable of adjustment. For this purpose all that is required is to slide the outer cup and inner cone towards one another, thus decreasing the vertical distance between them, and so taking up any clearance between the roller and the surfaces upon which it works. This operation, as will be shown later, in several applications of the bearing, is accomplished in a very simple and straightforward manner.


Figs. 6, 7, 8, and 9. The component parts of a Timken roller bearing.

It might be thought, and indeed it is often suggested by people who do not trouble to consider this matter thoroughly, that in a bearing of this kind the rollers would have just as much tendency to plough permanent furrows for themselves in the races as balls exhibit, but this is really not the case. The angle of taper of the rollers is somewhere about 5°, or, as it might be expressed otherwise, about 1 in 12. If the roller should wear, however, so that the clearance between its surfaces was one hundredth of an inch it could clearly do with nearly one-eighth inch lateral adjustment, and such an amount of side play would be a clear proof that the bearing was not receiving reasonable attention. If adjusted from time to time as required by slight wear there is no tendency for channels to be cut through the cup or the cone. In all cases such play would immediately show itself as soon as it developed, and as adjustment is a matter of such simplicity there is no reason whatever why the bearings should not be kept at their very best. The standard type of bearing has a cup width of from 17 to 22 mm., which means that a maximum of 1 mm. of wear can be taken up by adjustment only.

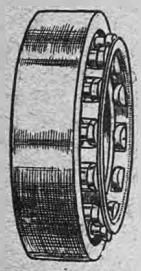
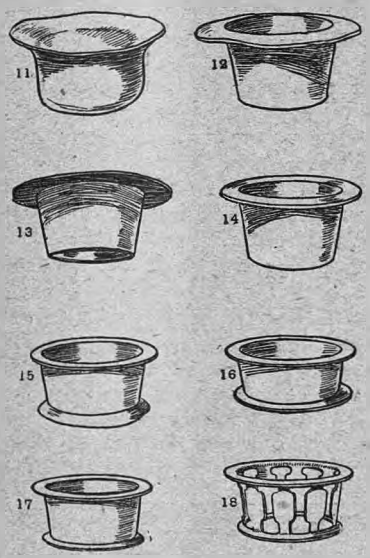


Fig. 10.

We now turn to the actual arrangement and form of the complete bearing itself, which is illustrated in its various parts in fig. 6, which shows the inner cone, fig. 7 showing the cage, which holds the rollers in their relative position, fig. 8 showing the cage with rollers in position, fig. 9 the cup, and fig. 10 a perspective view of the complete bearing. The cone and cup are machined out of solid steel bar, the work being done on multiple-head lathes for small size bearings, and on single-head tools for larger sizes. After having been turned, these parts are brought to the desired hardness, and are then ground dead true to size, after which they are carefully tested, before being passed for assembly. The rollers are also treated similarly, being first of all machined from the bar.



Figs. 11, 12, 13, 14, 15, 16, 17, and 18.

The utmost care is taken in hardening these small parts to obtain homogeneity. For this purpose they are put in an automatic rotary muffle which ensures that they are all evenly and steadily heated to exactly the same temperature before being dropped into the bath of water, which quenches them. They are afterwards carefully ground, both the rollers and the cups and cones being held during this operation in chucks worked by compressed air. This protects them from any possibility of being scored or damaged when on the machines after hardening.

The cage shown in fig. 7 serves for the purpose of keeping the rollers in strict alignment, preventing them dropping out when the cup is removed from the bearing, and also ensures the rollers being supplied freely and evenly with lubricant. The making of this cage is a very ingenious series of operations, as it is entirely in one piece of metal which exists originally in the form of plain steel sheet. A circular blank having been made in a large press, it is then taken to the second machine, which brings it to the form shown in fig. 11. This has then to be put on another machine which flattens the bottom of the cup, and also bringing the rim to a sharp angle as shown in fig. 12. The next operation consists in driving the bottom out, whilst in the next the rim is neatly cleaned up, so that at this stage the cage is as shown in fig. 14. The bottom edge is now rimmed as shown in fig. 15, being afterwards squared off as in fig. 16. After this has been done, the bottom edge is trimmed off square and sharp as in fig. 17. The next operation consists in piercing holes through the walls of the cup, whilst the final operation is bending the edges of what may be described as the balusters shown in fig. 18.

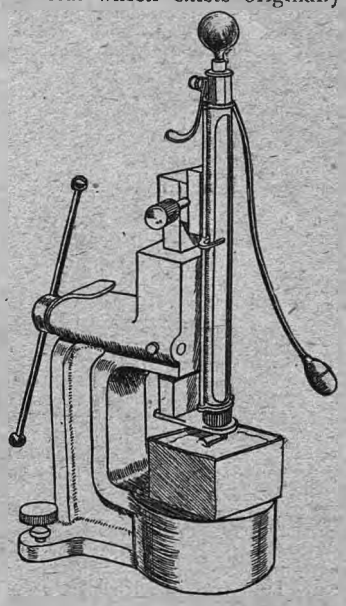


Fig. 19.—Hardness testing machine.

Very careful measures are taken to ascertain that in all bearings turned out the material, hardness, and accuracy of manufacture are up to a certain standard. Every batch of raw material is subjected to a laboratory test before being passed, whilst, after it has undergone various processes of machining, various parts of the bearings are separately tested for hardness and trueness, and, finally, the complete bearing is put on a testing machine. It is quite unnecessary, and, of course, out of the question to test every unit, and this is therefore done on a percentage basis in which one in every so many bearings is taken.

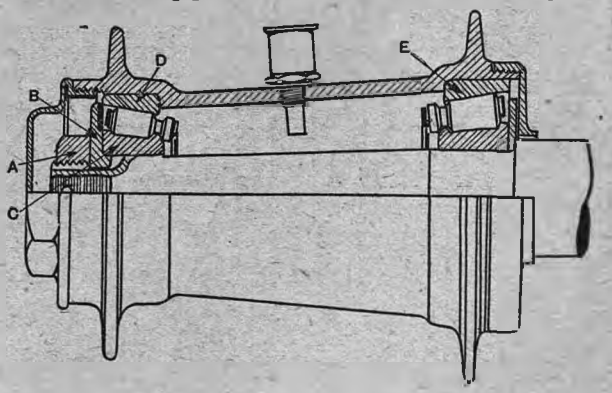


Fig. 20.—A cycle car hub with Timken roller bearings.

The hardness test, which is applied to cups, cones, and rollers, is carried out by means of an ingenious little instrument known as a Schleroscope, which the writer thinks of sufficient interest to illustrate. Its essential parts are a long vertical glass tube which is

Timken Roller Bearings.

rested at its base on the object to be examined, and which acts as a guide for a small hard steel bullet. This is dropped from the top of the tube on to the roller or cone under test, and the height to which it rebounds is then measured. This height is dependent upon the hardness of material of the test piece, and consequently if the rebound exceeds a certain minimum, say 90% of the original drop, the piece is known to be all right. In the actual instrument the glass tube is suitably graduated and furnished with a pneumatic release for dropping the "bullet," whilst a second rubber ball at the top of the tube, when squeezed and

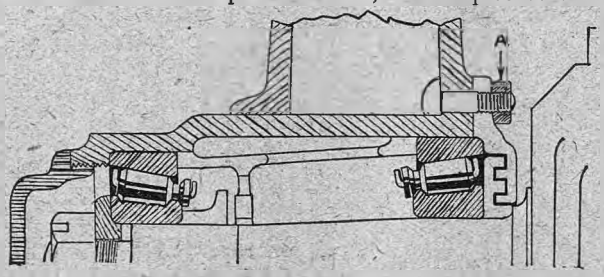


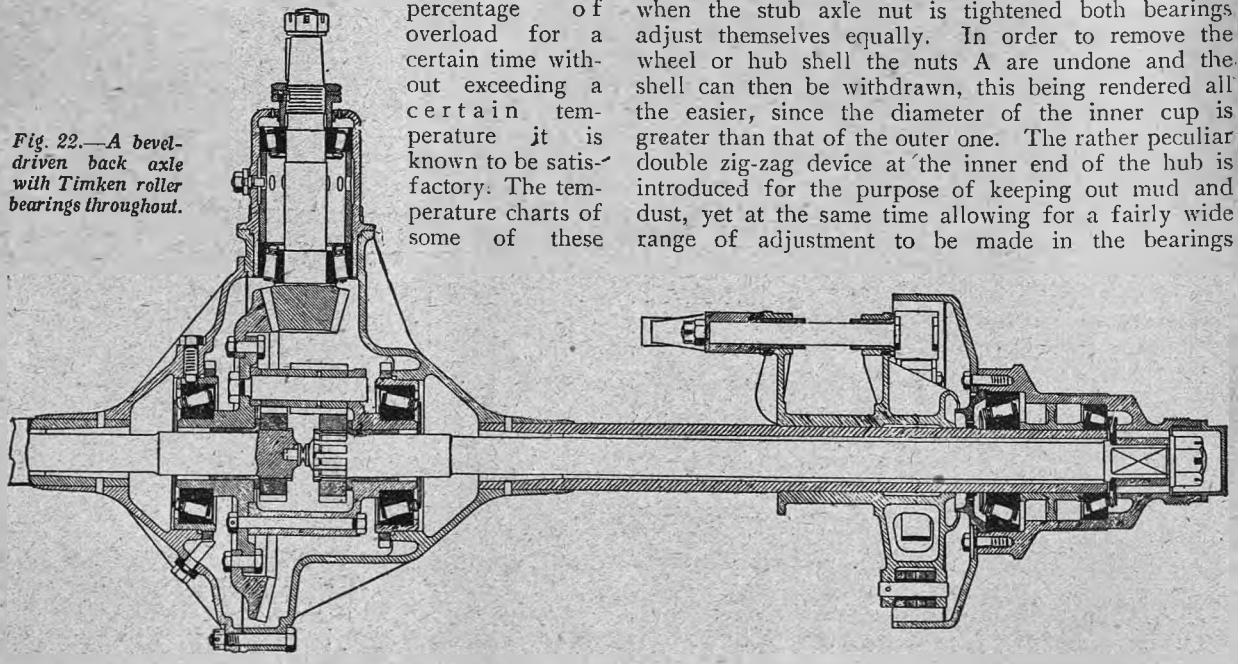
Fig. 21.—Front hub design with Timken roller bearings.

let go, sucks the bullet up to the top again ready for another drop. Screw feet are provided, so that the tube can be set accurately vertical.

In the illustration fig. 19 a roller is shown under test. For this purpose it is partially embedded in a box of pitch and the instrument adjusted so that the bullet falls in line with the diameter of the roller.

The testing of the complete bearing is carried out on a large and massive machine which is so constructed that both radial and thrust loads can be applied to any degree either separately or together. Intermittent loads can also be applied. In order to ascertain how the bearing behaves in these circumstances it is only necessary to observe its temperature with a thermometer; if the bearing sustains a certain percentage of overload for a certain time without exceeding a certain temperature it is known to be satisfactory. The temperature charts of some of these tests are exceedingly interesting and graphically illustrate the tendency for the Timken bearing to heat up very slowly and cool exceedingly quickly. It is, therefore, capable of sustaining under intermittent conditions a very large overload without damage.

Fig. 22.—A bevel-driven back axle with Timken roller bearings throughout.



The Timken bearing is made in two types, long and short, the only difference between them being the length of the rollers. The short type is approximately the same size as an ordinary ball journal bearing.

Inasmuch as this bearing is suitable either for a radial load, or a thrust load, or any combination of the two, its applications are many and various, the instances given herewith showing some of its particular uses in motor car work.

Fig. 20 shows a simple form of cycle car hub fitted with Timken bearings. In this connection it is hardly necessary to point out that this is one of the most notable applications of a bearing which can support both radial and end thrust. The means of adjustment are very simple. The nut A on the stub axle is screwed a little further home, and the washer B bearing against the cone C thrusts the latter along the axle and brings it slightly nearer the other bearing. As soon as the wear between the cone C and the cup D is taken up, D thrusts the hub shell sideways, carrying with it the cup E. In this manner both bearings are equally and uniformly adjusted, the procedure recommended being to screw up the axle nut until the bearings run stiff and then slack it back until they are perfectly free, but of course without any lateral shake. It will be noticed that at the inner end of the hub a shell almost touching the stub axle is used for the purpose of keeping out dust and dirt. In all cases the cones of the Timken bearings, when mounted on a rotating member, are made a "press" or tight fit, or nipped up by nuts, whilst if mounted on a non-rotating member are made a "push" or easy fit. The cups are generally a press fit or held firmly in position against a flange.

A more elaborate front stub axle design is shown in fig. 21, wherein arrangements are made for the complete removal, when necessary, of the hub shell without at the same time disturbing the roller bearings. In this case it will be perceived that the cups of the two are held apart by a distance piece, so that when the stub axle nut is tightened both bearings adjust themselves equally. In order to remove the wheel or hub shell the nuts A are undone and the shell can then be withdrawn, this being rendered all the easier, since the diameter of the inner cup is greater than that of the outer one. The rather peculiar double zig-zag device at the inner end of the hub is introduced for the purpose of keeping out mud and dust, yet at the same time allowing for a fairly wide range of adjustment to be made in the bearings without destroying its protective qualities. That is to say, the plates can move apart some little distance and still overlap one another's serrations.

In fig. 22 is shown a part sectional plan of a bevel-driven live axle showing the application of Timken

roller bearings to all the points at which ball races are generally used, namely; to the driving bevel-shaft, each side of the differential and inside the floating hubs of the ends of the axle casing. In each case they are required to take both thrust and load, and the use of the Timken bearings makes greatly for simplicity and fewness of parts.

It may be pointed out that in some quarters doubt has been expressed concerning the suitability of the Timken bearings for use in connection with the driving member of a worm gear. In this case it is obvious that the thrust load, on a car at any rate, is nearly always in the same direction, and that consequently one of the bearings will get worn much more rapidly than the other; further, it is clear that if the worm were not set up, after bearing adjustment, in exactly the right position along its axis of rotation, the efficiency of the gear would be greatly reduced. Against these points must be brought this, that if the thrust bearing be made of good proportions it will be less liable to wear than the worm itself, and that consequently when being adjusted the difference in the position of the worm will be immaterial, and that if care be taken in adjustment and due provision be made for it the worm can be reset exactly as it was at first.

It is not only in back axles and hubs that the Timken bearing is used, however. It is coming into use in gear boxes—in which an end thrust is exercised on the gearshaft when the gears are changed—in steering pivots, in steering gear boxes, in clutch withdrawing mechanism and the like.

The Timken roller bearings are made in this country by the Electric and Ordnance Accessories Co., Ltd. (Vickers, Ltd., proprietors), Cheston Road, Aston, Birmingham.

***IN THE NEW FOREST.** A typical picture in early spring. The New Forest is at its best from the motorist's point of view in early summer, for then the notoriously flinty roads have not had time to break up and the foliage is in its prime. The car by the roadside is a 17-25 h.p. Armstrong-Whitworth.*

Easy Starting with Mixed Fuels.

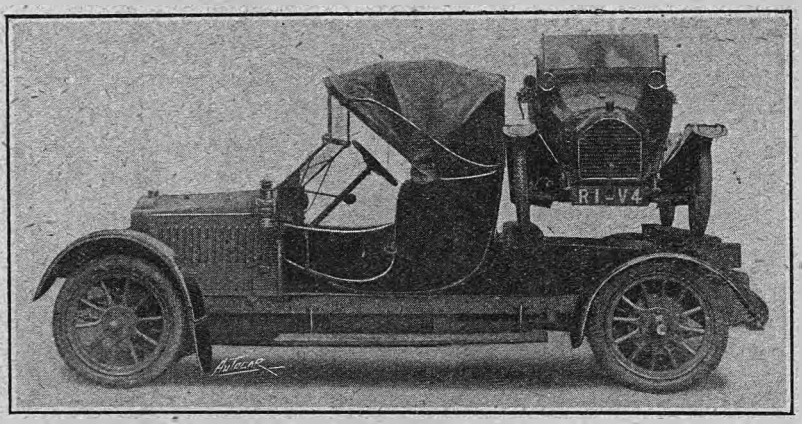
Some time ago we described and illustrated the Rightaway Easy Starter, which is sold by the Supplementary Carburetter Syndicate, 47, Longmore Street, Birmingham. It enables, as its name implies, an easy start to be made in the case of engines which are normally difficult to set going. The device consists of a small petrol tank and an easily regulated vaporiser, which are intended to be fitted to the dashboard. It has been suggested to us that this device would be of great service to those who are at the present time experimenting with or using any of the various mixed fuels, such as paraffin and benzole, or paraffin and petrol. With these mixed fuels difficulty is sometimes experienced in starting the engine, but if the device we have referred to were utilised there would be no difficulty in getting a start by means of the petrol contained in the supplementary tank. It is a very simple matter to fit this device, the only addition required to the engine being a union piece screwed into the induction pipe. The prices, including the necessary tube, unions, etc., vary from 17s. 6d. to 30s., depending upon the size of the tank and fittings.

On the Road.

Insurance and Assurance. Barred Entries for the Isle of Man Race.

"'It 'im anywhere and 'is ears move. 'It 'im in the stummick and 'is 'eels flies over 'is 'ead."

THE few mild remarks I wrote some time in last November—and which only saw the light in March—concerning indiscriminate premiums for all sorts and kinds of motorists appear to have had the effect of the bull's-eye, for the heels of many are around me on every side. Truly a cheerful greeting for me on my return to my native shores, and, were it not that I have had many pleasant and kind letters from those of a contrary opinion, one that might have daunted many a braver soul. At the same time I must apologise to the A.A. and the R.A.C.—or, rather, to their secretaries—for having written so loosely that my remarks might be taken in a wrong sense, for in these days of high official purity one cannot be too careful.



***THE BABY PEUGEOT.** An idea of the diminutive size of this car may be gathered from the above illustration, which shows one of these cars loaded on a 26 h.p. eight-cylinder De Dion car. This practical and interesting demonstration was carried out by Mr. Pullar Phibbs, one of the leading agents in Dublin.*

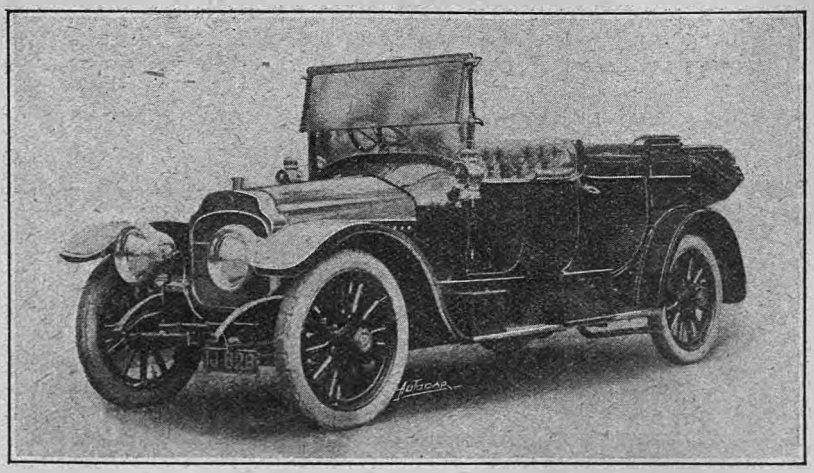
What I intended to convey was that these societies, by sanctioning certain insurance companies and permitting the use of their initials on the advertisements of them, were not likely to assist the private motorist to better his position, and I still could wish that they did not look on the present state of affairs as the best possible and one incapable of improvement.

I have never been contented with everything, nor have I wanted to be, though no one has realised better than I have how very easy, very pleasant, and—may I add—how very profitable a thing it is for a writer to do nothing but speak and put down pleasant things. But it would be dull in the extreme for readers, and, personally, I should cease to enjoy the correspondence columns as I do now. Still, having charged the R.A.C. and A.A. with attracting part of the premiums of those who insure through them, and being told that I am wrong, I regret having made the statement, although it should be remembered that I attributed no base motives at all to them in the matter. May I compliment Messrs. Stenson Cooke and Orde on the manner of their rejoinders, and suggest to the writers whose letters follow them on the same subject that they should cultivate a like reasonable style.

I have not time, nor the inclination, to wade through the sixteen points of Mr. J. Whitcomb's reply. Most of his questions are impertinent and the others are absurd—as far as I can understand them—but in pure matters of opinion I have as much right to my own as he has to his. What he fails to understand is that I was looking on the matter as a whole, and not from the petty point of view of a man with only one point in view. My idea of a company of respectable motorists may have been too Utopian; I gave it as an idea, and I still adhere to the notion that we need not all submit to being tarred with the same brush.

Mr. Fisher's letter (19344) is far more sensibly written, although he does not allow me much intelligence or experience, and his argument that as "there is no power that can prevent careful drivers being charged by the scorcher, therefore they must insure," is based on ignorance of the fact that there is such a thing as the law—even for motorists—and through it one can obtain damages and costs from the offender. Similarly, according to his reasoning, every pedestrian and horse driver must insure against being run into, and also he must know quite well that in all law cases resultant from collisions it is the insurance company that insists on the plaintiff bringing the action, even though the latter often has to appear a heartless beast for so doing.

At the same time, from the remainder of his letter I perceive him to be a man of discrimination, and so I feel sure that when we get a happier state of affairs he will find himself and his advice much sought after.



A 25 h.p. Vauxhall with a "Sutherland" body supplied to Major A. Nugent, Ballyedmond Castle, Co. Down, by Messrs. Harry Ferguson, Ltd., May Street, Belfast.

On the Road.

The following number of *The Autocar* contains an epistle (19377) from one Mr. McRobie Turrell, and consists of little else than a tirade against me with quite uncalled-for touches of the Scot's wit that must so annoy his more human countrymen, because it helps to keep alive the old-time slander about a certain surgical operation. Indeed, I have often wondered why Scotsmen have not seen to it themselves, for, in the main, it is just as untrue as the notion that because "Taffy was a thief" all Welshmen are dishonest. Much that Mr. Turrell writes my intelligence cannot grasp, his Latin tags fail to impress me, and his sarcasms concerning a car I paid £500 for in 1909 and got rid of a year ago leave me under the impression that I must have done him out of some "bawbees" at some time or other. Yet I cannot remember ever having come across him, and I do not think that ignorance of Mr. Turrell's name is to argue myself unknown. Since, however, he confesses that he only reads my articles with pain in order to do him good, I see no object in discussing him or his exhaust any further beyond calling attention to the fact that in his final sentence he remarks, "All the foregoing more in sorrow than anger."

As a change to this I should like to call attention to the letter of "W.C.R." (19376) immediately preceding, wherein the suggestion is made that reductions on premiums to motorists who have made no claims should be cumulative. I have often wondered why this eminently reasonable idea has not been taken up, for, while, of course, one would not expect to get the same amount off every year, yet the fact of a continuous decrease would keep clients faithful for evident reasons, and the reduction itself, caused by, say, four years' freedom from accident, would be sufficient to prevent the insurer claiming for anything less than for really expensive accidents.

But enough concerning the insurance of motor cars, though I must repeat that my convictions as to the unfairness of the present state of affairs are quite unaltered, and that I need more than abuse and incoherence to convert me. As a barrister, I am aware of the proverbial advice to a lawyer with a bad case.

I mentioned Scotland a little while back. I will now tell a true tale of Ireland and the Irish. Indeed, the letter it was in came to the Editor with a pious hope that I might be permitted to comment on it, and I take this opportunity of thanking the correspondent. Yet, as it is said to be useless to paint the lily or to gild refined gold, I am of opinion that it goes better without any comment at all, save that it cannot be a unique specimen, since my copy is a slightly faded reduplication in violet ink of a kind I have not seen since I was worried by examination papers as a small boy at a private school very many years ago:

Secretary's Office, Court House, Carlow.

Dear Sirs,—Applications having been made to me from time to time by owners of motor cars resident in England to register same in my county owing to the few cars registered therein, and consequently the low numbers available, it has occurred to me to bring the matter under your notice with the hope that you may see your way to have some of your cars registered with me, which would help to bring them under the notice of the public.

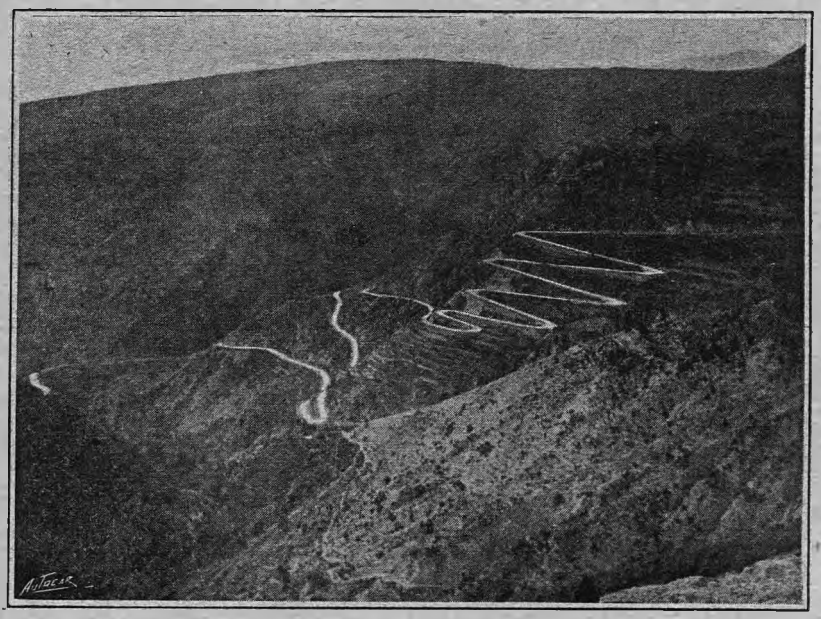
As there are only about seventy cars registered in this county so far, you will know the numbers available, and as some recompense for your trouble I am prepared to allow you 5% commission out of my remuneration on any cars you may register in my county.

Yours faithfully,

RICHARD J. KEOGH.

God save Ireland, but *what a country!* or, to parody a song we all used to know:

"As I drive my car both near and far
And shove it along all out,
I can hear the 'nuts' all shout:
'There's a millionaire about!'
I can hear them sob, 'Begob! what a job!
England to rob to save five bob,
There's the man who marked his car in County Carlow!'"



A WELL ENGINEERED ROAD. Part of the road between Nice and Sospel. The summit of this road, the Col de Bras, in the Maritime Alps, is given in the Michelin Guide as 999 metres or 3,277 feet.

This beats giving commissions to petrol sellers for recruiting members for our leading societies absolutely hollow.

Having begun on the correspondence columns, let me return to them in my comments. Letter 19369, from the Calthorpe Motor Co., Ltd., is worthy of notice, for its *motif* is a plaint that the R.A.C.—the Society of the Encouragement of Automobilism—refuses its entry for the International Race for the Tourist Trophy in the Isle of Man, on the grounds that the measurements of both its cars, viz., 90 × 150 and 80 × 150, are such that they are precluded from participation, although the latter would come into the far more sensible c.c. rating that ought to be the rule for such events, and indeed is even of a much smaller cubic capacity than many other cars allowed to compete. It seems hard on the Calthorpe folk, and not good for the industry at large, because it is only so that one can judge whether unusual dimensions are sound engineering jobs or merely freaks.

Curiously enough, an even harder case came under my notice last week. The two-cylinder Valveless car—the engine with only six main moving parts—was entered by its vendors. It will be remembered that this car has a two-stroke engine. Yet because it is a novelty and not the ordinary follow-my-leader

On the Road.

type of engine, it is barred from competing because it does not comply with the regulations drawn up to govern the race. Well and good, if the law had been made by the Medes and Persians, or the prize was the bequest of a dead hand. But when it is remembered that the governing authority is the club that alone can permit motor racing, and that its primary object is the encouragement and development of motoring, it seems extraordinary that the case of cars not conforming to the usual practice should not have been considered and some arrangements made for their inclusion if it were desired to enter them. Neither the Calthorpe nor the Valveless are unknown cars; it was not inconceivable that they might be entered. I spurn the thought that the trade section of the R.A.C. feared lest some new type might oust their ancient solitary reign. Yet I do remember a case in which my friend Mr. Coleman's White steam car once won a gold challenge cup and was refused permission to defend it the year after, because a new rule had been passed to make steam cars ineligible for the trophy. If my memory does not fail me he declined to give up the cup on the ground that he was not allowed to defend it; certainly, there was a lovely row about it all, and the end was—like it so often is—that the despised motor got a far better "ad" out of it all than if it had gone in for the competition again and won it once more.

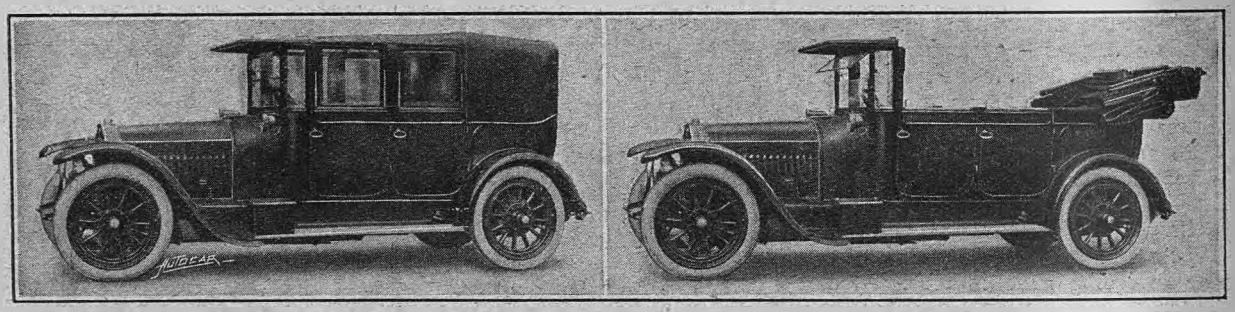
Though it was hard on the White Steamer I am not sure that there is not more hardship in the present cases, for the steam car in those days had a wonderful knack of hill-climbing, not unattended with a certain risk to the brave driver who was content to risk mutilation by sitting on the safety valve. My advice to the aggrieved firms is to be importunate, remembering the immortal widow and the wearied judge. Let me conclude with an Irish story bearing out the same moral.

At the end of a police court case somewhere in the West, a man got up at the back and said, "If ye plaise, yer honour, the main drain of my house has burst and all my chickens and hens are drowned." "Sit down, sir," said the magistrate. He sat down, but at the end of the next case he got up and said, "If ye plaise, yer honour, the main drain of my house has burst an' all my chickens and hens are drowned." The magistrate got angry. "Sit down," he said, "this is a police court. If you want redress you must go across to the county court and get it there." The man rose and thanked the magistrate and went out.

In about an hour he came back, and when the case was over he got up again. "If you plaise, yer honour, the main drain of my house has burst and all my chickens and hens are drowned." The magistrate got very wroth. "How dare you," he says, "come back here again with your tale? I told you to go to a civil court if you had a grievance, didn't I?" "I did, sor," said the man, "and I stood up to the judge and I tould him that the main drain of my house had burst and all my chickens and hens were drowned." "Well," says the magistrate, "and what did he say to that?"

"What did he say?" says the man, "Why," he says, "Oh, are they? Then go to h—ll and kape ducks!"

OWEN JOHN.



A totally enclosed body with folding superstructure which has been fitted by Messrs. Humboldt, of Bradford, to an eight-cylinder 26 h.p. De Dion chassis. The car was supplied to Mr. Ernest Barrett, of Bradford, by the Thornton Engineering Co., Belle Vue, Bradford.

Italy's Foreign Motor Car Trade.

The automobile industry in Italy would appear to have recovered from the crisis which beset it some years ago, due to excessive company promotion. From the official returns just issued we find that 3,587 cars of the pleasure type were exported from Italy in 1912, amounting in value to £1,431,446, as compared with only 2,918 and £1,165,115 respectively in 1911. Great Britain was far and away the best customer, taking 989 vehicles as against 935 in the previous year, the Argentine Republic being second with 439 (246); then France with 383 (292), Brazil with 366 (151), Belgium with 224 (166), Australia with 175 (138), Roumania with 111 (104), the United States with 109 (144), Switzerland with 90 (81), Germany with 43 (24), Austria with 41 (46), Holland with 37 (29), and "Other Countries" with 580 (562). The figures in brackets represent the number of cars taken by the different countries in 1911.

The Government and Main Roads.

In the House of Commons last week, Sir Archibald Williamson asked the Secretary to the Treasury (Mr. Masterman) whether his attention had been drawn to the complaints of the county councils of the North of Scotland that the funds of the Road Board are not available to mitigate the burden of increasing rates caused by motor traffic; whether he is aware that these rates have already become oppressive in these Northern counties; and whether it is the intention of the Government to introduce legislation to extend the powers of the Road Board with regard to grants, or to take over the maintenance of the main roads of the kingdom?

Mr. Masterman: The answer to the first part of my hon. friend's question is in the affirmative. Pending the Report of the Committee on Imperial and Local Taxation, I am not in a position to make a statement as to the Government's intentions with regard to the legislation which he suggests.

On the Track.

Records Beaten and New Records set up by the Peugeot.

IT was announced at the conclusion of the race meeting on Easter Monday that Goux would attempt the short world's records on the 110 × 200 mm. (7,603 c.c.) Peugeot car on Thursday last week and the six hours world's records on the Friday. The short world's records made by Victor Hemery on the 90 h.p. Benz were, however, hardly within the reach of the Peugeot, and although Goux made some very fine times on Thursday, his records for the flying half mile, mile, and kilometre will only take rank as Brooklands class records in both the old 40 rating class and the new cubic capacity class G (confined to cars of 7,784 cubic capacity), in which heretofore nothing has been attempted. In both cases the records in the next lowest class are held at better speeds by the Clement-Talbot, with a considerably smaller engine.

When we come to examine the figures for the ten laps record from a standing start, however, we find that the Peugeot put to its credit the best ten laps on record, and we append a few other ten lap records for comparison.

30.0	Peugeot ...	16m. 4.90s.	=103.23 m.p.h.
90.0	Napier	16m. 14.091s.	=102.257 ,,
25.5	Talbot	16m. 14.21s.	=102.24 ,,
59.6	Brasier	16m. 18.213s.	=101.778 ,,
45.0	Excelsior ...	16m. 19.80s.	=101.66 ,,
59.6	Lorraine-Dietrich	16m. 23.78s.	=101.25 ,,

This is a most interesting comparison, and shows how nearly matched these six cars are. In fact, there is not 2 m.p.h. between them.

The records secured on Thursday last week by Goux are as follows:

40 R.A.C. Rating Class.

Half-mile, flying start	16.58s.	=103.56 m.p.h.
Beating 27.3 Benz	17.351s.	=103.759 ,,
Kilometre, flying start	20.79s.	=107.60 ,,
Beating 27.3 Benz	21.720s.	=102.990 ,,
Mile, flying start	33.87s.	=106.29 ,,
Beating 27.3 Benz	37.397s.	= 96.264 ,,
Ten laps	16m. 4.90s.	=103.23 ,,
Beating 30.1 Sunbeam	19m. 40.12s.	= 84.41 ,,

The same records are secured also in Class G, where the ice is broken for the first time, and there were no previous times to beat.

Major Lloyd, in giving us these figures, asks us to say that they are subject to confirmation, as the car has not yet been officially measured.

The lap times (by hand timing) for the run on Thursday were as follows. They show a wonderful regularity:

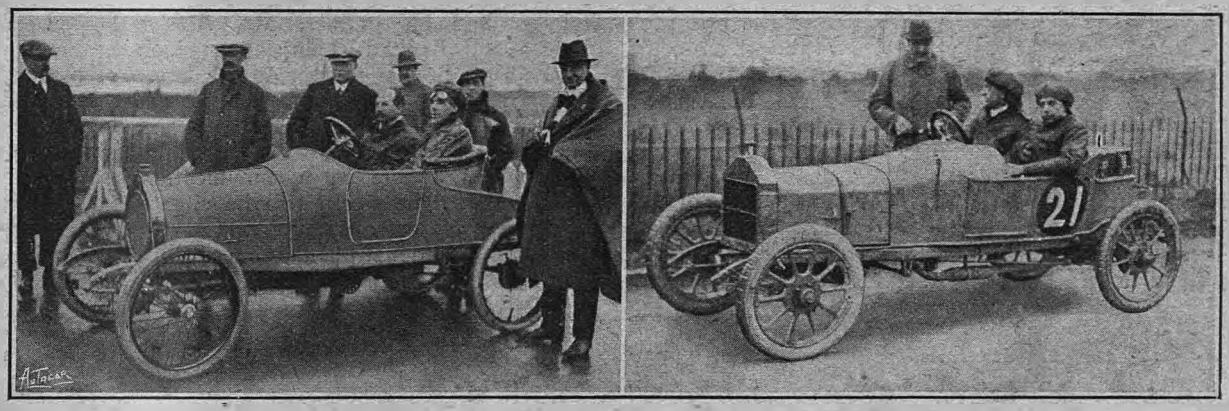
1st lap	1m. 51⅗s.	6th lap	1m. 35s.
2nd ,,	1m. 35⅕s.	7th ,,	1m. 34⅘s.
3rd ,,	1m. 34⅖s.	8th ,,	1m. 34⅖s.
4th ,,	1m. 34⅘s.	9th ,,	1m. 34⅖s.
5th ,,	1m. 35⅖s.	10th ,,	1m. 34⅕s.

The short records, taken with flying start, were accomplished during the ninth lap.

The initial lap from a standing start was very good, as will be seen from a comparison with other recent performances, viz.:

Talbot, November 16th, 1912	1m. 50s.
Excelsior, November 15th, 1912	1m. 51⅖s.
Lorraine-Dietrich, November 27th, 1912	1m. 52s.
Excelsior, November 15th, 1912	1m. 52⅕s.
Talbot, February 8th, 1913	1m. 52⅖s.

The Peugeot car, of course, has been built for the road, and not for track racing. It would run far better, one would think, with a longer wheelbase and a body following more closely the lines of those found on cars which have been pronounced in their successes on the track.



CYCLE CARS AT BROOKLANDS. The Singer (right) and the Calthorpe (left) which competed in a 100 miles high speed reliability trial at Brooklands on Saturday last. The Singer actually beat the 100 miles and two hours cycle car records, but was subsequently found to be 30 lbs. above the weight limit.

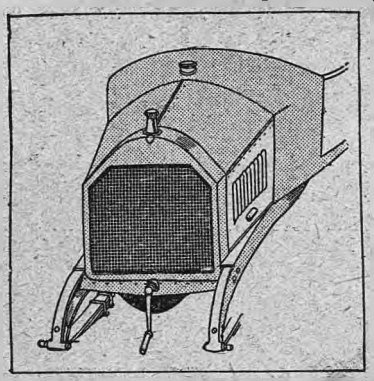
On Saturday last a 100 miles high speed reliability trial was held by the British Motor Cycle Racing Club. *The Motor Cycle* had offered a silver cup for this contest, which was to be awarded to the vehicle whose fastest and slowest lap times were most nearly equal. Eleven competitors started. The minimum average speed called for was 35 m.p.h., but a 10 h.p. four-cylinder Singer, driven by B. Hayward, started off at a high rate of speed and was soon a lap ahead of the others. Most of the remainder ran very regularly, though tyre troubles caused the withdrawal of the G.W.K. Another cycle car broke a front spindle.

The new four-cylinder Calthorpe ran very sweetly and was much admired. It had a four-cylinder water-cooled *monobloc* engine, three speeds and reverse, and bevel drive. The driver, G. W. Hands, would have taken second place but for a miscalculation of his schedule by a second per lap, with the result that he was slightly under the minimum average. The winner of the cup proved to be A. W. Lambert, driving a Morgan-Jap, the difference between his fastest and slowest laps being only sixteen seconds. The Singer finished far ahead of the remainder of the field, and would easily have gained the 100 miles and two hours'

On the Track.

cycle car records, as it averaged nearly fifty miles per hour, but when the chassis came to be weighed it was found that it was 30 lbs. in excess of the limit allowed, the overweight being explained by the Singer Co. having fitted a Colonial type radiator and heavy grooved tyres.

On Tuesday this week, driven by Jules Goux and Georges Boillot in turn, Mr. H. Boissy's Peugeot was set the task of beating the six hours world's record. The distance to be eclipsed was 518 miles 312 yards, accomplished by Victor Hémery on a 59.6 Lorraine-Dietrich last November. The start was arranged for nine o'clock in the morning, but owing to the dull weather and wet state of the track, heavy rain having fallen until 8.35 a.m., Goux (who took the first spell at the wheel) could not start away until a quarter past eleven.



BONNETS AND RADIATORS. In illustrating the Hupmobile bonnet and radiator in our issue of the 22nd ult. we took the 12-14 h.p. model as an example. We now show the front of the 15-18 h.p. model, which is a later type, and embodies a taper scuttle dash.

The first lap, about 2 miles, was covered at 91.81 miles per hour, the second at 107½, and ten laps, from a standing start, were completed in 15m. 40.75s., a speed of 105.58 m.p.h., beating all previous records for that distance. Goux had to stop at the seventeenth lap for nearly two minutes, thereby losing the fifty miles world's record put up recently by Mr. Percy Lambert on the 25 h.p. Talbot. The Peugeot's time was 30m. 5.51s., giving 99.81 m.p.h., whilst the record is 29m. 2.5s., a speed of 103.3 miles per hour. There were two stops for tyres, viz., in the seventeenth lap, as mentioned above, and in the twenty-seventh circuit.

The drive is noteworthy as being the first occasion on which a French machine steered by a French driver had covered a hundred miles in an hour. The actual distance travelled in the sixty minutes was 100 miles 321 yards. The time for the 100 miles was 59m. 49.78s. Another stop was made in the fortieth lap, and the attempt was abandoned in the fifty-fourth circuit owing to a big end going. The fastest lap was the fifty-second, which was accomplished in 1m. 31.2s., or at a speed of 109.22 miles per hour.

An amalgamation is being effected between the Mascot Co., Rugby, makers of Mascot plugs, and the sparking plug department of Messrs. Lodge Bros. and Co. Mr. Bernard Hopps, the proprietor of the former, and his brother, Mr. Alfred Hopps, of Hopps and Bankart, Leicester, are joining the two partners of the Lodge firm on the board of the new company, which has been registered under the name of the Lodge Sparking Plug Co., Ltd. The head office of the new company will be at Wrentham Street, Birmingham, where all communications should be addressed. The works will be situated at Rugby, where new and extensive premises have been acquired fitted with additional plant to cope with the combined businesses.

Mixed Fuels.

A Device to Facilitate Engine Starting.

THIS invention has been mentioned in connection with the settling of the taxicab strike in London, for by its adoption the British Motor Cab Co. have been able to arrange for the use of a petrol-paraffin mixture in their cabs, which mixture can be supplied to drivers at a much lower rate than petrol only. The chief difficulty with this mixture is to obtain the initial explosions and to overcome this a engine picks up on the petrol-paraffin mixture. The arrangement is the invention of M. de Jarny, and the patent, No. 2,457, 1913, bears his name and that of the British Motor Cab Co., Ltd.

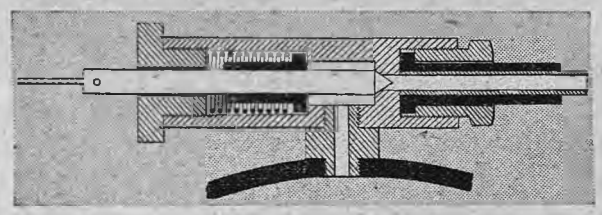


Fig. 1.—Petrol valve on the induction pipe by which petrol for engine-starting can be admitted.

small tank A (fig. 2) of petrol is arranged on the dash-board and is connected through a valve at B in the inlet pipe at C. The valve B is held closed by a spring and can be opened by actuation of a trigger D fitted at the front of the car near the starting handle. When a driver wishes to start the engine up he turns on the petrol-paraffin mixture to the carburetter, and then flicks the trigger D to inject a small quantity of petrol into the inlet pipe. This ensures the preliminary explosions, after which presumably the

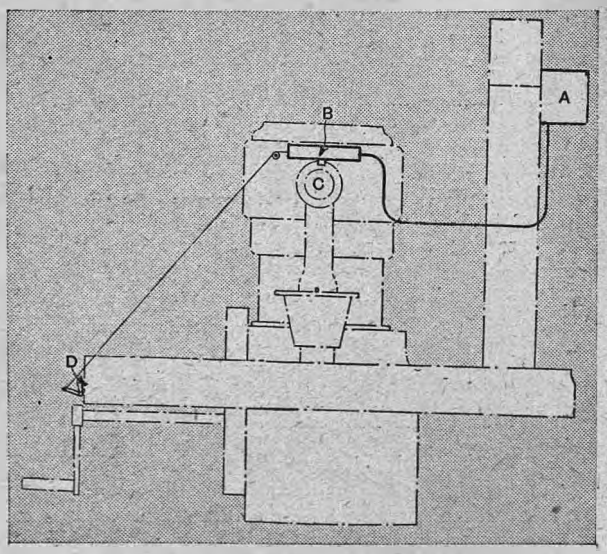


Fig. 2.—Diagram showing the general arrangement.

A, petrol tank
B, petrol valve
C, induction pipe
D, operating trigger

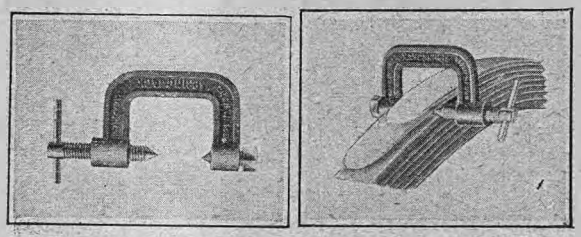
The Isle of Man Race.

Banned by the Society of Motor Manufacturers and Traders.

WE understand that the Society of Motor Manufacturers has issued warnings to its members not to enter for the Royal Automobile Club International Stock Car Race for the Tourist Trophy, to be held in September next. Further than that, members are warned that bond-signers who participate in the event will be infringing the terms of the bond. This does not mean that the race will not be held. It merely infers that a majority on the Council of the Society object to the race.

On page 601 we give a list of the cars which are eligible, but, now that the Society has banned the race, we should imagine it is highly probable that its scope will be widened by modifying the conditions, so that instead of restricting the dimensions to 90 mm. bore and 140 mm. stroke as maxima, engines of longer stroke will be made eligible so long as the bore is proportionately less. In other words, the 90 × 140 mm. engine gives a capacity in cubic centimetres of 3,561, and if the conditions were modified to admit engines not exceeding this capacity, it would render a number of other cars eligible, including all those in the 80 × 150 mm. class.

Incidentally it should be mentioned, while referring to the action of the Society of Motor Manufacturers, that it also banned the proposed race in Ireland for machines coming within the cycle car definition, which was to have been held to commemorate the tenth anniversary of the Gordon-Bennett Race held in Ireland in 1903. We are informed that the grounds of the Society for banning this race were that the promoters, the Irish Automobile Club, were a co-operative society, but we imagine that some mistake must have been made here, because the Irish Club gave up its activities in this direction years ago, as the members did not avail themselves of them, and, indeed, some resigned on account of them. However that may be, it does not really matter very much, because we believe the proposed race in Ireland would have fallen through without any banning by the Society of Motor Manufacturers, as the majority of makers of cycle cars did not wish to participate.



THE LUBRICATION OF LEAF SPRINGS. Two views of the Duco Spring Jack which has just been introduced by Brown Brothers, Ltd., Great Eastern Street, London, E.C., to facilitate the lubrication of leaf springs. The right-hand view shows the device in operation. By screwing up the adjustable end the taper points enter, one on each side, between two spring leaves, and hold them apart while lubricant is introduced. The price of this useful little accessory is 4s. 6d.

"The Autocar" Golf Trophy.

The fourth annual competition for *The Autocar* Golf Trophy will be held at Hunstanton, Norfolk, by the courtesy of the committee and members of the Hunstanton Golf Club on Saturday, the 12th inst. The competition is confined to members of the motor industry, and a replica in miniature of the cup is presented annually for the best 18 holes under handicap limited to 18. Entries should be sent to the hon. sec. of the Automobile Golfing Society, Mr. Hamilton Hobson, 9, Grafton Street, Bond Street, London, W.

Among the participants in the Sydney-Melbourne annual reliability trial there were two Talbot cars. These finished first and second, and, what is more, the winner obtained maximum points for reliability, maximum points for hill-climbing, and maximum points for economy in petrol consumption. This is certainly a notable performance, and we hope to give further particulars in a subsequent issue.

* * *

The Right Hon. John Burns, President of the Local Government Board, received on Tuesday morning, April 1st, a joint deputation from the R.A.C. and the Institute of British Carriage Manufacturers. The R.A.C. was represented by the Hon. Arthur Stanley, M.V.O., M.P., Colonel Crompton, Dr. Hopkins Walters, and Mr. J. W. Orde, the secretary, whilst the Institute of Carriage Manufacturers was represented by Messrs. Alford, Thrupp, Maythorn, Colonel Mulliner, Mr. Meier, and Mr. Hamlin-Hamshaw, the secretary. We understand, however, that the members of the deputation put before Mr. Burns at some length their views upon the suggested restrictions which it is understood are in contemplation in regard to totally enclosed cars. Mr. Burns accorded to the various speakers a most courteous and sympathetic hearing, and we understand that he will not be unmindful of the interest of the body building industry in framing any regulations which may hereafter be necessary.

Twelve entries have now been received for the Coupe de l'Auto, which is to be run on September 21st on the Boulogne circuit, confined, as last year, to cars with engines of not greater than 3,000 c.c. The entries consist of three Peugeots, two Delage cars, four Kœchlins, and three Th. Schneiders.

* * *

The motor 'bus drivers on the Sidcup service have been cautioned by the police against giving warning to motorists of the traps in operation at Eltham and Sidcup, the usual method being by hand signalling. Last week-end a trap was in operation on the Eltham Road between the bridge and the A.A. box.

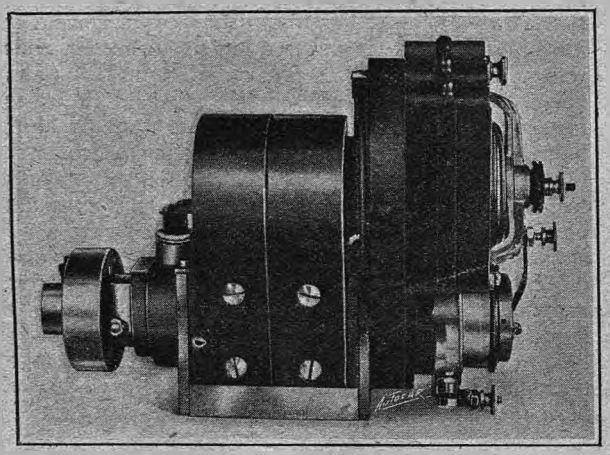
* * *

The Herts County Automobile and Aero Club will hold a fuel consumption test (confined to members) on Saturday afternoon, April 19th, starting from the Red Lion Hotel, Hatfield. Any fuel may be used—petrol of any grade, benzole, paraffin, or other fuel, or a mixture of any of them—the winner to be the competitor who covers the greatest distance at the least cost on his allowance of fuel. This allowance will be according to the following scale: Four-cylinder cars at the rate of 1½ pints for 600 lbs. and 2½ pints for 1,200 lbs., due allowance being made for passenger weights; two-cylinder cars 25% less than for four-cylinder cars; one-cylinder cars 33⅓% less than for four-cylinder cars. The speed must not exceed twenty miles per hour.

A New Bosch Magneto.

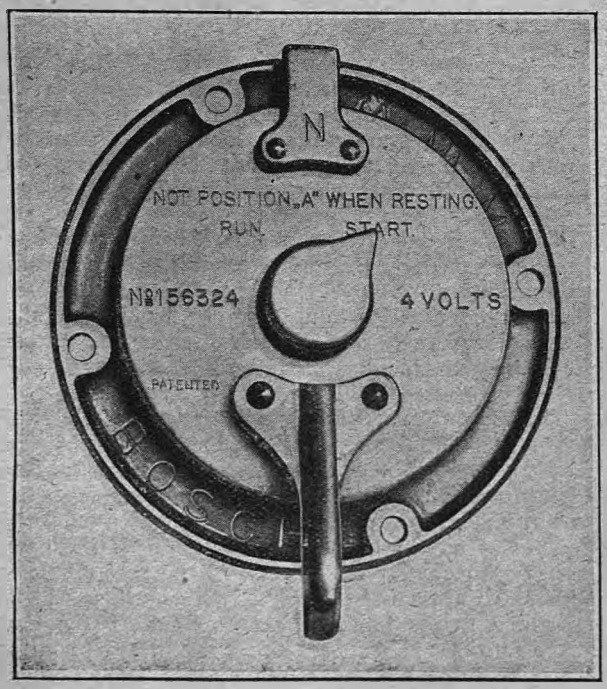
With Double Distributer and Contact Breaker, Providing Two Distinct Ignitions.

AT this moment of time it would hardly be supposed that there are people who shrink from absolute reliance on single magneto ignition, and are not comforted unless they have a standby of some description. The Bosch dual ignition is, of course, well known, but it does not form two entirely

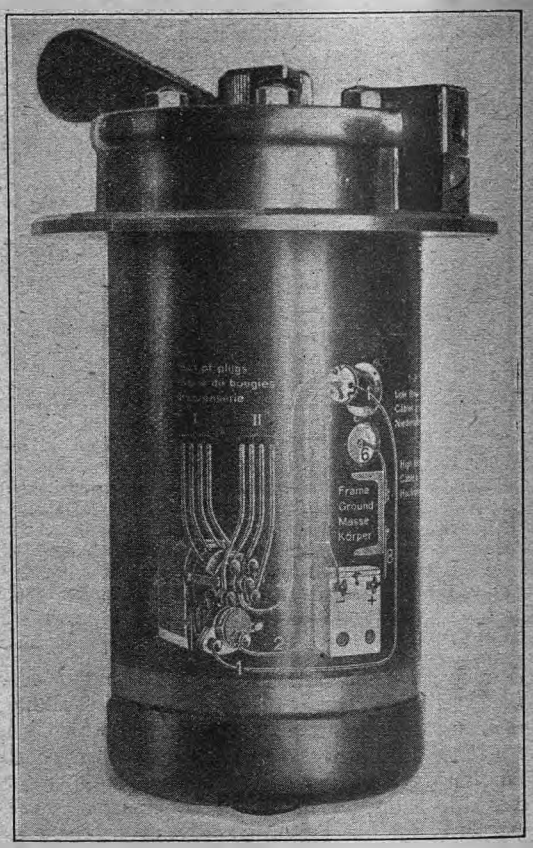


The new Bosch magneto with double distributer and contact breaker, which, with a set of accumulators and a dashboard coil provides two distinct ignitions.

independent systems, and finding there is a demand for such a duality, the Bosch Magneto Co., Ltd., 40-42, Newman Street, Oxford Street, London, W., have now put the Bosch double distributer dual system upon the market. In this arrangement, as can be seen from the accompanying illustration, the magneto itself is made with two distributers and a twin distributing brush. One of these brushes is fed with current from the back of the magneto in the ordinary way while the other gets its current from the accumulators and coil. This distributer operates exactly as though it were part and parcel of an accumulator system of ignition, for it has, too, its own set of plugs, each cylinder, therefore, having two. A coil fitted with a trembler is placed upon the dashboard as in the dual ignition, but the trembler only comes into operation for self-starting. Both systems are absolutely synchronised, so that a two spark effect is obtained when they are operated together. This can be done



The switch of the new Bosch magneto. The milled edged button and pointer in the centre switches the trembler of the coil into or out of action.



The high tension coil and switch of the new Bosch magneto. It will be noticed that the case of the coil bears a diagram showing how the two ignition systems should be wired up.

or either system can be employed separately. A switch forming part of the coil gives either of these three arrangements.

For those, then, who demand two ignition systems usable as set out above, the Bosch double distributer dual magneto gives it to them with an absolute simplicity of wiring.

The magneto is provided with the form of drive which entirely overcomes the lag or backlash due to the passing of the armature through the maximum magnetic field. It consists of a flanged disc with two opposed slots, which engage with a crosshead on the armature spindle formed of a flat bundle of very thin laminated springs.

For the instruction and guidance of the uninitiated, a wiring diagram is clearly imprinted on the upper part of the coil case, all terminals and wires being thereon numbered and referenced.

The 9.5 h.p Standard.

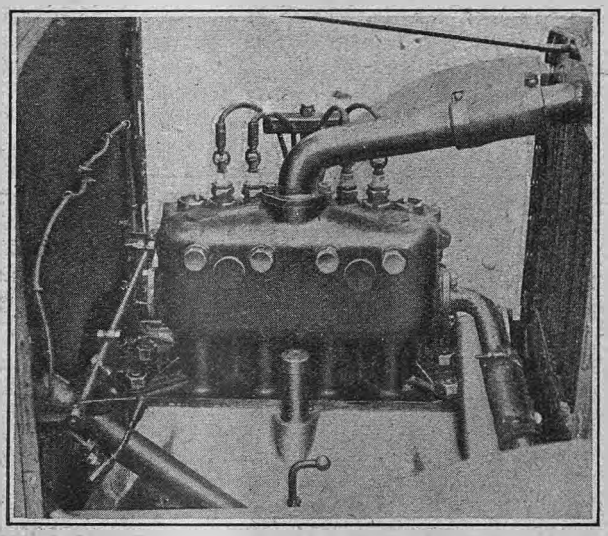
Four-cylinders, 62 × 90 mm. Chain-driven Distribution Gear, Three Speeds, Worm Drive. 14 h.p. at 1,900 r.p.m.

THE latest firm to turn towards the production of a miniature car is the Standard Motor Co., Ltd., Coventry, who are now putting on the road a small car which bids fair to uphold the reputation of the Standard Co. The 9.5 h.p. model, as the new vehicle is called, follows closely the lines of a big car, and, of course, more closely, Standard practice, that is as far as it is possible to embody large car practice on a miniature scale at a proportionate price. Several instances of the following of large car design are particularly obvious, notably the pressed steel frame, four-cylinder engine, single plate clutch, gear box, and worm drive back axle. Exceptional features on this type of car also are a variable spark magneto, hand and foot throttle control, and ample body accommodation.

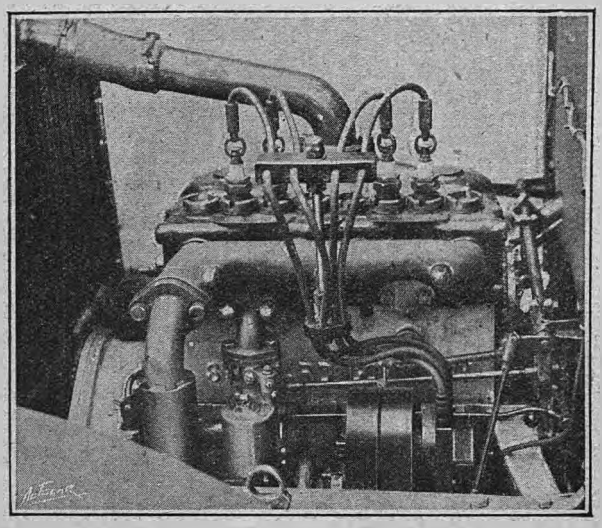
With regard to the latter, the designers have not lost sight of the axiom that, however small they intend the car to be, the body must, of necessity, conform to the size of average human beings; in fact, the dimensions of the body work of the 9.5 Standard have been based on the requirements of two male occupants of rather more than average size. Especially is this the case in regard to leg room.

As before stated, the engine has four cylinders, cast *en bloc* with the valves all on one side, the bore and stroke being respectively 62 × 90 mm., which gives a cubic capacity of 1,088 c.c. The inlet passage is cast integral with the cylinders, a short pipe leading up from the carburetter, which is a Zenith, to the centre of the passage, while the exhaust manifold is bolted up to the cylinder ports in the ordinary manner.

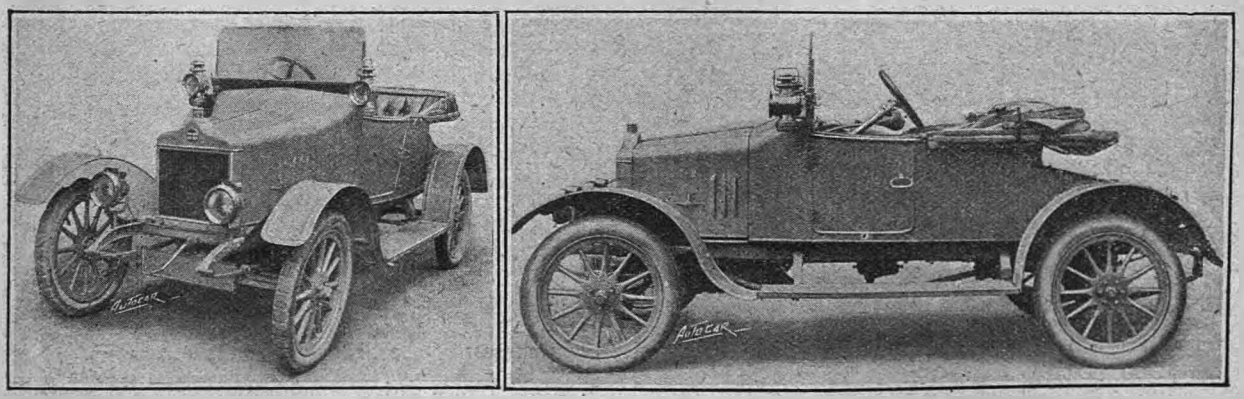
The valve chest is covered with a quickly detachable plate accurately faced to retain the oil, which is allowed free access from the base chamber to the valve stems and guides. Cooling is maintained on the thermo-syphon principle, the water jackets and leads being of very generous proportions, as also the gilled tube radiator. A noticeable point in the design of the cooling system is the straight-through passage for the water under the valve pockets. A vaned flywheel and an undershield extending almost to the gear box



The off-side of the 9.5 h.p. Standard engine, showing the cross shaft for the control gear on the dashboard, and also the generous diameter of the water pipes. The lever in the foreground is provided to operate the oil level tap on the base chamber.



The near-side of the 9.5 h.p. Standard engine, showing the carburetter, magneto, induction and exhaust pipes, also the valve cover and the cross shaft upon which the control gear from the steering wheel is mounted. A foot throttle is also provided.

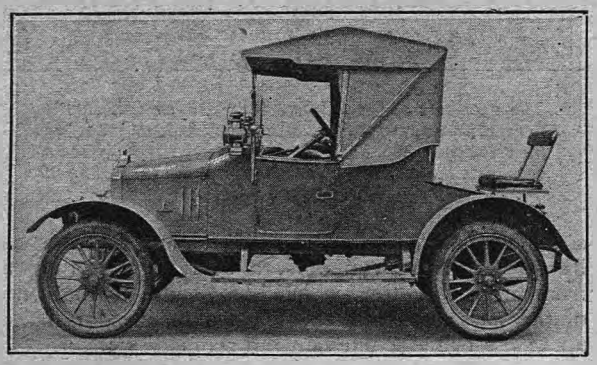


A three-quarter front view and a side view of the new 9.5 h.p. Standard car.

The 9.5 h.p. Standard.

assist in cooling. The magneto is of the high tension variety with variable ignition point and is driven, together with the camshaft, by means of a single silent chain from the front end of the crankshaft, provision for adjustment of the chain being provided in a simple manner by movement of the plate on the timing gear case carrying the bearing of the magneto driving spindle, this movement taking up the slack of the chain by the spindle receding from the crankshaft centre.

Lubrication, as befits a miniature, high speed, highly efficient engine, has been carefully attended to. Bolted to the back end of the crank case and enveloping the protruding end of the camshaft is a small casing, containing an ordinary eccentric paddle pump driven by an Oldham coupling engaging a cross slot in the end of the camshaft. The oil is drawn by this pump from the sump in the base chamber through a filter and forced to the engine bearings and also to two troughs only, cast across the base chamber and situated each below and centrally between each outside pair of cylinders. The dippers, instead of being as usual carried on the connecting rods, are carried on the webs of the crankshaft. The oil then runs back into the sump through a strainer of large area situated between the two troughs. Special precautions have also been taken to ensure proper lubrication of the distribution gear.



The 9.5 h.p. Standard car showing the hood and the folding dickey seat.

From the engine the drive is taken by a triple plate clutch which follows the practice adopted in the larger Standard models. Carried on the clutch cover by means of studs passing through holes in the cover is a plate upon which is riveted a ring of Ferodo. This plate is held up to the cover plate, to which is also riveted a ring of Ferodo, by helical compression springs threaded on the studs before mentioned, but between it and the cover plate is a third plate which transmits the drive when pinched between the two other plates by the helical springs. Instead of the spring studs taking any driving stresses, stout studs are inserted specially to relieve them. Provision is also made to insert lubricant between the plates should they not engage quite smoothly. The clutch is operated by a simple toggle arrangement which pushes the inner plate away from the inside of the cover plate against the springs, thereby releasing the driving plate pinched between them.

The gear box is a neat job, providing three speeds forward and a reverse, the changes being operated through a gate. A good feature is a direct drive on the top gear through dog clutches, and another is the provision of extra heavy second speed gear wheels and stout shafts. The top gear ratio is 4.6 to 1, and the low gear 15 to 1.

The propeller-shaft universal joints are of the cross pin type of substantial design, and are carefully encased in globular dust-proof metal covers.

The back axle, as mentioned before, carries a worm driving gear of distinctly massive proportions, and here again the influence of the larger models is to be seen, for the casing is formed in such a manner that an adequate lubricant filling orifice is afforded just under the tail of the wormshaft. Both the front and back wheel bearings and also the casing of the differential (bevel type) are mounted on special ball bearings designed to take both thrust and journal loads, a feature of great value in the wheel bearings, as few realise the great side stresses on the road wheel bearings when turning corners at even reasonable speeds. The front axle is a substantial H-shaped forging with knuckle ends.

The steering arrangements are on quite uncommon lines. Bearing in mind the axiom regarding the relative proportions of man and miniature motor cars, it is obvious that, if the steering column is to be raked to a comfortable angle, the forward end of it, allowing for substantial brackets, etc., would be almost under the radiator, leaving no room for a longitudinal steering rod. The difficulty has been overcome in an ingenious manner, which consists simply of turning the worm and segment casing on its side with the steering arm uppermost, then replacing the longitudinal steering rod with a cross rod to the near side wheel, which in turn is coupled by another rod to the off-side wheel in the ordinary way. This arrangement also has the advantage of eliminating errors in steering due to varying angularity in short rods under the action of the springs and when the wheels are other than straight.

The frame is of pressed steel of the usual type, with heavy brackets for the side steps, the brackets being braced to one another across the car, thereby stiffening the frame structure considerably. The wheels are Sankey steel detachable, carrying 700 × 80 mm. tyres, and the springs are of the half-elliptic type underslung. Neither torque nor radius rods are provided, an arrangement which has proved quite successful in practice on many much larger and more powerful cars. The wheelbase is 7ft. 6in. and the track 4ft., the weight complete being about 12 cwts.

The car with two-seater body is sold at £185, with hood, screen, lamps, spare wheel, etc., and as a slight extra a dickey seat may be added, the bolt holes and one or two small fittings being standard to all of the 9.5's, so that the dickey may be fitted by the owner with a minimum of trouble should he desire one at any time. This dickey, by the way, is as generously proportioned as the rest of the seating accommodation. Reference to the dickey seat brings us back to the body work, of which further mention should be made. Contrary to that which occurs in many cases, the body work of this little car is on quite pleasing lines. First and foremost it is eminently practical. Plenty of leg room is provided, a wide side door, plenty of head room to the hood, and the seat cushion is a reasonable distance above the floor level. Secondly, it is graceful in outline, as may be seen from the illustrations.

The running of the new car we hope to deal with later, after an extended test, but if the short run we have had on the first of the new models on the road is an earnest of the behaviour of its successors (a considerable number of which we have seen nearing completion), it should prove a practical and delightful little car.

The Tourist Trophy Race.

A List of Cars Eligible for the International Stock Car Race.

IN our issue of March 15th we published the particulars and conditions of the Tourist Trophy Race for stock cars to be run in September in the Isle of Man by the Royal Automobile Club. It will be remembered that the race is to be confined to stock cars only, and that the bore of the four-cylinder engines driving them shall not exceed 90 mm. or the stroke 140 mm.

In this race there is no possibility of next year's models being tested, as the main definition of a stock car is that it shall be shown in the manufacturer's or agent's catalogue published prior to February 17th. This makes it easy to find out what cars are eligible, and we give a list herewith.

It will be seen that there are only fifteen cars on the market to-day, and that only two of them are British, which actually have but do not exceed the maximum dimensions, which give a capacity of 3,561 cubic centimetres. However, so long as the two dimensions of 90 × 140 mm. are not exceeded, cars with smaller engines are available, and we have assumed that entries may be forthcoming from makers of cars considerably smaller. We, therefore, give classified lists of all the cars on the market which have engines of over 3,000 c.c., but are well inside the maximum bore and stroke dimensions permitted by the conditions of the race.

It is obvious that, had the conditions dealt with cubic capacity alone, that is to say, restricted the race to stock cars with engines not exceeding 3,561 c.c., the number of eligible cars would have been very considerably increased; for instance, the numerous 80 × 150 mm. cars, which only give 3,012 c.c., would have been available.

It should be understood that in giving the list of the eligible cars we have not consulted the makers in any way—we know that in many cases the particular cars will not be entered—but we have merely given them as showing the maximum possible number of cars which could be entered in the race unless the entrants should put in cars very much smaller than the maximum allowed. This list gives a total of 57 cars in all, 24 of which are British.

List of Cars Eligible for the Tourist Trophy Race.

90 × 140 MM.—3,561 c.c.

20-30 Alpine Austro-Daimler	25-35 Knight-Martini
25-30 Benz	25-30 Mercedes
20-30 Benz-Sohne	20-30 Metallurgique
18 Berliet	20.1 Renault
20.1 F.A.B.	18-24 Scout
20.1 Fafnir.	15 Talbot
20.1 Komnick	25-30 Zedel
16-24 Martini	

90 × 135 MM.—3,434 c.c.

30-35 Mathis	20 Spyker

90 × 130 MM.—3,307 c.c.

20 Ariel	16 Minerva
15 20 Baguley	16 Motobloc
20 Knight-Bayard	20.1 N.A.G.
20 Daimler	14-30 Opel
20 Dennis	18 Rover
20 Germain (Knight)	18-24 Siddeley-Deasy
18-30 Itala	20 Singer
25 Rotary Valve Itala	18 Turcat-Méry
18-20 Lorraine-Dietrich	20 Withers
17 Maudslay	

90 × 127 MM.—3,232 c.c.

20.1 New Pick.

90 × 121 MM.—3,080 c.c.

16-20 Wolseley.

90 × 120 MM.—3,052 c.c.

14-18 Clement	20.1 Springuel
20 Humber	15 Swift
20 Lagonda	16-20 Vauxhall
16-20 Pilain	

89 × 134 MM.—3,256 c.c.

20 Standard.

89 × 127 MM.—3,160 c.c.

16-20 Aberdonia.

89 × 126 MM.—3,136 c.c.

20 Austin.

88 × 130 MM.—3,160 c.c.

19.2 Hansa.

86 × 130 MM.—3,016 c.c.

16-20 Alldays	18.4 Enfield

85 × 140 MM.—3,176 c.c.

20 Bayard (Knight)	16 Brasier
18 Bayard	

85 × 135 MM.—3,051 c.c.

17-25 Armstrong-Whitworth.

83 × 140 MM.—3,032 c.c.

15-18 Hupmobile	16-30 Schneider

The Signposting of Bradford.

It only as an example to other provincial towns we would call attention to the work that is now in progress for the signposting of Bradford. The Bradford Automobile Club, which with over 400 members, claims to be the largest single club in the provinces, has given attention to this question, but it has been found difficult to evolve a satisfactory system owing to the physical features of the locality. Bradford straggles along and up the sides of a small branch valley of the Aire, and the centre of the city, where the roads converge, is a medley of warehouses and offices, which break up the through ways, and the touring motorist has much twisting and turning and enquiring to do before he can get clear. With a view to improvement a well-known member of the Bradford Club undertook to try to work out a scheme of signposting, which doubtless the city council would have adopted, for the relations between the two bodies are very amicable, but he found himself unable to straighten out the tangle of what is known as the central area. This central area has been scheduled by the city council, who are undertaking, subject to Parliamentary sanction, a comprehensive scheme of improvement which will mean wider, straighter, and more regular roads. Meanwhile it has been decided to make a beginning with the work of signposting, starting from the outskirts of the city and working towards the centre. Under the supervision of the City Engineer about thirty of the signs have been placed in position. When one remembers the number of cross-roads which exist on the borders of the West Riding towns, it will be realised how useful they are.

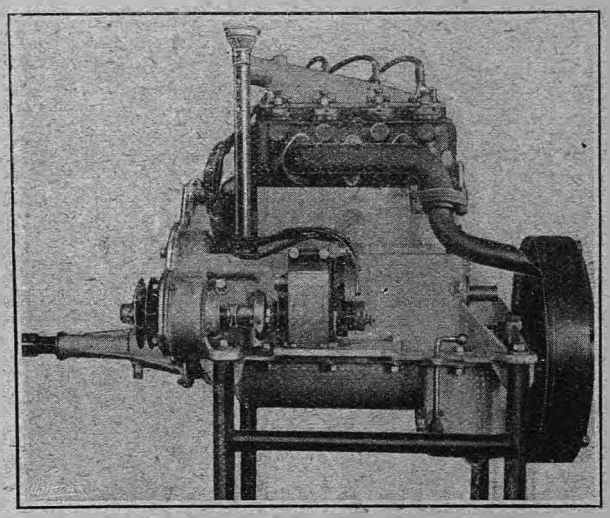
The rakish four-seated body work on the Rolls-Royce (London-Edinburgh type) car illustrated on page 556 of our last issue should have been ascribed to Messrs. Mann, Egerton, and Co., Ltd., Norwich, who, as is well-known, have spacious coach-building works capable of producing every type of body.

The Royal Automobile Club.

Annual General Meeting.

THE annual general meeting of the Royal Automobile Club was held at the Club premises, 89, Pall Mall, S.W., at three o'clock on Monday afternoon. The meeting was well attended, and the Hon. Arthur Stanley was in the chair.

Dealing with the report, the Chairman said that those present should bear in mind that the Royal Automobile Club



A 12 h.p. four-cylinder motor car engine, presented to the motor car classes of the South African College, Cape Town, by the Standard Motor Company, Coventry, through Mr. Benjamin, of Messrs. Benjamin and Lawton, Cape Town. The engine is complete with a Standard carburetter and a Bosch magneto. Two brakes and a Hopkinson's flashlight indicator have been ordered by the College, and tests of the engine will be made by the students.

was both a club and a society of encouragement. As a business concern it was its object to show a big balance, but as a society of encouragement its attitude was to spend money for the benefit of the industry. He was glad to be able to state that those who had prophesied the Club's failure when the new premises were first occupied had been wrong in their surmises, and only in two small items had the Club shown any decrease in revenue—these were the swimming bath and the rifle range.

He mentioned that the total turnover in 1908 was £213,000, and in 1912 £1,266,000. With regard to the proposed purchase of a golf club house, the Chairman mentioned that the Club had the option of purchasing a freehold estate near Epsom, where they had room for two golf courses and a cricket ground, and he earnestly hoped that the necessary sum for the Golf Club and Country House, Ltd., would be subscribed by the members. As to the Club's activities as a society of encouragement, he would like to mention the Isle of Man race to be held this year for stock cars, and the excellent work of the Technical Department in carrying out trials. With regard to the complaints that the Club had not been doing enough, the Chairman said that those present should bear in mind that the Club did a great deal of good work which was never made public. The Chairman also mentioned the alteration in the conditions under which driving certificates were issued, which was done at the suggestion of the drivers themselves and at the representation of the National Society of Chauffeurs, the object being to render the certificate worth holding, and to prove that the man who held it was a good driver.

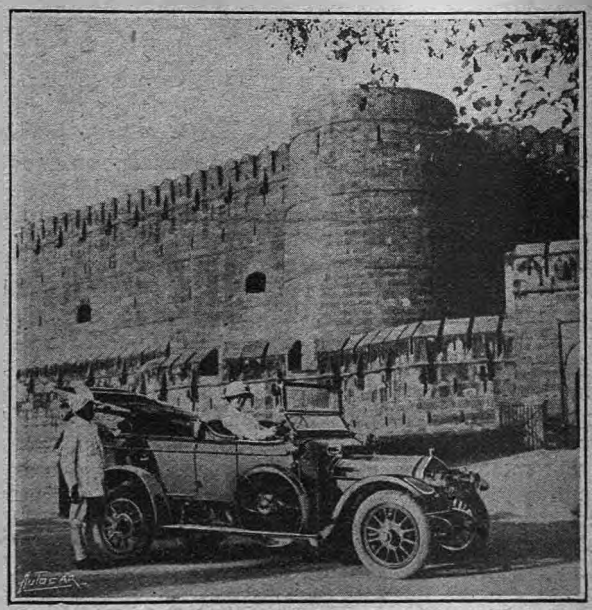
Touching the rise in the price of petrol, the Special Committee had collected a mass of valuable evidence. Out of that committee had arisen a committee to study the production of benzole, which consisted of representatives of the Club, the Society of Motor Manufacturers and Traders, and of the A.A. and M.U. As to those who hoped that the Club would be able to sell petrol to its members at a reduced cost, he would say that no one had yet suggested where the supply was to be obtained, nor had anyone put down the £5,000,000 capital, necessary for bringing that supply over here.

Mr. Stanley went on to speak of the work of the Legal and Touring Departments, and in connection with the latter he made special mention of its very capable head, Mr. Herman Moroney, who was a perfect genius at the work in which he was engaged, and that they were very fortunate in having such a capable man in charge of that department. He also spoke of the value of the "get-you-home badge."

The Chairman then went on to speak of the various criticisms which had been levelled against the Club. He considered it would have been the height of folly for the committee to be annoyed by those criticisms. It was necessary to know where and when they were going wrong, and he assured those present that they had not lacked advice in this respect. Nevertheless, if certain members who desired to criticise the Club would first come and ask the chairman or secretary for the necessary facts, it would be a great deal better. He mentioned an instance of a member who came and saw him and complained that the Club did not do enough on the encouragement side, and said he only hoped half the money which was being spent on the new building next door would be handed over to this side, and that it would be much better for the movement. In reply, the speaker asked him how much he thought was being spent on the building next door. The complainant said that he did not know, but he thought that at least half the sum might be spent otherwise; to which Mr. Stanley replied that the Club was spending nothing on the building next door. He would now deal with three important points which had been criticised.

Firstly, as to the taxation of old cars. There was, of course, a great deal to be said for the contention that more had not been done, but he assured the meeting that it was not the fault of the R.A.C. They had been in negotiation with the Chancellor of the Exchequer, who, he understood, was willing to receive a deputation, but no definite reply had yet been obtained. He hoped, however, that Mr. Lloyd George would shortly receive a deputation, and he assured those present that the matter was in the hands of a capable member of the Club who was also a member of Parliament.

Secondly, as regards a certain unofficial tyre trial. He did not mean to go into controversies as to who was in the right, but he would read a letter which had been received from Mr. Yarworth Jones. This letter stated that the only misapprehension which might arise out of the unofficial competition which had just been completed was as to the attitude of the Victor firm towards the position of the R.A.C. The writer's only concern was for the maintenance of the standing and dignity of the Club, as the sole governing body of motoring, and the fact that his firm had



MOTORING IN INDIA. A 16-20 h.p. Wolseley cabrio-phaeton outside the entrance to the fort at Agra.

first applied to the R.A.C. to conduct the trial, and that it has just accepted a challenge from another tyre firm for a test under R.A.C. auspices, was the best evidence of that attitude. He considered his firm had been unfairly treated, and had said so emphatically, but he had never questioned the personal integrity of the committee in the conduct of the R.A.C. trials. He did not approve of unofficial trials; the one just concluded was the first he had ever entered into and would be the last. The Chairman, continuing, said that the Club would always be willing to carry out another tyre test for the Victor firm so long as it approved of the nature of the test proposed.

The third criticism was that found in a letter in a motor paper speaking about the influence of the trade and mentioning that six directors of the Society of Motor Manufacturers and Traders were shareholders in the R.A.C. The Chairman said that the case had been understated; there were nine instead of six, and to show the extent of their influence he would mention that altogether they owned ninety shares, *i.e.*, £900 out of £214,000 capital, so that the Club was not entirely at their mercy. The services of the trade members of the committee had been of the utmost value, and had never influenced the Club in its judgment in any way. It had been suggested that the Club was always quarrelling with the A.A. and M.U.; that he denied absolutely. They were always on most friendly terms, and when they met together on questions of legislation their views absolutely agreed. Of course their work had overlapped occasionally. In conclusion, he said he would like to convey his thanks to the staff, and to Mr. Julian Orde in particular, for the excellent way in which the work of the Club was carried on. The Chairman duly moved the adoption of the report. This was seconded by Mr. A. Armitage.

A member then rose and asked if anyone commercially interested in supplying goods to the Club was on the committee or proposed for election to the committee; also, if any practising solicitor served on the Legal Committee; and, lastly, criticised the method in which the accounts were made out, saying that the items therein should be stated more in detail. The Chairman, in reply, said that next year, if the committee thought it advisable, the accounts should be be given more in detail, and that on the Legal Committee there were several practising solicitors whose advice was, of course, invaluable. As regards the elections, this matter was in the hands of the members, and he did not propose to interfere with their choice. The Chairman then proposed the adoption of the accounts, which was seconded by Mr. Manville. Next followed the adoption of the Budget, the election of the Council, and slight alterations in two rules, one of which would alter the date of the annual general meeting from February or March to a date not later than the 31st May, and the other dealing with the re-election of members after one year. The meeting concluded with a vote of thanks to the Chairman.

A Chamber of Motor Experts.

Of Special Interest to Inventors and Investors.

RECENTLY a company has been formed known as the London Chamber of Motor Experts, Ltd. The purpose of this company is to consider and report upon new inventions and patents generally, and also to furnish information and advice to investors. On the payment of a small fee the opinion of the Advisory Committee will be given not only in connection with new patents and inventions, but also in regard to any schemes for the development of existing motor businesses, or in cases where finance is required and where advice is desired prior to money being advanced by the financier.

The Advisory Committee consists of the following, almost every one of whom is well-known in the motor industry:

Messrs. D'Arcy R. Baker, Robert W. A. Brewer, Hamilton Hobson, Charles Jarrott, Arthur F. Mulliner, A. S. Mays-Smith, and James A. Tinling.

It is hoped that this enterprise will fill a want and be useful, particularly to inventors and investors, for instance:

(1.) To one who has an invention with the means to exploit it, but is doubtful as to whether the invention has practical value and is a good commercial proposition.

(2.) To the inventor who has a good thing but no money to exploit his patent.

(3.) To the parent who, perhaps, wishes to put a son in the motor business and invest a substantial sum of money with him and has no means of ascertaining as to whether the venture is a good one or not.

(4.) Where a firm requires financial support and the lender wants to know from experts as to whether the venture is good enough to lend money to.

It is not assumed that the Advisory Committee embodies all the expert knowledge in the motor industry, but each man upon it is practical or has had very special experience, either of the motor industry or of business generally, and it is proposed in cases where for one reason or another the problem is one with which the committee feels itself unable to deal without expert knowledge of a very special character to call in the services of specialists.

There are many other ways in which the Advisory Committee can be of service, but we have said enough to show the general aims of those concerned.

It is, perhaps, natural to ask: With small fees how is it that seven busy men care to devote themselves to the problems which may be submitted to them either of an engineering or a financial nature? We think the answer is fairly obvious—that is to say, if their services are taken advantage of they will be kept in very close touch indeed both with the inventive and monetary activities of the moment so far as they affect the motor industry, and this, probably, will be of far greater service to most of them than any actual fees they may receive. No doubt some critics will say that they would prefer to submit their matters to a committee composed of disinterested people, but they must bear in mind that in such case it is extremely improbable that disinterested people, *i.e.*, people unconnected with the industry, would be in a position to give them really practical advice, still less to put them in the way of financing an invention or putting it upon the market.

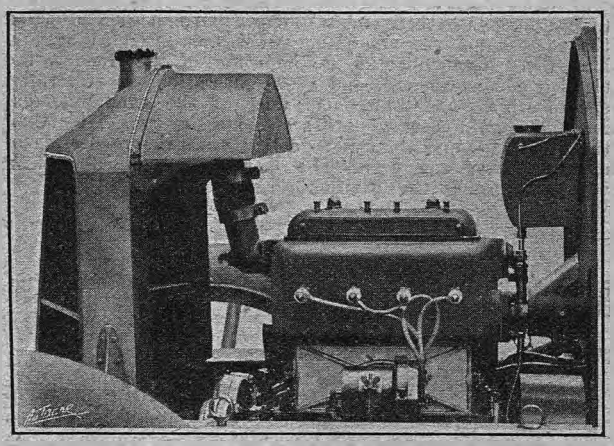
The address of the London Chamber of Motor Experts, Ltd., is 13, Finsbury Circus, E.C.

In furtherance of the work already done by the Automobile Association in connection with the institution of county byelaws compelling horsed vehicles to carry rear lights at night, the patrols in certain counties have been instructed to remain on duty after dark and keep a look out for horsed vehicles contravening the byelaws regarding rear lights, and to report all such cases to the nearest constable, with a view to the drivers or owners of such vehicles being prosecuted. The Berks County Council has just issued rear lighting byelaws, which came into operation on March 25th.

The 12 h.p. Palladium.

Four Cylinders, 75 × 120 mm. Bore and Stroke. Three Speeds. Bevel Drive.

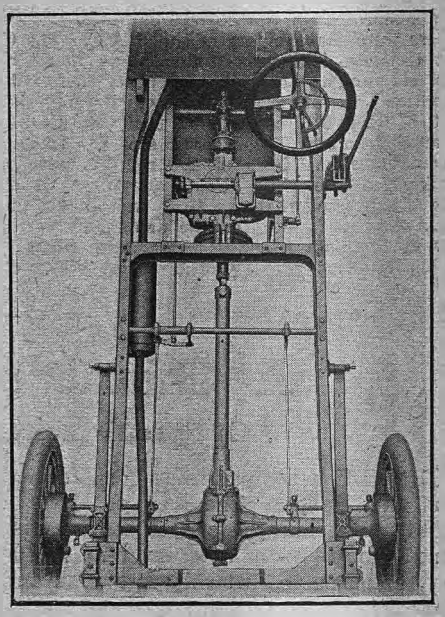
THIS car, which is of British construction abaft the dashboard, is handled by the Motor Exchange, Ltd., 378, Euston Road, London, N.W. The frame is of channel section steel, flared at the dashboard insweep and smartly upswept over the back axle. There are three cross members, one immediately behind the radiator and the second more or less in the centre of the frame. The rear member is angled and produced to form the brackets taking the stub ends of the unusually long threequarter elliptical springs. The first and second cross members support a long underframe which sustains the engine and gear box.



Near side view of the 12 h.p. Palladium engine showing the dashboard oil tank and the large extra water tank on the radiator.

The four-cylinder engine is the well-known Chapuis-Dornier, a side view of which we give, and by which the remarkably clean, neat appearance of the *en bloc* casting is evident. Overhead inlet valves are fitted, enclosed by a cover which carries the rocking arms actuated by long tappet rods which pass through the cylinder casting. The exhaust valve stems and tappets are also enclosed by a single, easily-detachable cover, and are placed in the usual position at the side of the cylinders immediately under the inlet valves. The exhaust trunk is in one with the casting.

The stroke and bore of the engine are 75 × 120 mm. The magneto is set midway on the left of the engine in an accessible position, and is gear-driven off the end of the camshaft. The sparking plugs are placed on the side of the combustion spaces between the inlet and exhaust valves.



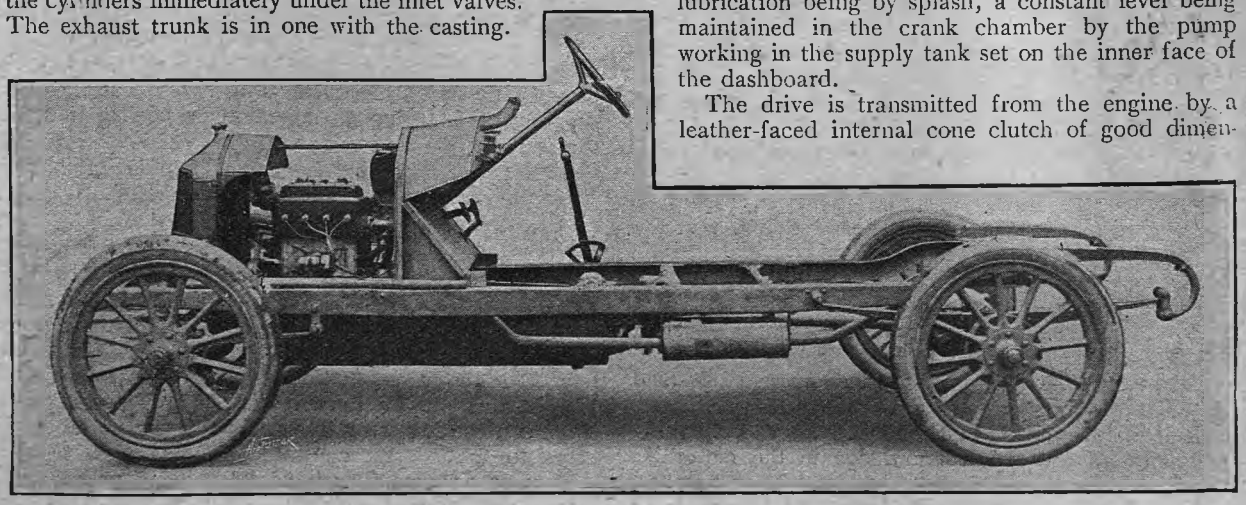
Plan view of the 12 h.p. Palladium chassis behind the dash.

Thermo-syphon cooling is adopted, the leads being of large diameter. The outflow is set in the bottom of the spacious overhang tank of the radiator in such a way that the cylinders, even should a considerable amount of water be lost by evaporation or otherwise, are still well covered.

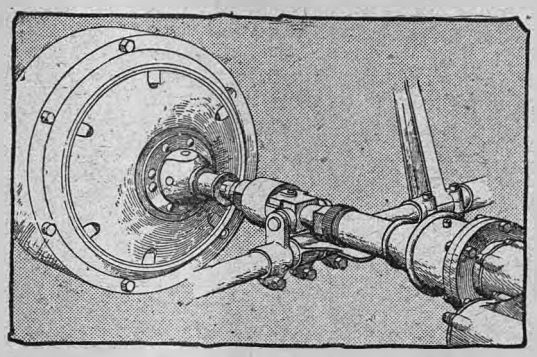
The crankshaft rotates in two large bearings, and the pistons have three piston rings above the gudgeon pin.

With regard to the lubrication, the oil is pumped to each crankshaft bearing, the remainder of the lubrication being by splash, a constant level being maintained in the crank chamber by the pump working in the supply tank set on the inner face of the dashboard.

The drive is transmitted from the engine by a leather-faced internal cone clutch of good dimen-



Near side view of the 12 h.p. Palladium chassis. The dashboard petrol tank and the unusual length of the rear three-quarter elliptical springs are points to be noted.



Sketch showing the clutch and universally jointed clutch-shaft of the 12 h.p. Palladium.

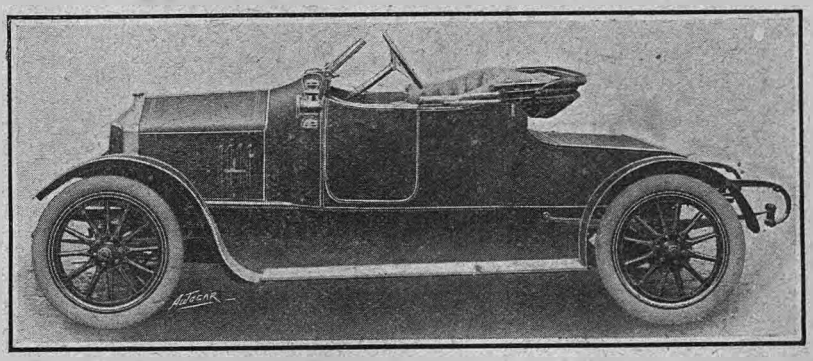
sions with first intention springs beneath the leather. The clutchshaft is connected to the gear box by a universally jointed shaft, shown in detail by the accompanying sketch.

The gear box affords three speeds operated by a neat form of gate change. The gearshafts are kept short, the gear wheels being formed with unusually wide teeth, the shafts running in roller bearings, with adjustable stuffing boxes to prevent oil leakage. All the striking gear is placed within the box and operated from above. The spigot bearing of the primary gearshaft has also a roller bearing. The primary gearshaft connects with the propeller-shaft through a large encased universal joint which carries the brake drum. The propeller-shaft itself runs through a tubular casing with a roller bearing at its forward end. The drive to the back axle is by bevel.

The differential gear sockets and the live axles all rotate in roller bearings with ball thrusts, the driving wheels themselves running on the axle sleeves, so that the driving-shafts have no other duty than that of rotating the road wheels.

The wheel brake drums are of large diameter, the brakes being of the internal-expanding order, side lever applied, and nicely compensated by a cross-head.

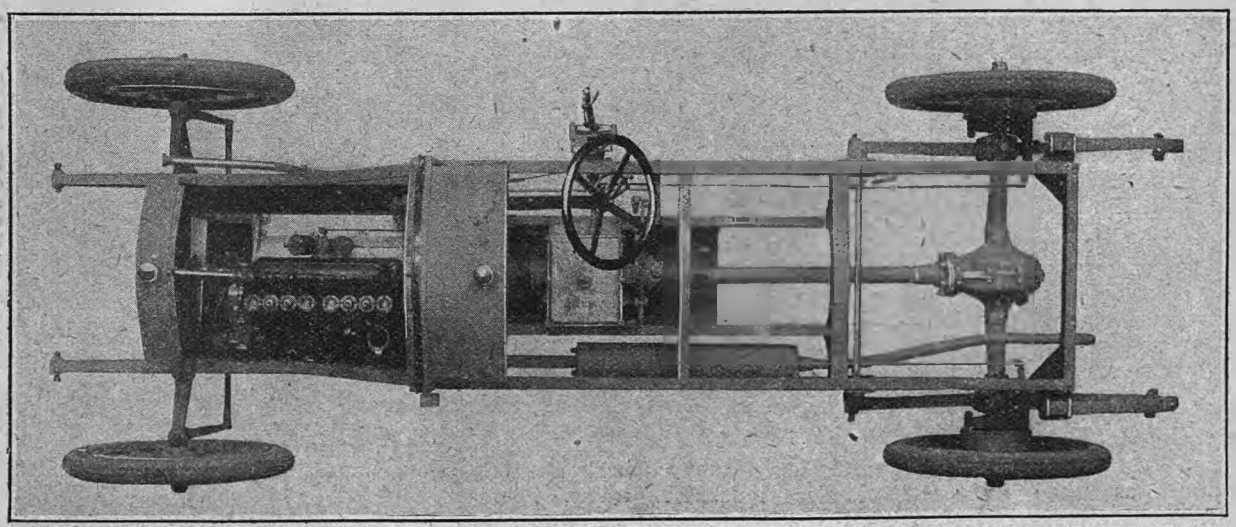
The petrol tank is placed at the rear of the dashboard, so as to be accommodated within the scuttle, and has a content of seven gallons. An easily detachable undershield runs from the base of the radiator to the rear of the gear box. The wheelbase is 9ft. 6in., and the wheel gauge 4ft. 6in. The wheels are 760 × 90 mm.



A 12 h.p. Palladium with a smart two-seater body

Motoring in Buenos Ayres.

The Canadian Trade Commissioner at Buenos Ayres reporting to his Government says: "A comparatively fair trade is being done in motor cars in Brazil; the majority are doubtless for use in Rio de Janeiro, for the roads of the Republic do not admit of their employment in the country districts. As the city of San Paulo is well paved and also possesses some of the most beautiful suburban drives to be found anywhere, it should continue to absorb motor cars in large numbers for many years. There should be a future for the lighter and less expensive class of motor car. Most of the vehicles in use are substantial-looking and fitted with artillery wheels. The touring or open car is almost universally used; on account of its airiness it is very suitable to the climate. Flimsy, cheap-looking cars are not popular. Whatever quality the vehicles may be for the South American trade it is essential that they look well."



Plan view of the new 16 h.p. poppet valve Darracq chassis, referred to on page 498 in "The Autocar" of March 22nd.

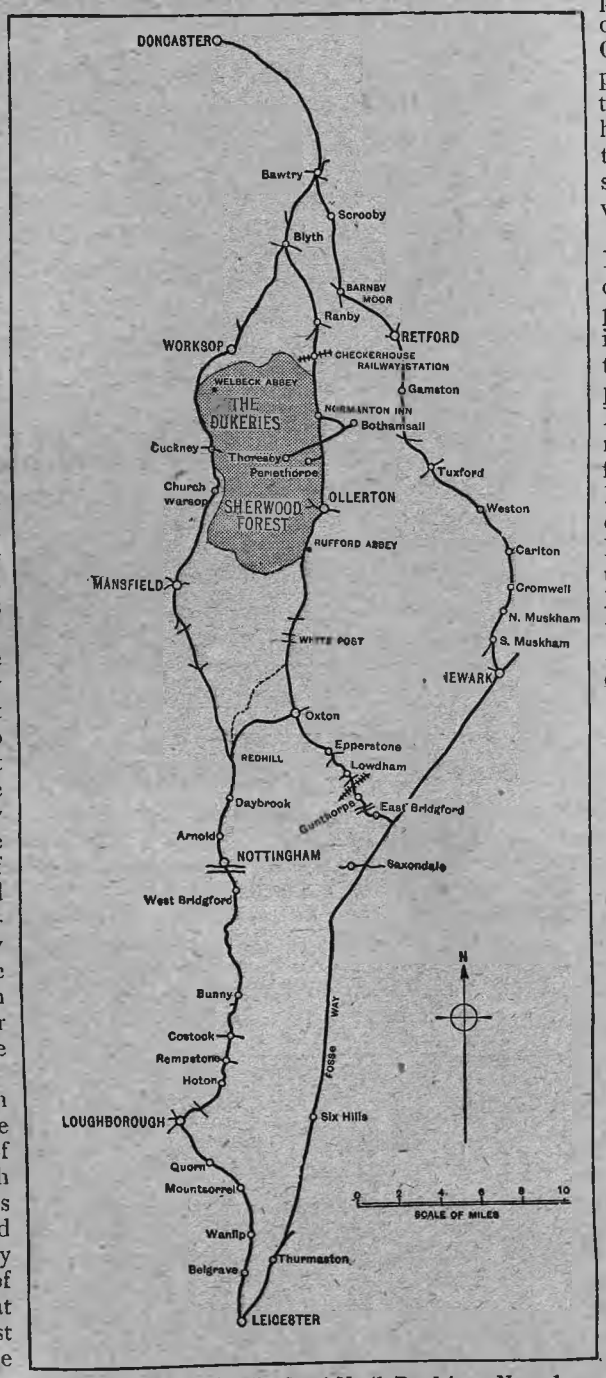
Road Reform in Nottinghamshire.

By Charles G. Harper, Author of "The Autocar Road Book."

THERE has recently come into my hands a remarkable volume, issued in a limited way by the Notts. County Council, which shows with what thoroughness the Council is grappling with the problem of road reform within its boundaries. This volume, intended to detail the schemes of road improvement towards which the Road Board was and is invited to contribute, was officially prepared for semi-private circulation, and consists of some sixty pages in large quarto; partly lithographed maps and plans, hand-coloured, and partly printed pages. The large scale plans, mostly of dangerous corners which have been already improved, or are about to be dealt with, are generally accompanied by photographic views taken with a Panoram Kodak camera. Thus both the technical and lay mind can readily grasp the problems treated of.

It will be obvious at once that a volume produced by these methods must be not only a costly work, but also of very limited numbers. It is understood that only some forty were produced, mostly for the information of the chairman and members of the Highways, Bridges, and County Buildings Committee of the Notts. County Council. Of these, some are now in the Nottingham Public Library and other public institutions of the county.

The position of Notts. in the community and on the map of England, is of peculiar interest. Through it, from a point four miles south of Newark, and through Tuxford to Scrooby and Bawtry, a distance of thirty miles, runs the Great North Road. North-east and south-west goes the ancient Fosse Way, for thirty miles of its total of 223; and towards the north-eastern part of the shire is that delightful relic of the ancient Sherwood Forest, the beautiful district known familiarly as "the Dukeries." Modern industrial developments are rapidly changing the face of this ancient forest shire; and all around the district where the "greenwood tree" still flourishes the rich Notts. coalfield is being more and still more widely exploited. Even from the gardens and terraces of Welbeck Abbey, the seat of the Duke of Portland, signs and portents of these things are visible; for from that point you may see the tall chimney-shaft of the new Cresswell Colliery with its plume of smoke; even though the Duke's gardeners have been at pains to plant trees to mask it and preserve the amenities of the view.



Sketch map showing the Great North Road from Newark to Bawtry and Doncaster, together with the route from Leicester by Loughborough to Mansfield and Doncaster; also the proposed relief route, Leicester, Saxondale, Oxton, Ollerton, and Blyth.

At Clipstone, too, where King John hunted the red deer he loved so well, new pits are being sunk. Thus it happens that the population of Notts. is rapidly expanding in such centres as Mansfield, Worksop, Hucknall, and Annesley. Retford, too, on the Great North Road, is growing industrially. In fact, the latest census returns show that of all the counties Notts., with the exception of the West Riding of Yorkshire, had the largest increase. The percentage was about 25.8.

A problem has arisen from these facts: how to secure a relief route to the north, avoiding alike the Great North Road on the east side, and Nottingham, Mansfield, and Worksop on the west. The difficulties of proceeding from Leicester through the long, narrow and squalid street of the granite-quarrying village of Mountsorrel, and thence through the exiguous and obscure turnings leading from Loughborough to Nottingham town, up the severe gradients and awkward turns of Bunny Hill, are well-known, and the impossibility of getting readily through the town of Nottingham need not be demonstrated. The narrow streets and ubiquitous tramlines of Mansfield are also further disabilities on this line of advance. Such a relief route would leave the others more free for the heavy and rapidly increasing intercommunicating traffic.

It is considered that, in view of the restoration of the 12½ miles of the ancient Fosse Way in the territory of the Notts. Council, now in progress between

Saxondale and Six Hills, and the already fair condition of the same road onward to Leicester, an excellent and in every way attractive route could, at comparatively little additional cost, be made (as shown on accompanying sketch map) from Leicester to Ollerton, the Dukeries, and the Great North Road at Bawtry, by way of East Bridgford, Gunthorpe, Lowdham, Epperstone, and Oxton. The distances are:

	Miles.
Leicester to Saxondale	22¾
Saxondale to Gunthorpe Bridge	5¾
Gunthorpe Bridge to junction with road to Nottingham, between White Post and Oxton	9
From road end to Ollerton	7¾
Ollerton to Bawtry	16¾
	60

The distance between Leicester, Loughborough, Nottingham, Oxton, White Post, Ollerton, and Bawtry is 60½ miles, only half a mile more, but the gradients *via* Fosse and Oxton are easy, and the road between Leicester and beyond Saxondale is singularly lonely. When we come to consider the section which branches off to left 2¼ miles beyond Saxondale and runs 7¾ miles to Oxton, we find again an excellent road, qualified at present by the toll-bridge across the Trent at Gunthorpe. The estimated cost of freeing this bridge was in 1898 £5,000. The road beyond Oxton ascends and goes undulating across the moors, finally descending to the beautiful wooded hollow of Rufford. This is essentially a tourist's route, and continues by successive left and right turns out of Ollerton, past the cross-roads to Perlethorpe to Normanton Inn. The one mile or so shown on the sketch-map between the Bothamsall and Thoresby cross-road, and near the Normanton Inn, was until last year an unmetalled stretch, overgrown with grass. It has now been restored with a slag-pitched foundation and rejections, slag sub-crust, at a total cost of £1,165, by a grant from the Road Board. Another short grass section exists between Checkerhouse railway station and Ranby. At present the Road Board is prepared only to contribute pound for pound on any further expenditure beyond this point towards Bawtry, but it is hoped that further consideration will show that this, which is for all purposes a "by-pass" route, is deserving of support. While the cost of restoring the thirty-seven miles between Saxondale, Oxton, Ollerton, and Bawtry has not been fully ascertained, a rough estimate is possible, by which it would seem that £8,150 would suffice to construct the "out-of-hand" portions up to the condition of being ready to receive a final coat of tarmac, which would add another £33,000 making the total cost £41,150.

The dotted line shown on the map is a long derelict road of four and a half miles, whose restoration would shorten the route as between Nottingham and Ollerton by rather over one mile. The restoration of it has been mooted, but the prospects of the work being taken in hand are somewhat remote.

The details of the work at present in hand on the twelve and a half miles of Fosse Way already alluded to are interesting. For many years past the section between Saxondale and Six Hills, where the Leicestershire border is met, has been in a neglected state, and in places wholly derelict. It is a 66ft. road, in general, between the hedges, but signs of old encroachments are here and there evident. Six and three-quarter miles were wholly unmetalled and in the nature of a soft grass ride, and but two and a quarter miles were in a fair condition. The remaining three and a half miles were in a poor state. The Road Board has granted the entire cost of re-making, re-grading, and re-metalling this distance. The works, which will be completed towards the end of the year, will cost £21,428. The new metalled portion has been laid to a 15ft. width, and faggoted and side-drained. When completed, a margin of 5ft. of turf on either side will be available for cantering horses. The bottom foundation is of hand-packed slag 7in. to 9in. thick, with a sub-crust of 3in. of slag-rejections. The surface is generally 15ft. width of tarmac, reduced in some portions to 9ft.; the tarmac specified to be laid, as to a bottom layer, of 2¼in. gauged material, all interstices filled with 1½in. and ⅝in. tarmac; and faced with a final facing of 1½in. gauged tarmac, again with the interstices filled with ⅝in. tarmac. This, it is hoped, will make twelve and a half miles of the finest motoring road possible.

The passage of the Trent has always been a serious problem for Notts. This broad river enters the shire at Sawley and flows past Nottingham to Newark, gradually changing from a north-easterly direction to due north, and leaving Notts. at Gainsborough. There are some forty-eight miles of the Trent within its boundaries. The river has from the earliest times been a base in military strategy, and has determined the course of many an army and the fortunes of war in the old troublous days. Numerous main roads cross it, but of all the bridges that span this important waterway between Trent Bridge, Nottingham, and the sea, Newark Town Bridge is the only free one. There are four toll-bridges in Notts. which the County Council is desirous of freeing. These are Wilford Bridge, one mile south of Nottingham, and those of Gunthorpe, Dunham, and Gainsborough. The probable cost of extinguishing private rights in these was ascertained in 1898. The figures were respectively £30,000, £5,000, £5,000, and £18,000. The tolls for motor cars range from the excessive one of 2s. at Gainsborough Bridge down to 6d. at Wilford. It costs 5s. for a traction engine to cross Gainsborough Bridge. In view, however, of the traffic and the consequent income from tolls having greatly increased since 1898, the cost of purchasing these properties would now doubtless be considerably higher. It is urged that, as the users of these bridges would be principally persons from outside the county, the Road Board might fairly be asked to be at the cost of freeing these important means of communication.

The remarkable work now under notice contains a number of proposals under Heading 4 of the Road Board's circular—"Opening out of Dangerous Corners and Alteration of Dangerous Curves," all illustrated with plans and photographs. These are in the nature of a first instalment, and include improvements at

Burton Joyce, Nottingham and Southwell main road.
Bulcote, Nottingham and Southwell main road.
Kelham, Leadenham and Southwell main road.
Bingham, Nottingham and Grantham main road.
Elton, Nottingham and Grantham main road.
Radcliffe-on-Trent, Nottingham and Grantham main road.
Castlegate, Newark, junction of Fosse and Great North Roads.
Toton, Sawley and Derby main road.
Trowell, Nottingham and Ilkeston main road.
Upper Broughton, Nottingham and Melton main road.
Plumtree, Nottingham and Melton main road.
Carlton-on-Trent, Great North Road.
Gamston, Great North Road.
Clarborough, Retford and Gainsborough main road.
North Callingham, Newark and Gainsborough main road.
East Markham, Dunham and Markham main road.

Road Reform in Nottinghamshire.
Sutton Bonington, Kingston and Gotham main road.
Grassthorpe, S. Leverton and Sutton-on-Trent main road.
Rempstone, Nottingham and Loughborough main road.
Coddington, Leadenham and Southwell main road.
Wilford, south of Nottingham.

Of the roads thus to be re-modelled at their most dangerous corners, the Nottingham to Grantham Road would seem to most people easily the worst, the Bingham corner, coming from Nottingham, simply inviting the stranger to run right into the fields out of the main road; while the reform of the excessively acute and dangerous bend approaching Elton will easily be worth the £570 it will cost if the Council's Scheme for the carrying out of the proposed improvement is adopted, by which the whole of this elbow will be cut off and the route shortened by 300 yards. The origin of such strange twists as this is not easily to be traced, but is probably a legacy from those olden times when England was an unenclosed country and the roads were left to themselves; when horsemen and other travellers, finding the usual route impassable, struck out a new line for themselves on such firm ground as they could find.

In conclusion, it will be seen that the Notts. authorities have approached the needs of modern road-users in a resolute and thorough manner scarcely attained yet in other quarters.

Small Car Talk. By Runabout.

Bore-stroke Ratio.

RECENTLY I enjoyed a particularly interesting sidelight on the Pomeroy-Coatalen controversy, for I was taking my ozone on a chassis which represents the extreme left wing of the discussion, viz., the 15 h.p. Sizaire, which has four cylinders 70 mm. × 170 mm.—quite an extreme ratio. I daresay I am not as sensitive as some people to the individualities of a four-cylinder engine, for as a small car man I am more accustomed to the pauci-cylinder types. However, I have a good general acquaintance with typical fours, and I must confess I should never have dreamt that this car was at all unorthodox in its ratio. At extremely slow speeds in city traffic I was fain to open the cut-out, for the engine was absolutely silent and vibrationless, and I was apt to stop the engine altogether. I admit that in spite of a good clutch it was not easy to get away from a practical standstill on top, but that is hardly ascribable to the freak bore-stroke ratio; a highly geared 70 mm. four-seater cannot be expected to emulate End-to-end one-gear runs. The acceleration of this tiny engine is terrific, and its speed limits provide ample intoxication. My one criticism of the car is that the presence of its heavy axle is noticeable when riding over pot-holes.

A Contrast.

The following week I took out an American car, considerably cheaper than the Sizaire, with a bore from which we should demand at least 30 effective h.p. if the car had emerged from a European factory. The main feature in the comparative experience was the ability of the French 70 mm. to beat the Yankee four-inch on all points of road efficiency. The French car had no marked period in its engine; the American, while better than any other cheap Yankee I have tried in this respect, had a dithersome engine whenever the throttle was widely opened. The Sizaire would run slower on top speed, and would also turn over considerably faster; it would ask for its second gear much later, and cling to it much longer, simultaneously maintaining a far heavier pressure on the speedometer needle. Oddly enough the American car also possessed a rear axle gear box, and yet I never detected the weight of the axle on a bumpy road, as I did with the Sizaire occasionally. I fancy the dirt roads and washouts of the States teach a spring designer more than most Europeans have a chance to learn, but we can give the American designers points in engine efficiency. The American engines, to use a canine simile, are like large woolly sheep dogs, while ours are like keen little ratting terriers. But the Americans are wonderful value at the price.

American Lamps.

In a general way I have not much to say in favour of cheap accessories. Two years ago I spent a solid month on an imported car, provided with a standardised outfit at an inclusive price, and the experience was not enthralling. The windscreen shed the rubber packing which ought to have held the glass *in situ*, and we returned home with a naked frame, a rear passenger gingerly supporting the glass panels on his knees. All five lamps shed their glasses into the road at different points of the tour, and even the generator had intestinal troubles, while the hooter was in a galloping consumption, and could only "wuff" hoarsely, pianissimo, in its interior. The modern imported equipments are much better in material and durability, and in one item of design they give some of the home stuff a strong hint. My English lamps are full of chinks and crannies which are most awkward to clean. The lamps on three American cars I have tried recently have all been of the bisected eggshell type, with never a projection or a corner that was inaccessible in cleaning. Electric lamps are notoriously easier to design in this respect, but some of the Yankee acetylene head lamps are excellent practice, and deserve imitation.

Whose Shoe Pinches?

I am afraid there is a certain amount of hypocrisy anent the American influx. Quite a number of the importing concerns are run by British brains and British capital. Quite a decent proportion of the shares in several leading American factories are held by British investors. Quite a good percentage of the profits on sales of American cars in this country goes into the pockets of British agents. So far as dividend-earning goes, the so-called invasion is a gold mine to many a British capitalist, both small and large. Many a country mansion and many a suburban villa form pockets for the gold that comes of the large sales of the imported cars, and many a financier, big and little, interested in the motor trade would prefer things to remain as they are. He is making money out of small cars, without the trouble of securing a design, building a factory, or organising a demand. The same is true of many a shallow-pursed motorist. He is getting a cheap car, which suits him indifferently well, and so long as it runs quietly and costs little to maintain, he does not worry very much what its country of origin may be. The real sufferers—if any—are the British workmen and those towns who are in search of new industries; and neither workmen nor municipalities can lay down the capital requisite to cope efficiently with the huge motor manufacturing concerns of Detroit.

A.A. and M.U. Notes.

Communicated by the Secretary, The Automobile Association and Motor Union.

Whitcomb Street, Coventry Street, W.

Late Crossings at Birkenhead Ferry.

As a result of representations made by the Association, the ferry authorities at Birkenhead have just instituted additional facilities whereby motorists may take their cars over after the ordinary service of vehicle steamers has ceased for the day. The charges for such late transport are (for one car) between 10.35 and 11 p.m., 10s.; 11.0 to midnight, 20s. A special vehicle steamer may be chartered during the night at a charge of £2 10s.

A Dangerous Street Lamp

One of the Association's road patrols reported that, since a road at St. Cross, Winchester, had been widened, the reflection of a street lamp caused the corner of a wall to be obscured at night, with the result that motorists had collided with the wall. This danger to road users was pointed out to the local authorities by the Association, and an assurance has since arrived to the effect that the lamp will be moved into a safer position.

Level Crossings.

Complaints have been received from members concerning the excessive camber between the rails at the Llandudno Junction level crossing. The Association has therefore taken the matter up with the railway company concerned, and has received an assurance that the crossing will be inspected, and that if any defect be found, it will be put right.

A Holyhead Road Warning.

Members are particularly warned that the Holyhead Road, between Corwen and Cerrig-y-Druidion, is in a very bad state. This is due to heavy traction engines being used in connection with the transport of material to the new Birkenhead water works. The local authorities are constantly repairing portions of this road, and the Association understands that the contractors building the water works are also sharing in the expense of repairs, but, notwithstanding this expenditure, there are always portions of the road which have been so badly cut up by the wheels of the traction engines (which are passing day and night) that it is very difficult for cars safely to use this highway.

Latest Road Information.

CHESHIRE.—Members are warned to slow through Altrincham and Northwich.

GREAT NORTH ROAD.—Remetalling operations are in progress on the Hatfield to Welwyn Road, between the 23rd and 24th milestones, full width, roller at work, clear at night; also in progress on the Baldock-Biggleswade Road, between the 41st and 42nd milestones, full width, roller at work, clear at night Remetalling at Tempsford, between the 52nd and 53rd milestones, full width, roller at work, lights at night. Under repair at Codicote, between the 27th and 28th milestones, full width, clear at night.

LAKE DISTRICT.—Kendal-Keswick Road: Remetalling from Kendal to the half-mile post; boards protect it by day. The making of the new road at Ings, between the 6th and 7th milestones, from Kendal, is still in progress.

LANCASHIRE.—Road widening still in progress between Little Marton and Blackpool, roller at work, lights at night; alternative route, *viâ* Moss Side and Lytham to Blackpool. Kirkham-Lytham Road: Foundations are now being laid in Wrea Green, four miles east of Lytham, protected at night. Motorists are advised to turn left at the Post Office when proceeding to Lytham. Preston-Garstang Road: Special caution is necessary between Withy Trees, Fulwood, and Broughton village, also through Garstang. Blackpool-Poulton Road: Members are warned to drive with caution through Poulton-le-Fylde and district. Preston-Wigan Road: In bad condition between Preston and Standish, owing to very rough surface and frequent holes. Preston-Blackburn Road: Full width in very heavy condition on Brookholes Hill, two miles east of Preston.

YORKSHIRE.—York-Malton Road: Under repair, full width of the road eight miles from York, roller at work. Melton-Scarborough Road: Under repair full width between Ganton and Staxton, roller at work. Under repair full width between the 7th and 8th milestones north of Wetherby. Otley-Addingham Road: Likely to be in flood half a mile west of Otley, owing to the still swollen state of the River Wharfe through the bad weather; alternative route, leave Otley by the Bradford Road, and, arriving at Menstone, turn right.

BIRMINGHAM ROAD.—In bad condition right through, owing to loose metal. Yardley tramway under repair, and all traffic is diverted.

WARWICK-SOUTHAM ROAD.—Old Warwick Road under repair between the Canal Bridge and Leamington, half width, lights at night.

NORWICH-AYLSHAM ROAD.—Hovingham Bridge under repair, temporary bridge at Ingworth.

NORWICH-IPSWICH ROAD.—Roller working one and a half miles from Norwich, and also between the 4th and 5th milestones, full width. Broken bridge at Newton Flotman which cannot be seen until motorists are nearly on top of it.

ROYSTON-CAMBRIDGE ROAD.—Members are warned to drive with care through the village of Melbourne, three miles from Royston, as a new water main is being laid down, lights at night.

LINCOLN.—The Town Bridge will be closed for three months for reconstruction from the 5th of April; there is an alternative route.

GLOUCESTER CITY.—Bristol Road: Trench open outside tram sets, lights at night.

BRISTOL-WESTON-SUPER-MARE ROAD.—Control likely to be working on the Bristol side of Rhodyate Hill, about six miles from Bristol.

BATH ROAD.—High Street, Maidenhead, under repair, roller at work, members are warned to drive slowly. Under repair between Calcot and Thatcham. Under repair one and and half miles the west side of Twyford.

BRIGHTON ROAD.—Under repair between Kingswood Church and the top of Reigate Hill, also unrolled metal left at night; members are warned to drive with caution between Povey Cross and Crawley; care is necessary through Merstham, lights at night. Roller working between Gatton Point and Redhill; Redhill to Horley.

KENT.—Control likely to be working on the Frant Road one and a half miles out of Tunbridge Wells.

LONDON DISTRICT.—Controls are likely to be working at London Road, Figgs Marsh; High Road, Streatham; Streatham Road; Mitcham; Morden; Sutton; Charlton; Finchley; Kingston Hill; Putney; Wandsworth Common: Sunbury, Staines.

SOUTHAMPTON ROAD.—Under repair between Staines Bridge and Egham, half width; will take about a week. Windsor Road: The entrance to this road at Egham is under repair, full width; this work will last about a week. Winchester-Bournemouth Road: Under repair at Holmsley Station, full width.

SHOREHAM-CHICHESTER ROAD.—The coast road between Worthing and Lancing is blocked owing to the Easter storm.

SURREY.—Mickleham-Capel Road: Loose macadam laid down full width on the Holmwood side of Capel. Esher-Guildford Road: Control likely to be working between the Orleans Arms Inn and the Long Arch, Esher. Kingston-Leatherhead Road: Members are warned to slow down between Chessington and Hook as a control may be working. Portsmouth Road: Flashlight controls are likely to be working between Kingston and Esher.

SUSSEX.—Members are warned to slow through the ten-mile limit at Uckfield. It is intended to repair the main roads between the following points: Lewes-Cooksbridge; Lewes-Falmer; Rottingdean-Newhaven; East Hoathley Polegate; Laughton-Horsebridge; Offham Ditchling: Kingstanding Hartfield; Eridge-Tunbridge Wells; Halland-Uckfield; Buxted Hadlow Down; Witherenden and Stonegate; Ticehurst; Seacox Heath and Flimwell; Flimwell and Hurst Green; Guestling and Winchelsea.

The Grand Tour.

By Owen John. (*Concluded from page* 556.)

IT will be remembered that we left our friend, or, rather, our friend left Lord A. and the Countess, playing *picquet* because of the danger of bed immediately after a supper that concluded with pike and included most other in-and-out-of-season delicacies, going to the bed he had instructed his courier Antony to watch being made. Well, in this bed we find him next morning, and we will let Mr. Baedeker tell his own tale because it bears on its face the stamp of truth and experience.

"Peter, what o'clock is it?"

"It is past eight, sir."

"How! Eight? Why do you come to my room so late?"

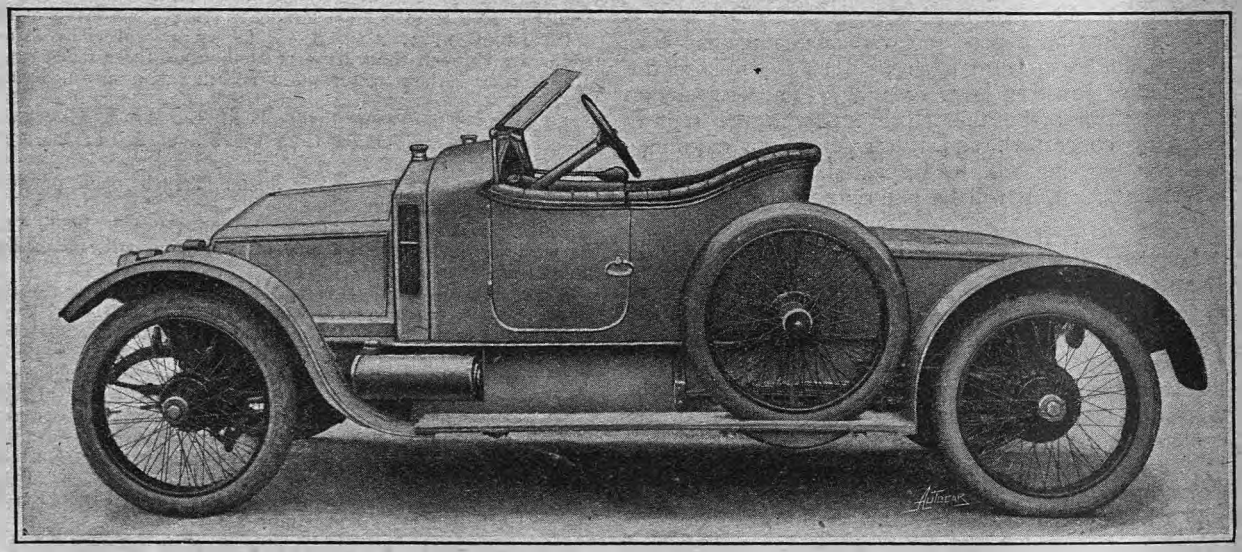
"You told me last night not to come before nine."

"Yes, that's true; now I recollect. It was very late when I went to bed."

"Do you mean to get up now, sir?"

"Yes; draw back the curtains, make a fire, and warm some water for me to wash with."

"Will you shave to-day, sir?"



Nearly two years ago this car, which is a 14-20 h.p. Siddeley-Deasy, accomplished a 15,000 miles reliability trial at Brooklands under R.A.C. observation at an average speed of 34.7 m.p.h., and this trial still stands as the longest performance ever accomplished without involuntary stop. The total renewals at the end of the trial cost less than £2. The car is still running as well as ever and must by this time have covered at least 25,000 miles.

"No, I shaved yesterday, and shall not shave again till to-morrow. You know I commonly shave only every other day."

After which comes a long and irritable conversation as to the clothes he will wear, and finally he decides on cotton stockings to wear with his boots and kerseymere trousers. Then he wants to know if Peter delivered the letter he gave him last night for Mrs. N., and is told that it was given to her maid, who bade him come for an answer before twelve.

Then ensues trouble with the washerwoman, and the list of things that go into her bill include trousers, gloves, veils, laces, and sleeves. By the way, a man's dressing-gown becomes a *robe de chambre*, while a lady's is translated into a *robe de diable*.

"Let me see," says he querulously—for last night's carouse is still in his head—"if my linen is white. No; the shirts are too blue and are not well ironed. They should be as white as snow and the pleats much finer. I beg of you," he goes on, "not to boil my linen too much, and especially not to leave it too long wet, as that ruins it."

Then he orders, with many instructions and forebodings, unlimited pairs of shoes, pumps, and half-boots to wear with his pantaloons. Whereupon the cobbler mildly remonstrates, "If you wish your boots to fit exactly and not to hurt you, you should have a boot-tree."

"My boots," he rejoins, "must be neither too wide nor tight, too long nor too short. I wish to feel at my ease, and not to get corns."

After which from the tailor he orders many things, including four waistcoats. But the trying-on process upsets him again and he curses heavily. Curiously enough, when at last the tailor leaves him he pays him fifty-five and a half *francs* "for the amount of the cloth," which looks as if tailors in those days were not the prosperous fellow clubmen they now are.

Although till now our friend has made no mention of his wife, the next chapter indicates that he is no longer alone. For we find him at a jeweller's, and he is buying in such profusion that it is clear—if it is his wife that is with him—that she must have lost all her jewellery by the robbers in the forests, or else—but let the book tell the tale.

Milord: "I want several trinkets very much; but, at present, I have no money."

Jew (not in the least surprised): "Everything in my shop is at your service."

M.: "Do you (*à la Mr. G. P. Huntley*) happen to have a ring with a good deal of lustre and—er—er—not very dear?"

Jew: "Here is a brilliant of six grains and a half that has a great deal of lustre."

M.: "It is a pity that it has a little colour."

Jew: "If it had a fine water it would be worth a hundred *louis!*"

M. (candidly): "I want a diamond that makes a great show and costs little."

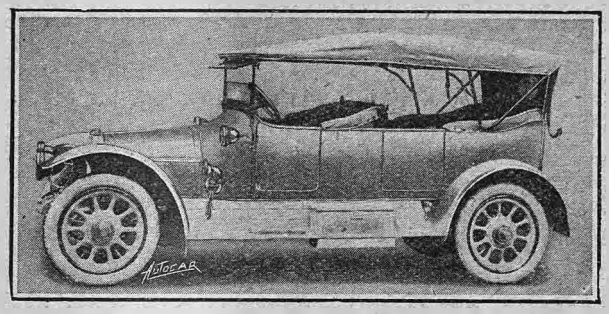
Jew: "Then this is just the thing for you."

M.: "Tell me the lowest price and I shall then see if it is very dear."

Jew: "Twenty *louis*, and it is very cheap."

M.: "It is very dear."

But I suppose he buys it, for he goes on—"My wife wants a gold chain, a pearl necklace, earrings,



A 17-25 h.p. four-seated Armstrong-Whitworth car which was recently delivered to Mr. F. W. Burnley, of Bradford, by Messrs. J, Coxeter and Co., Ltd., 84, Victoria Street, Westminster, S.W.

bracelets, and a watch set with diamonds; but she will come and choose them herself."

Jew: "I will do all I can to suit her taste. In the meantime I beg you to present my respects to her. *(Aside, I expect)* Solly, ring up Scotland Yard and load my revolver. The English season has set in."

At this point Mr. Baedeker remembers that ladies travel as well as their husbands, and the next dialogue is between a lady and her maid. Possibly the lady was she who ate the pike when the candle fell into the salad oil and drank the champagne when it was "up."

Lady (faintly): "Clean that looking-glass a little, it is quite dull. I look very ill this morning; I did not sleep well last night."

Maid: "On the contrary, madam, your complexion is very good and your eyes are quite lively."

Lady (finally): "Notwithstanding, I have a very bad headache."

Then ensues a dialogue on hair-dressing, not for republication, which concludes—"Put only a few curls on the right. I wish the most of them to be on the left side of my forehead, and to cover the eye a little. Remove the combing-cloth *(Peignoir) (Pudermantel)*."

Meanwhile, the gentleman is busy hiring rooms and a body servant. Things have changed, for when he asks, "Are you given to drinking?" he gets as a reply, "I like a glass of wine very much, but I never get drunk."

Q.: "Are you married?"

A.: "No, sir; a man who, like me, always keeps moving does better not to marry."

Q.: "Can you dress a horse?"

A.: "Yes, sir, and even two or three if necessary."

Q.: "Are you acquainted with the coins, weights, and measures of the different countries of Europe, and what wages do you ask?"

A.: "Five *francs* a day."

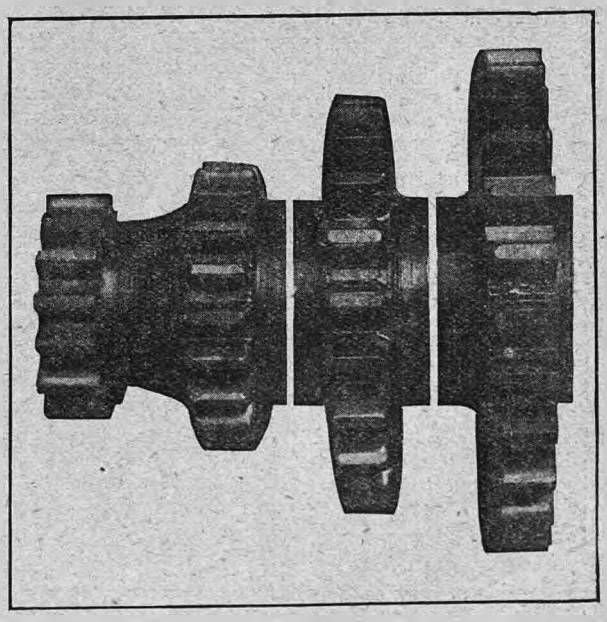
Q.: "But you have not always had as much as that?"

A.: "Oh! sir, sometimes I have not had more than thirty *sous*." *(Engaged.)*

Of course there are many more chats, but they concern details, as a rule, of so lively a character that we modern travellers, who take so much for granted, would never travel at all if such enquiries were necessary nowadays. Also our friend gets many invitations and presents many letters of introduction, and his excuses—especially when he is asked to a party with music—are perfectly delightful in their vagueness and inconsequence. He is also asked to a "shooting-party" which begins at eight, and refuses a dinner at five o'clock because it is too late for his wife, who is not very well. He hires a *valet de place (commissionnaire)* to show him the town, and gives him good *Trinkgeld* for doing it. Mr. Baedeker is a bit weak in English slang, but altogether, in his brusqueness and his contempt for all foreigners and their ways, our friend did much for England, and I fear greatly that his modern descendants do not leave anything like so high and mighty an impression.

There is also much of interest in the vocabulary, which, by the way, is so up-to-date that it includes quite a lot of railway words. For instance, an engine-driver is *le conducteur*, while our dear old friend *chauffeur* is the French for the fireman, which is what I have always maintained was correct in the highest of upper circles. *L'axe* is given as the proper word for an axle. Mr. Stevens gives it, *L'essieu*. Here is a trap for the unwary. Suppose you are motoring in France and come across a notice which says "*Corner*." Probably you would bless the R.A.C. or the A.A., or whatever wood-pavement-god you affect, and look out for a *Tournant dangereux*. Not a bit of it—"*Corner*" means "Blow the horn."

The concluding article in this invaluable book is on the coinage, and it was no wonder that in those days travellers took couriers with them and put themselves in their hands entirely. For then Germany had half-a-dozen different kinds of money, and there was a lot to learn concerning the various values of Hanoverian, Brunswick, Bremen, Mecklenburg, Bavarian, and Prussian gold pieces. Sardinia also came in with its own particular, while Italy was rent between Austria and Rome. In addition to which it had lately started the decimal system, and the brain



The gears of a 6 h.p. Wolseley car which has been in almost daily use for six years. Although it is difficult to render fine detail in modern high speed printing it is obvious from this illustration that the teeth of the gears are in almost perfect condition. We are indebted to Mr. Howard Wilson, 33, Acre Lane, Brixton, S.W., for the photograph from which the illustration is reproduced.

The Grand Tour.

whirls with *bajoechi*, *scudi*, *pauls*, *tara*, *francescone*, and *lira*. Austrian paper-money fluctuated (we read) from 20 to 40 per cent. under the value of its equivalent in silver, which made one count one's change, while, even in Holland itself, Dutch gold rose and fell according to the exchange.

So let us be thankful for Mr. Cook and all his works, though it is good to think that in those far-off times, except in Southern Italy—where the ignorant inhabitants took it for a 20 *franc*-piece—the English sovereign was worth its full value, as it is to-day.

Also there were English doctors to be found in some places, according to this work, though where they did not exist one could get most necessary enquiries out of the dialogues. The last phrase at the chemist's is a "peach"—

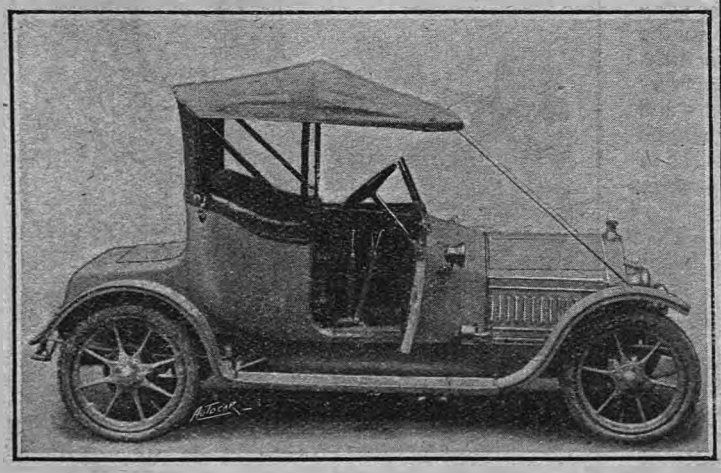
"Have you," asks the Englishman, "fresh leeches? These do not bite. Please to change them for others."

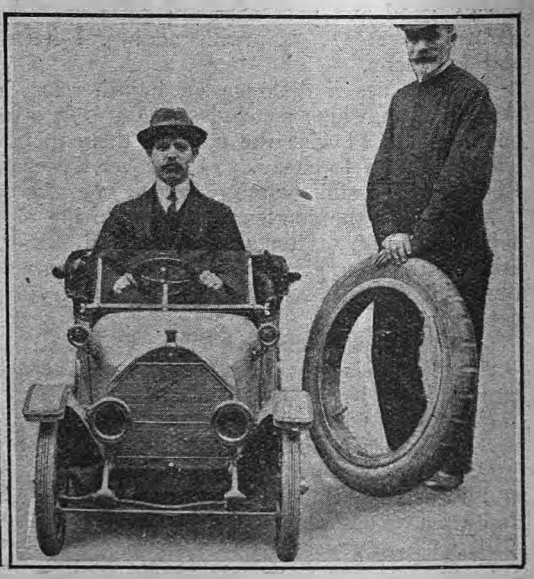
Altogether, travelling on the Continent in those days must have been a Great Adventure. Where, except in the interior of Tibet and the back of China, can we equal it now? I have lately been staying with a couple who are off up the White Nile to shoot lions and anything else that bites. I have been privileged to inspect their maps and to have their plans and itineraries unfolded to me. One, it seems, can buy everything on earth at Khartoum, and if one gets becalmed or wind-bound higher up there seems generally to be a steamboat to give a kindly tow round the next corner. One takes out a licence and one hires a boat through an agent, all as easy as going by the Twopenny Tube, yet I envy them their chance, though, I am told, the perfect evenings are badly leavened with mosquitoes. The only exploration I have ever done was in Spain, and it was when we stayed at a village where no one had ever taken a motor to before. In which they were wiser than we were. There was nothing peculiar about anything but the roads—they were unmentionable—and the fact that all night long our car was visited by all the inhabitants, each one of whom made it a particular point to blow the horn. The car lay in the open, we missed nothing at all, and the only drawback to that extremely pleasant evening was that our landlord would sit with us at table and, very methodically and exhaustively, dissect and eat a not too well done sheep's head.

I am told that there are still motorists, men and women of means and leisure, who hesitate to motor abroad because—well, because it *is* abroad. I have always done my best to allay their fears and soothe their alarms, and, at this time of the year specially, to induce them to try their luck. Yet, except in the unmotoring districts of the Riviera and that most beautiful coast of East Spain with its appalling roads, perhaps there are no other parts of near Europe available immediately to visit and enjoy. Sicily is glorious at this time, but Sicily is afar off, and the Near East is too unsettled and war-weary to be of much use even if one could depend on the climate. But there are big ships that go everywhere, and they tell me that Northern Africa, in parts, is as near perfection as possible, that the roads are good, that the charges, as yet, are not too absurd, and that one can rely on sunshine as a certainty pretty well all the time. Portugal I hope to inspect for myself; at present one hears little of it as a pleasure ground, but if it has fair roads and revolutions are off, I see no reason why it should not become as popular a touring ground as any. Many steamers go to Lisbon, and the journey is not more than three days—unless one should happen on the bad luck of the *Narrung*.

But we are getting a long way from our early Victorian friend and his travels—which only shows how travelling has altered, since undoubtedly he would have looked on the idea of a month's pleasure tour in North Africa, or even in Portugal, as an undoubted sign of madness, requiring something far more potent than any number of fresh and hungry leeches. Let me conclude with one of his little sentiments.

In the meantime I entreat that you will do me the honour of accepting the assurance of my highest respect and esteem. *Lieben Sie wohl!* OWEN JOHN.





Two views of the miniature Cadillac car recently completed for Prince Olaf to the order of H.M. Queen Alexandra. It will be remembered that a similar car was supplied for Prince Olaf last year, but this proved to be rather too small. The present one has been constructed at the Cadillac Works in London to the designs of Mr. A. H. Bailey, the works manager, under instructions from Mr. F. S. Bennett. The motive power is supplied by one of the electric self-starting and lighting equipments now fitted to all standard Cadillac cars. It works at six volts pressure, and as evidence of its efficiency this small car was run for thirty-five minutes on one charge on its first test with a driver weighing twelve stones. The general construction follows Cadillac practice in the floating back axle, double bearing front wheels, fully compensated brakes, etc. A reverse driving gear is fitted. The body-work is beaten from one piece of metal, and was made by Messrs. Lockwood & Son, Brooksby Street, Islington, N.

Correspondence.

EDITORIAL NOTICES.—No letters from members of the motor industry will be published when they deal with subjects which may be regarded as advertisements for the writers, or their business interests. At the same time as many of the most practical suggestions come from those engaged in the motor industry, their letters will be inserted when possible, though the names of the firms they represent may be expunged, and the initials of the writers substituted.

Letters of a personal nature will be withheld.

The Editor, although accepting no responsibility for the opinions expressed by correspondents, reserves the right to publish a portion of a letter, and to omit any part which he does not consider interesting or essential.

All communications under a *nom de plume* should be accompanied by the name and address of the writer, not necessarily for publication, but to assure the Editor as to good faith.

Enquirers who ask for the experiences of private owners with specified cars, parts, or accessories, are requested to enclose a stamped addressed envelope, so that replies which space will not permit us to publish may be forwarded to them. Circulars or letters from interested parties will not be forwarded.

WORM GEAR—A CHALLENGE.

[19386.]—We are very pleased to see our letter [19313] (which was really acting on the suggestion of 19231) has brought forth from the Daimler Co., Ltd., what they are pleased to call their challenge, and as we are most anxious to enter our parallel gears into a thorough test with the Hindley or hollow type, we have a few suggestions to put forward whereby the competition will not only decide the superiority of one or other of the types, but will at the same time provide data which will be of real benefit to all interested.

We appreciate the kindness of the Daimler Co. in placing their testing machine at the disposal of the National Physical Laboratory, and we note that they wish to stand by the report of their efficiencies already published.

As, however, the efficiency of worm gear cannot be accurately determined until the temperature remains constant, and as we have been informed that each test carried out by the National Physical Laboratory lasted only for some five or six minutes, we consider that it is only fair to the public that new and entirely independent tests be held.

Seeing that London is by far the most convenient centre for such tests, we do not know of a better independent authority than Faraday House. Of course, it goes without saying that we do not question the results published by the National Physical Laboratory, but would point out that, for comparative purposes, they appear to give inconsistent readings, caused, no doubt, by the very short duration of each test. For example, observe the following:

	R.P.M.	H.P.	Temperature.	Efficiency %.	Torque.
Table 1 Aa ...	1.522 ...	31.5 ...	74° C. ...	95.4 ...	449 ft.-lbs.
„ Ae ...	1.527 ...	31.6 ...	46° C. ...	95.7 ...	449 ft.-lbs.
„ Aj ...	1.522 ...	31.5 ...	41° C. ...	95.1 ...	449 ft.-lbs.

Here we have an identical torque of 449 foot-lbs. in each case, at a practically identical speed, and yet the temperature varies 12° C. or 21.6° F., whilst the efficiency varies .6%.

It is obvious that at a certain speed and at a certain torque both the temperature and the efficiency should remain constant quantities, and we believe that this would have been so had each test been carried out for a reasonable period, so that we consider new tests essential.

If the Daimler Co. will lend their testing machine to Faraday House we shall be very pleased to avail ourselves of it, or, alternatively, we would design and make a testing machine of our own, which would give equally accurate results, if sufficient time be allowed.

As regards cost, the sum that the Daimler Co., Ltd., mention is quite satisfactory to us, although we had no idea of entering this contest for monetary gain or self-advertisement, but simply to prove what our experience as worm gear manufacturers has taught us to be correct, namely, that the parallel type of worm gear, if properly made, is quite as efficient as, if not more efficient than, the Hindley or hollow type, and in addition possesses many advantages.

We are quite willing to provide one, two, or three sets of gear of any ratio and centres which the Daimler Co., Ltd., may care to adopt, whilst we shall expect them likewise to make one, two, or three sets of gear to the ratio and centres which we, in turn, will choose. It will, therefore, be possible to test identical gears of each make under identical conditions, half the gears being made to ratios and centres selected by the Daimler Co., Ltd., and the other half to ratios and centres selected by ourselves.

None of the gears supplied by the Daimler Co., Ltd., or ourselves shall have been run previously to the tests, and shall be exactly similar to those supplied to the motor trade. Moreover, in each gear, when a constant temperature is attained, the direction of rotation shall be reversed, and the gears run for a further period. We would also suggest that each combination of gears be run at four different speeds under four different loads, between 500 and 2,000 r.p.m., the duration of each test being determined by constant temperature, that is to say, the temperature of the oil must show no increase for a period of, say, half an hour. The same quantity of the same oil to be used in each test, the oil itself to be mutually agreed upon.

Test to Destruction.—The Daimler Co. state that in the destruction test when the efficiency falls below 93%, then the gears shall be deemed to have failed. We cannot take this proposition seriously, because the fact of the efficiency dropping to 92.9% in no way indicates that the gears are destroyed and useless for further work.

If, however, the Daimler Co. really mean what they say, then we would point out that Daimler worm gears, even at their very best, are often running on the verge of destruction, because on referring to Table 1 Af we find the efficiency of Daimler gears only 93.5%, not only at a high speed of 1,497 r.p.m., but also at a low speed of 499 r.p.m. We think it will come as an unpleasant surprise to motorists to find that their gears are frequently only ½% from what the Daimler Co. propose to call the point of destruction, and we notice in Table 4 Ah that the Daimler gears on this basis were virtually destroyed, the efficiency falling to 92.8%, and yet these same gears reappear in the very next test Ai!

We shall be only too pleased to enter our gears for a serious destruction test; that is to say, the gears are to be loaded (the loads being gradually increased) until they actually collapse, thus proving conclusively which type of gear will carry the heavier load. At the same time, the temperature and efficiency will, of course, be plotted, and thus really instructive data obtained. In fact, our desire is to make the tests so thorough that they will become a standard of reference.

In this connection we cannot understand why the Daimler Co., Ltd., should suggest a commencing torque of only 100 ft. lb. on the driven shaft, for this with an 8 to 35 ratio would give less than 2 h.p. at 400 r.p.m. of the worm, and less than 7 h.p. at 1,400 r.p.m. of the worm. We cannot see what useful purpose would be served by starting a destruction test with just 2 h.p. passing through the gears! We are afraid the destruction process would be somewhat lengthy. Personally, we consider it only reasonable that the commencing h.p. should be at least that which the gears were designed to carry.

The above gears will, of course, as regards length of worm and width of worm wheel be designed according to our respective practice, but in addition we should very much like a further comparative test. As the Daimler Co., Ltd., claim an advantage for their gears owing to the wrapping action of the worm around the wheel, the essential feature of the hollow type, we suggest that they take full advantage of this feature and make their worm, in at least one set of gears, as long as our standard worm and their wheel as broad as our standard wheel. We, in turn, shall be only too pleased to make, in one set of gears, our worm as short as their standard worm and our wheel as narrow as their standard wheel.

DAVID BROWN AND SONS (HUDDERSFIELD), LTD.

CHEAP MOTOR SPIRIT.

[19387.]—As the object of the majority of motorists is to run their cars as economically as possible, it may be interesting if I recount my endeavours to discover a cheap and effective motor spirit. The first fuel I tried with the object of reducing running expenditure was a mixture of equal volumes of paraffin and petrol. The car was a 15.9 h.p. Darracq. I used the ordinary Darracq carburetter with the following modification, namely, opening an extra air valve by means of a lever controlled from steering handle and taking the air passing over the jet from near the exhaust pipe.

At the outset, I had to inject petrol into the induction pipe to start the engine. The car ran successfully for about ten miles, apparently as well as on petrol. After stopping

Correspondence.

for two or three hours, I was only able to get the back cylinders to fire. The trouble seemed to be due to the gumming up of the exhaust valves in the guides, the valves remaining open and consequently giving no compression. Before things could be put right, I had the pleasure of generally cleaning up and grinding the valves. The conclusion I arrived at was that a special carburetter is needed for paraffin mixtures.

My next experiment was with what is sold as cleaning spirit. This is a heavy petrol, costing me a shilling a gallon. A drop of this placed on paper would evaporate completely in five minutes and leave no trace of grease. I found it necessary again to inject petrol into the induction pipe to start the engine. The engine developed about two-thirds of its usual power. I ran the car about twelve miles, and found it very sluggish in climbing hills. I thought it advisable not to try anything too steep. On my return, I examined the valves, but found them about as usual. I confess I was disappointed with this class of spirit.

I obtained some 90's benzole, and paid for it one shilling per gallon. I filled the tank, and, at the beginning, did not use heated air from the exhaust pipe. I injected a few drops into the induction pipe. The engine started more easily than on any fuel I have ever used. I ran about eight miles, then it pulled badly, one of the overhead inlet valve seatings becoming loose, thus putting one cylinder out of order and pumping air back into the induction pipe. I tightened this up, and from that time to this the car has never looked back.

I examined my valves on various occasions in order to see if any carbon was deposited. The first thing that I noticed was that the exhaust valve had been stripped of every particle of carbon. A slight deposit existed on the inlet valve; this was of the nature of a powder and could be brushed off. The engine had a deposit of carbon before I used benzole. Thinking the benzole might have altered the character of the deposit on the top of the piston, I rotated a bottle brush by means of a hand drill, inserting the brush through the plug holes, and found I could clean the piston top. After this I inserted a small electric lamp through the same hole and the piston head seemed clean. The deposit had come away as a fine powder. I might add that carbon deposit had been a source of trouble on this car, no doubt due to the lubricating oil getting past the rings and coking on the piston top.

In my opinion benzole tends to give a deposit on any cool surface, and this accounts for the deposit on the inlet valve.

My experience is that the car goes further per gallon on benzole than on petrol, no doubt due to its greater calorific value and higher specific gravity. Thus it is once again shown that if you buy heavy fuels at the gallon rate you get more for your money. So the price of benzole is not the true index of its value as a fuel as compared with petrol. The next thing I learned was that the car climbs hills at a higher speed, and that it can also develop a greater speed on the level.

While for these reasons I would far rather drive a car on benzole than on petrol, it is only fair to mention one rather serious drawback. This is the intolerable smell of the exhaust gases. One must frankly say that any idea of running the motor 'buses of London on benzole is really out of the question. The public would not stand it. In the country it is a different matter perhaps, but the point I want to make is that if the benzole manufacturers want this spirit to become popular they must in some way or other get rid of the sulphur compounds. I know that the elimination of carbon bisulphide, thiophene, etc., is no easy task for the chemist, but, in my judgment, it has to be faced before benzole can take its legitimate place as a cheap and popular motor spirit.

Altogether, I have experience of benzole with four different cars and four different motor cycles, and in each case the results have been most satisfactory, apart from smell. As one would expect, a mixture of benzole and petrol somewhat mitigates the nuisance, but does not get rid of it.

J. H. Lowcock.

[19388.]—Six weeks ago I began using benzole on three 3-ton Maudslay waggons. I gave more air and got 20% more power and three more miles to the gallon than on petrol. Last week one engine gave a lot of trouble. It began by misfiring and back firing and would not open out, so I took down all the pipes, cleaned out the filter, float chamber and jet, and made sure that there was no stoppage in the pipes, but I got no better results. I obtained some petrol and the engine started up, and I had no trouble whatever for forty miles home. After running on petrol for a week, I went back to benzole. The car ran well for two days and then the trouble began again, and after going over everything, such as valves, ignition, pressure, new plugs, and raising the petrol level in the float chamber, I begin to feel at a loss to find a remedy. The other cars are doing well on benzole, and I am anxious to use benzole on this car, but I cannot account for the strange happening. The same car is running well on petrol without any alteration whatever to carburetter or anything else. Could any reader suggest anything as the cause of the trouble? Although I have had several years of tuning up engines and carburetters of different makes, I have never had anything so unusual as this.

A. Williams.

[19389.]—In your issue of March 22nd you publish a letter from "East Anglia" [No. 19354] stating that "To-day benzole can be purchased in Hull at 9d. per gallon." Is this correct, and, if so, would your correspondent inform me where benzole can be bought at that price, as I am having to pay 1s. per gallon by the barrel?

A. Wood.

TRADE TRUSTS AND THE CONSUMER.

[19390.]—I disagree wholly with Mr. Rice's opinion, method of argument, and deductions in letter 19379. Mr. Gamage compared the price of American spirit with that ruling to-day, viz., 1s. 9d., not that of last September.

Mr. Rice "thinks" the price has advanced there as much as here during the last six months, but it is useless to found argument on "thinking," when facts can be easily learnt.

Reverting to the first part of the letter, and assuming (as I know nothing to the contrary) that American petrol is not dutiable there, we get the comparative prices (as stated by Mr. Rice) as 11d. there and 1s. 6d. here. Mr. Rice thinks 7d. per gallon for freight to England is reasonable and fair. I suppose the freight charges from the Far East are little more than one penny per gallon, and from America, carried in bulk, in the Trust's own steamers, would be no more than one penny. That makes 1s., as compared with 1s. 6d.

Really, I do not think there was any need for Mr. Rice to have come forward as an apologist on behalf of the oil trusts. They are well able to defend themselves—very much more so than Mr. Rice shows himself to be.

W.H.D.

[19391.]—In reply to Mr. J. Rice's letter [19379], I only stated what I saw with my own eyes, and I saw petrol on several occasions chalked on a board sixteen cents a gallon; this was in Detroit. I have no knowledge of what it was in September; I was speaking of January, 1913, and I was told by several consumers that they thought this a high price, and that they had been paying ten cents and twelve cents.

There is not the slightest reason why petrol should not be sold as cheaply in England as in America, plus the duty, as the difference in the cost of transportation is very slight; I can get a ton of goods from New York to London for a less sum than I can get a ton from Birmingham.

I do not think that your readers will agree with Mr. Rice that 1s. 6d. is a fair price. It is a fictitious one, and is simply forced up by the trust or combine, and until a practical substitute is found, I am afraid motorists will be at the mercy of trust and price maintainers. If we had more competition in petrol, a very different price would prevail.

A. W. Gamage.

ELECTRIC LAMP LIGHTING TESTS.

[19392.]—I enclose a copy of letter written to the Royal Automobile Club in reference to their electric lamp lighting tests.

I think the Club are to be strongly commended in inaugurating these tests, and they should be of extreme value, and I would appreciate very much if your readers would criticise the suggestions which I have made to the Club, and possibly make additional ones, as it is all important that every one of us as road users should try to make these tests the most searching that have ever been held of lighting apparatus for motor cars.

It is a great duty thrown on motorists to see that they use lamps really powerful on their cars, so that they themselves when driving may be entirely free from strain, which is very severe when driving cars with imperfectly functioning lamps.

I think the Club will get a splendid entry for their enterprise, and the tests should be held in great favour, not only by motor car users, but by electric lamp producers.

S. F. EDGE.

[COPY.]

26th March, 1913.

The Secretary the Royal Automobile Club,
Pall Mall, S.W.

Dear Sir,—I was very pleased indeed to see that the Club propose to hold tests for electric lighting sets for motor cars. It is high time that such a test should be carried out, but the suggested rules do not, in my opinion, go nearly far enough.

Firstly, it seems to me essential that the output in watts at engine speeds of 200. 500, 1.000 and 1.500, and 2,000 revolutions should be measured and compared with the claims of the apparatus submitted for test.

Secondly, I think it is necessary that the width of the head light beam should be measured at distances of 20, 50, 100, 150, 200, 250, and 300 yards from the front of the car.

Thirdly, I also think a test should be taken to see the exact distance at which a dark clothed pedestrian can be plainly seen by the light of competing lamps.

I think that prior to the tests the competitor's actual claims as to what his apparatus will do should be set out. It seems to me most important that the actual useful power of the lighting set should be tested in every possible way. One has to remember that the primary object of the lighting set is to show the car driver his way and to pick out dangers or obstacles for him.

On the other hand, I think it should be considered very carefully as to whether a 2.000 mile road test is really useful or necessary. It seems to me a much shorter road trial would give all data necessary for road experience.

Yours truly,
S. F. Edge.

NIGHT DRIVING.

[19393.]—The recent correspondence on head lights in *The Autocar* derives additional interest from the photograph of the accident on the Evesham Road (page 542).

I am glad to join in the chorus of congratulation that the accident had no more tragic ending. But what on earth were those people doing, driving on a dark, wild, and stormy night at such a pace that they could not see a huge tree all across the road?

It goes without saying that, if they could not see that tree, neither would they have seen any other object, animate or inanimate, which may have happened to have been on the road that night.

Such a style of night driving cannot be too strongly deprecated. ANOTHER DOCTOR.

ROAD CONSTRUCTION.

[19394.]—I have read Mr. Higginbotham's letter [No. 19346] on road construction with much interest. He begins by stating, what I have often pointed out in these pages, that the roads as at present constructed are unable to carry the huge locomotives which are making use of them to-day. He goes on to advocate the reconstruction of the roads by building them up on a concrete foundation. I would like to ask him two questions: Has he considered what the cost would be, and where does he propose the money should come from? I scarcely think he would suggest that the already over-burdened taxpayer should find the immense sum required for such a costly scheme simply for the benefit and aggrandisement of the traction engine owners. Much the better and less expensive plan would be to reduce the weight of the offending locomotives by a short amendment to the present Act of Parliament controlling them. But perhaps Mr. Higginbotham will kindly give us his own views on the subject. I think they would be of interest to many of your readers. C. M. NAINBY.

THE HOLYHEAD ROAD IN WALES.

[19395.]—I have just returned from a tour through Wales, and being much interested in the correspondence now running in *The Autocar*, took the opportunity of driving over the Cerrig to Corwen section. I have regularly motored over this section for the last ten years, but I never remember such a state of affairs as now exists. The ruts are six to seven inches deep, and it is almost impossible to drive anywhere except down the ruts, and that only on the second speed. Steering is almost impossible, and my car was squeaking badly by the time we arrived at Llangollen, the bodywork being considerably strained. It is a disgrace that the contractors should not be compelled to put down a light railway. Twice we overtook monster traction engines with heavily laden trailers, and could with difficulty get by. My old car is quite accustomed to rough roads, being a very solidly constructed West car weighing over a ton with only a two-seater body, but I draw the line at mountaineering on a first-class *(sic)* Welsh highway whilst our benevolent Government relieves me of a six-guinea tax per annum. [And adds 3d. per gallon to the cost of petrol.—ED.] IVAN B. HART DAVIES.

EASILY CLEANED CARS.

[19396.]—May I ask for space in your widely read paper to call attention to the need there is for cars to be better designed for cleaning?

I am an owner-driver, and my gardener cleans my car and takes a long time about it. I must say that in these busy days it would be a great improvement if cars could have fewer places for dirt and dust to lodge in, and to be better protected all round. It seems to me that if the sides could be made to curve downwards in one surface inside the wheels and join on to the undershield it would be very easy to hose down, whereas now, in most cars, the surface is in and out and very difficult to rub down.

I have had my brasswork, lamps, etc., all painted to match the car, and it looks very well, and saves no end of time in polishing; now I would go one step further, and make the work of cleaning lighter.

As time goes on the owner-driven cars will be far more numerous, and owners will more and more appreciate any aids to economy as regards labour. PRO BONO MOTORO.

CYLINDER CLEANING.

[19397.]—A letter appeared in *The Autocar* lately from a correspondent who stated that he had run his car nearly 30.000 miles and had not once taken the engine down, nor even had the cylinders removed. I have always understood that if you wish to treat your engines in a proper manner the cylinders should be removed once a year, or after every 5,000 miles, consequently this car ought to have had its poor cylinders cleaned six times, yet the writer states that he has not given them one cleaning.

What would the owner of that car think of a parent who boasted that he had a child six years old, and that child had never been cleaned or washed? RED ROCK.

ACCELERATOR AND DECELERATOR CONTROL.

[19398.]—I have driven cars of various makes for the past thirteen years, including De Dion cars. I certainly agree with Mr. Stocks that the De Dion control is superior to the ordinary accelerator, for, as Mr. Stocks says, one is not so liable to make mistakes. My present car is a Sheffield-Simplex, which has a sliding accelerator, the clutch and brake being on one pedal. I consider that this form of control is superior to any other, as you always have full control of the engine, your foot being always on the accelerator. Another point in favour of this method is that your foot is always resting flat, and this position does not tire the ankle like the ordinary accelerator, this being more noticeable on a long drive.

This form of control is adopted on some American cars, and I cannot understand why more manufacturers do not adopt this system. I presume it is because the public are prejudiced against anything out of the ordinary, and get frightened at the prospect of driving a car so fitted.

R. KIRKE, JUN.

NON-SKID TYRES.

[19399.]—The old saying that "Truth is stranger than fiction" has again been proved in the most remarkable way by a recent fatal accident (which I am sure we all deplore) on Hindhead.

In *The Autocar* of March 22nd I noticed the Kempshall Tyre Co. issued a challenge to the Victor Tyre Co. [letter 19361] to submit their steel-studded non-skid tyre to the Royal Automobile Club, "that it might receive the imprint of this impartial tribunal," and it is indeed strange that in less than a week the car which was to prove to the public the reliability of these tyres should have "demonstrated" their liability to skid in such a remarkable manner, especially on a road which is only a gentle bend, and where the frictional surface is always good. I have frequently travelled this road in all weathers, and have never had a suspicion of a side-slip, and therefore the

Correspondence.

utter failure of these steel-studded tyres under such favourable conditions does seem to me to emphasise the need outlined by the letter of the Kempshall Tyre Co., that these steel-studded tyres should no longer be sold to the public as non-skid tyres until they had received the endorsement of the Royal Automobile Club as to their inherent merit.

This accident, unfortunately, does not stand alone. The papers frequently contain such reports, and, as far as I can judge, in every case the cars are invariably fitted with these so-called steel-studded non-skid tyres, and it is high time that the authorities took some steps to see that the public are protected against purchasing goods which have so ably demonstrated that they have not the merits claimed for them. T. LUTHER PYNE, M.I.C.E.

[Our correspondent's arguments are somewhat weakened by the fact that the Victor tyre under test when the accident occurred at Hindhead was not a steel-studded but a plain rubber tread.—ED.]

[19400.]—The letter [19361] from the Kempshall Tyre Co. in your recent issue is duly noted. The suggestion this firm is concerned to make is that there is no non-skid tyre in the world except its own. The modesty of that suggestion is the chief charm. The motive of it will be fairly obvious. The amount of truth in it can only be laboured at the risk of a seeming discourtesy.

We have to deal with a specific statement, and a specific challenge. The statement is that steel-studded tyres are not non-skid tyres at all. The challenge is that we shall submit our tyres to a test by the R.A.C. for non-skid qualities. There is also an inference that we have questioned the impartiality of the R.A.C. official trial.

We will dispose of the latter at once. We have never alleged that an R.A.C. trial was ever conducted unfairly or with partiality. Our difference with the R.A.C. was another matter, as your correspondents very well know. If, therefore, it is expected that this difference will be a bar to our acceptance of the challenge we may disappoint your correspondents.

Replying to the specific statement, we have to note, quite *en passant*, a somewhat curious fact. Your correspondents, who are so definitely alleging lack of non-skid properties in steel studs, are, in the same issue of your paper, announcing that they are combining steel studs with rubber on the tread of one type of tyre, and under the grotesque heading of "the only non-skid tread" they list a "non-skid," an "anti-skid," and a "grooved" as well as the combined tread previously referred to. The difference between an "anti-skid" and a "non-skid" escapes us; and we are not at all clear which of the four tyres is alleged to be "the only non-skid tread." We take it that the firm will select its best non-skid if it decides to accept the offer contained below.

Our reply to the challenge is threefold. First. The Victor steel studded non-skid tyre is alleged to be not a non-skid at all. The statement is, "We wish to combat the assertion that these said tyres are non-skid tyres at all." We will therefore give our combative friends the opportunity they require. We will submit a Victor steel studded non-skid tyre to R.A.C. test. If the R.A.C. is unable to discover any non-skid qualities in the Victor steel studded tyre, we lose £100, which we will stake at once if the Kempshall Company will cover with an equal amount. The losers' money will go to any charitable or benevolent fund mutually agreed upon.

Secondly, and upon similar terms, we will submit our Victor non-skid covers to comparative test by the R.A.C. under ordinary road conditions against the Kempshall non-skid covers, the R.A.C. to determine those conditions, and the decision to be final and binding upon both parties. Our £100 is ready.

Lastly, again for an even £100, we will have a directly comparative durability test, also under R.A.C. auspices.

The best tyre necessarily is the tyre that combines efficient non-skid qualities under ordinary running conditions with durability and resiliency.

Anybody can make an absolutely non-skid tyre. A leather sucker on a string will lift a paving stone. A rubber sucker on a tyre has to be dragged out of the road. It makes an excellent non-skid, but the effect on the road and the life of the tyre might render it the most uneconomical thing conceivable. Anybody, again, can make an absolutely unpuncturable tyre, but it would lack resiliency. The best tyre, therefore, is a compromise between mutually antagonistic elements. A non-skid tyre that is deficient in durability and resiliency is impossibly absurd. The test to be useful must be comprehensive. Hence the durability test is essential to the non-skid test. Both must be directly comparative to be of value. The individual test, which is placed first in this letter, is our response to a very absurd statement by the Kempshall Company.

All we require now is the acceptance of these three tests by the Kempshall Co., and we will at once deposit our £300 with the R.A.C. Is the Kempshall Co. sufficiently in earnest to proceed? W. YARWORTH JONES,

Managing Director the Victor Tyre Co., Ltd.

UNOFFICIAL TYRE TRIALS.

[19401.]—No reader of your valuable paper can have failed to notice the large amount of correspondence on the above subject. I notice a large number of your readers appear to think that the R.A.C. was at fault in not supporting the challenge thrown out by Mr. W. Yarworth Jones. It seems to me that if the tyre companies challenged decline to take up the challenge, Mr. W. Yarworth Jones has no fair right to force the test in the manner he has done; neither can I see by what possible right he publishes the result of such test, seeing that the tyre companies concerned were averse to such competition. Possibly the R.A.C. may have seen it in this light, in which case the only mistake made by the R.A.C. was its ever having had anything to do with it from the outset. HERBERT FRANK WAYLAND.

India.

[19402.]—I have to thank you cordially for the very kind references to the Victor Tyre Trial contained in the leading article of a recent issue, and am particularly appreciative of your ready testimony to the scrupulously just method adopted in the conduct of the trial. When you, with the intimate knowledge which you were at such pains to acquire, can bear witness to the perfect fairness of what you describe as "by far the most important and protracted unofficial test that has ever been held," there is no room for any contrary view by the uninformed—although that contrary view has, I am glad to think (and it is one of the most gratifying features of the trial), never been expressed.

I want to say at once that we entirely agree that the R.A.C. is the one authority which should conduct trials and tests. We have always held that view, and the best proof of the attitude we prefer to adopt is in the fact that we first, and as a matter of course, asked the R.A.C. to conduct the Victor trial. We agree again that it must have been largely due to our action in requesting the R.A.C.'s assistance that we were able to enlist the support of so large and eminent and practical a committee of private motorists in conducting the test unofficially after the R.A.C. (wrongly, as we think is now generally admitted) refused its official aid. If I may, I would take this opportunity of publicly thanking every member of that committee very sincerely and very gratefully for this kind interest and courtesy and service. Without that co-operation the test could hardly have been held at all, and certainly could not have been the remarkable success it undoubtedly was.

So far as the controversy between the Club and ourselves is concerned, it is finished. The Club accepted control of the trial, drew up special and stringent rules for it (rules, by the way, which were made the basis of the trial, so that it may quite fairly be claimed that the Victor tyre won a protracted comparative test under the R.A.C. rules and conditions), and then declined to proceed. The Club, I think, made a mistake; but so far as we are concerned this can be the end of it.

I answer the question which has been put to me editorially during the last two weeks in the affirmative, and take the initiative in burying the hatchet very willingly, and my view of the place the R.A.C. should occupy in the government of motoring remains unchanged, despite our differences. Having proven Victor tyre qualities on the road, my company hopes also to be able to prove them with equal success on the track. In passing, I may remark that we are now challenged to an R.A.C. test by another tyre firm. We have decided again to accept. Particulars of this match are contained in another letter which I have ventured to send you.

Finally, to revert to the subject of your article, I may certainly say that we have held our first and our last unofficial trial. Very exceptional circumstances surrounded our test. Without those circumstances the trial was foredoomed. It is hardly conceivable that such special circumstances will occur again. Therefore so far as it is possible to be certain of anything, we are very sure that unofficial trials are finished.

Of course there never was a reflection upon the personal honour of any member of the R.A.C. Committee, nor upon the integrity of the Club's conduct of trials—neither ex-

pressed nor consciously implied. In common with all other responsible people, our desire is always to see the Club *sans peur et sans reproche*. We went on with our trial unofficially because we were prevented from proceeding as we desired to proceed, officially—no more than that. We do not in the circumstances expect the R.A.C. to endorse any particular unofficial performance, and certainly not the principle of unofficial trials, but we feel satisfied that the Club is convinced of the scrupulously fair manner in which this Victor test has been conducted. THE VICTOR TYRE CO. LTD.
W. Yarworth Jones, Managing Director.

FLINTSHIRE ROADS.

[19403.]—It might be of interest to tourists who contemplate doing North Wales during the coming touring season to be warned of a very bad stretch of road between Northop and Holywell, in Flintshire. It is perfectly correct to say that this stretch of road is in an atrocious condition at the present time, and until it is thoroughly repaired from end to end it is quite unsuitable for pleasure motoring traffic.

The road has rarely been in good condition, but having apparently no foundation, the heavy local traffic—probably due to mining operations in the district—has cut the road up into deep ruts.

It is true the authorities have started to rebuild the road from the Holywell end, putting in foundations, but these repairs, judged by the speed at which the work is now going forward, cannot be completed for this year's touring season.

It would be better for motorists to avoid this road, and, if travelling from Chester, either to go through Mold, or drop down into the lower coast road at Hawarden, leaving the lower road again outside Bagillt and joining the upper road at Holywell town, and so on over the moor to St. Asaph. D. BATES.

COMMISSION ON EMPLOYMENT.

[19404.]—I read with amusement the letter [19360] of your correspondent W. J. Menzies, who seems so hurt because a chauffeur offers £10 for an introduction to a situation. Did he but know the conditions of the labour market and how difficult it is for good men to obtain situations, he would express no surprise. Your advertiser is in the fortunate position of being able to offer £10 for what he wants; others are not so fortunate, but often have to spend more, indirectly, before they can get a situation.

Employers are naturally careful who they employ, chauffeurs have to take a situation on chance—a chance which they often pay dearly for.

It is a pity that some means cannot be taken of shutting up half of the motor schools, or at least warning the poor deluded men who enter them. But while they make the profit they do, it is useless I suppose expecting either.
UNEMPLOYED.

STOCK CAR RACE.

[19405.]—I was pleased to read Mr. Oscar Cüpper's letter on this subject. I take it that he has sufficient confidence in the cars his company sell to the public to enter one, provided other makers will do likewise. How many makers will give a list of cars made previous to this date and already in stock at their different agents, each maker to give at least the numbers of ten cars, one of these cars to be selected by ballot, and taken over by an observer and the maker's driver to contest the race? Will the R.A.C. support this straightforward policy, the only one I can think of by which one can have a reliable test of what makers are offering to the public? T.C.L.

PRACTICE ON BROOKLANDS TRACK.

[19406.]—I understand that several of the Grand Prix racing cracks are coming over from the Continent to practise at Brooklands, by reason of a statement that one of the factors of the Sunbeam's success was due to the drivers being able to put in some very fast speed work at Weybridge.

The importance of Brooklands to the automobile industry as an educational force is so patent that it appears to me the Society of Motor Manufacturers and Traders would do well to subsidise the track to a reasonable extent, to enable those members who have to devote considerable time on experimental work to avail themselves fully of its advantages at a nominal expenditure.

It would be of interest to know the opinion and views of your readers on this subject.
THE CONTINENTAL TYRE AND RUBBER CO. (GREAT BRITAIN), LTD.
Paul Brodtmann, Managing Director.

Correspondence.

UNSIGHTLY AND DANGEROUS TELEGRAPH POSTS.

[19407.]—I have often read of late in your paper about the degrading of our pretty country roads by unsightly hoardings, but I never hear a word of complaint about the ugly black telegraph poles which adorn the road every 100 yards, and whose presence is a great danger as well as an eyesore. A party of motorists from Batley (Yorks.) were motoring through Lincoln last summer, and when a few miles out on the road to Saxilby the chauffeur was stung by a bee on the leg, and while trying to knock the bee off he swerved a little to the left and caught a telegraph pole, which wrecked the car and injured the occupants. If there had been no telegraph pole the chauffeur could have righted the car on the grass in a few yards. A. BOWEN.

GUARANTEES.

[19408.]—Many are induced to buy under the security of a guarantee. It appears to me that such guarantees are absolutely useless. I bought a car new, and within the first week the ball race broke and the crown wheel consequently smashed up. It cost me about £20, and the makers denied liability on the ground of want of lubrication, though I had evidence of garage people that it was smothered in grease. Again, a firm selling a patent wheel deny responsibility, although they guaranteed their wheels for 10,000 miles, saying they would do 20,000. The set I bought were worn out in 3,000. The makers deny liability on the ground that my country has bad roads. DISGUSTED.

RECOMMENDED REPAIRERS.

[19409.]—Seeing that unknown repairers are such a doubtful proposition, it is pleasant on occasion to make a wholly favourable report. In this connection I should like to mention William M. Cunningham, of Clitheroe. Motoring through that town a few days ago, I was unlucky enough to melt a big end. I left the car and chauffeur at the repairers named, and the damage was most promptly and efficiently remedied, while the charge made was reasonable in the extreme. J.A.S.

[19410.]—While on an Easter tour, I arrived at Exeter on Saturday morning with a punctured tyre and no spare. I went on the advice of the local police to Messrs. Gould's garage, to find it fairly humming with motor cyclists on their way to Land's End, and everyone apparently busy to the last degree. However, on explaining my wants, two men were at once put on, to remove the cover and tube, fit a new tube, bring petrol, etc. The work was done quickly and satisfactorily, despite the crowd in the garage, and the charge for this service was *one shilling*. Is not this "good enough"? DN 114.

Flashes.

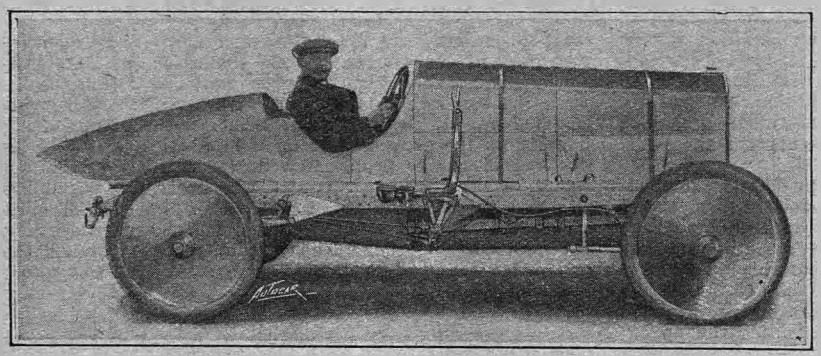
According to an American paper, no less than 2,600 motor cars were stolen in Chicago last year.

* * *

The surveyor of the Burnley Rural District Council is being provided with a motor car to enable him the more expeditiously to perform his duties.

* * *

A great fire in a motor garage at New York recently was started by an explosion in a silencer, sparks of carbon from the silencer igniting petrol on the floor.



The 14 h.p. Humber (13.9 R.A.C. rating), driven by Mr. W. G. Tuck, who is seen at the wheel, which secured first place in the Easter Sprint Race at Brooklands last week, and second in the 70 m.p.h. Short Handicap, beaten only by a car of 600 c.c. greater capacity and to which it conceded 30 secs. start. This was the car's first appearance at Brooklands.

The business of the Briton Motor Co., Ltd., has been sold to the Briton Motor Company (1912), Ltd. The latter company is carrying on the business and will discharge all liabilities. The vendor company is, therefore, being wound up formally.

* * *

Copies of the "Brooklands Year Book" have been sent to all the members of the B.A.R.C and the R.A.C. It contains a well-illustrated official description of the track, a list of records, map of the district showing how to reach the track, and other information of use and interest to frequenters of Brooklands.

* * *

The Herts. County Council has decided to take steps under the Ancient Monuments Protection Act to preserve the Roman roads which traverse the county. They include Icknield Way, Akerman Street, Watling Street, Stane Street, and the Via Militaire.

* * *

The ninth general meeting of the session of the Institution of Automobile Engineers will be held on Wednesday, April 9th, at the Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W., at 8 p.m., when a paper on "The Wheel and the Road" will be read by Col. R. E. Crompton, C.B. (engineer to the Road Board). Surveyors and others interested in the question of roads are specially invited to attend and to give their views in the discussion on the paper. Tickets of invitation may be obtained from the Secretary, 13, Queen Anne's Gate, Westminster.

The French Automobile Club is on the point of opening a new testing and experimental laboratory which it has established in the Boulevard Bourdon, Neuilly, near Paris. The new premises, which will replace those hitherto used for this purpose at Levallois, are well equipped for carrying out tests of the kind contemplated.

* * *

In the House of Commons on Monday, Mr. McKenna (Home Secretary), replying on behalf of Mr. Lloyd George (Chancellor of the Exchequer) to Sir John Lonsdale, stated that the use of paraffin as motor fuel has not appreciably affected the yield of the tax on motor spirit. It was still in an experimental stage, but the possibility of its further development had not been lost sight of. It could be taxed, under the definition of motor spirit, if it should come into general use on its capacity being established for providing reasonably efficient motive power.

* * *

On behalf of Mr. W. R. Smethurst, a motorist, of Bury, the A.A. and M.U. successfully prosecuted a man who on the night of the 26th January struck Mr. Smethurst's car with a stick, damaging one of the back panels. Mr. Smethurst, it was stated, stopped his car and remonstrated with the defendant, who appeared to be intoxicated and refused to give his name and address. The defendant denied striking the car, and suggested that it nearly ran him down. The Saddleworth Bench, before whom the case was tried, however, after hearing evidence, were unanimously of opinion that defendant was responsible for the damage, and fined him £1 and costs.

* * *

In connection with the prize of 2,000 guineas offered by the Society of Motor Manufacturers and Traders, Ltd., for home-grown motor car fuel to substitute petrol, Sir Boverton Redwood has kindly undertaken to settle the conditions for this competition.

TOURING IN KENT. Paying toll at the Old Barbican Gate, Sandwich.

Some Queries and Replies.

Readers seeking the experience of users of specified cars, parts, or accessories are invited to insert their queries in these columns, and their fellow readers are invited to reply.

Queriists are asked to enclose a stamped addressed envelope, so that replies may be made direct if the subject is not considered of sufficient general interest to publish.

Letters should be addressed to the Editor, "The Autocar," Hertford Street, Coventry, and replies to queries should bear the number of the query to which they refer.

Editorial advice is at all times willingly given to our readers.

REPLIES.

No. 2571.—Scout Cars.

"T.E.G." and "C.B." in *The Autocar* of March 8th (page 435) mention the petrol consumption being very fair and the car easy to control in traffic. Some carburetters must be handled very carefully in traffic, otherwise if the throttle be opened suddenly it chokes and stops the engine. It would be very interesting to me to know what make of carburetter is fitted to the Scout cars. Is it automatic, and if so, is the extra air admitted by a suction valve?—M.H.A.

No. 2601.—Silencers.

I fitted a Binks silencer to a 10-12 h.p. four-cylinder car last summer, and find it as perfect as could be desired. The engine, which had before overheated (thermo-syphon), now runs quite coolly, and also pulls better. No explosion is audible, but a very pleasing hum, and people remark "What a nicely sounding engine." The only fault I can find with it is that the cones are riveted in and cannot be taken apart, but the makers claim that it never needs cleaning, and up to now I have found this to be correct. I also wasted 16s. over a cut-out of the same firm, but it was not needed with this silencer.—LAMPORT.

No. 2608.—Carburetter for Benzole.

Any good modern carburetter, properly adjusted, will be all right for benzole. I have been using benzole for five years in two old De Dion cars and now in an 8 h.p. Rover with Zenith carburetter. I find the Rover most economical with this carburetter, and, using benzole, on a straight run it averages 44 m.p.g. compared with 40 with petrol. The main jet is No. 70, compensating jet No. 85, but I am going to try a smaller one. There is no reason why benzole should not be used, except an absurd prejudice, largely worked up by petrol retailers, who can rarely give a sensible reason either for or against. Until I find some fuel as efficient and cheaper I shall use benzole.—BENZOLITE.

No. 2427.—Ford Car Consumption.

I have run a 1912 Ford T model since last March between 3,000 and 4,000 miles, and up to the present I have never had an involuntary stop, and renewals have been a new coil assembly and cover of the timing gear case, both of which were replaced under guarantee by the Ford Co. without charge. In the first few months my petrol consumption was between 20 to 24 m.p.g. and about 800 to 900 miles to the gallon of oil, but since last July, when I had Bosch magneto fitted by the Linconshire Autocar Co., I have got six to eight miles more to the gallon of petrol, and oil consumption remains about the same. The engine is easier to start and runs infinitely sweeter and better than with the standard magneto without the slightest trouble and a total absence of back fire up to the present. I should strongly advise a Bosch magneto; also my tyres seem good for at least the same amount of mileage as I have already done. I make the usual disclaimer.—W. H. NOLLOTH.

No. 2407.—Lancia Cars.

I own a 30 h.p. 1912 Lancia, which has just completed 6,000 miles, all done touring on the Continent, over the mountain passes in the Dolomites, and in Scotland, during the last four months. I can recommend the car as most reliable, a fine hill-climber, with a silent and powerful engine.—M.M.

No. 2443.—Rubberine.

I have been using Rubberine in front tyres of my 45 h.p. Napier—front axle weight 17 cwts.—for some five months with excellent results. R.W. fixed wheels and 820 × 120 tyres are used. After 3,345 miles one tyre split at a join in the tread, the filling being visible for 1¼in. The tyre was run in this condition for 850 miles without the filling exuding and was then fitted with a leather gaiter, which wore through in 310 miles. A second gaiter has run 300 miles, bringing the total mileage up to 4,805. The body of the tyre near the bead is intact, and I propose to wear out gaiters until the tyre falls off the rim.—DESMOND F.

No. 2595.—Retreading Pragma-filled Tyres.

The British Tyre Filling Co., Ltd. (Pragma Patents), of Derby, write to take exception to a reply given by Almagam, Ltd., respecting the retreading of Pragma-filled tyres. They state that as Pragma filling contains no free oils the filling has no effect whatever either on the canvas or the rubber of the tyre. Rubberine Tyre Fillings, Ltd., 1, Albemarle Street, London, W., also take exception to the statements of Almagam, Ltd. They say that they have filled some six hundred tyres with Rubberine for one firm alone, whose engineer reports most favourably in every way on the results. They add: "We have never heard of a case of the layers of canvas becoming parted through the use of Rubberine," and in regard to the latter part of the reply referred to as to increased expense being the effect of such fillings, they say the experience of users of effective fillings is quite to the contrary, this statement being backed up by a testimonial from a customer who says he gets six hundred miles per tyre more out of Rubberine-filled tyres.

No. 2356.—Seabrook R.M.C. Car.

After running over 3,000 miles I had my four-seater 18-20 h.p. R.M.C. taken to pieces. None of the parts showed the slightest trace of wear, and nothing had worked loose. There was little difference in appearance between the back and the front tyres (all were in good condition). I have had experience with four cars. I consider the R.M.C. very light on tyres. It is also the only car of the four in which I have not had a fouled plug or a seized bearing, which speaks well for the lubricating system. I do not like the position of the levers, but beyond that I have nothing but praise for the car, which I find sensitive, fast, and powerful on hills. The two-point suspension of the crankshaft I viewed with dis-

Some Queries and Replies *(Continued).*

trust. I find I was alarmed without cause. The long bearing and the massive proportions of the shaft evidently compensate the need of a third bearing. —C. STAFFORD JONES.

QUERIES.

No. 2623.—Self-starter for Ford Car.

I SHOULD like to have particulars and experience of fitting a self-starter to a Ford car.—ANTI-WINDER.

No. 2624.—Carburetter for 15-20 Flanders 1912.

I SHALL be glad of the experience of any of your readers who may have tried carburetters other than the standard one on a 15-20 h.p. Flanders (1912).—H.C.

No. 2625.—Carburetter for 15 h.p. Talbot.

IF any of your readers have fitted any other carburetter to a 15 h.p. 1913 Talbot than the one supplied with the car I shall be obliged if they will advise me.—MANCHESTER.

No. 2626.—11.9 h.p. Arrol-Johnston.

I WOULD be glad to hear from an owner of this little car what tyre mileage he is getting, also if 22 m.p.g. is average consumption with W. and P. carburetter.—C 3257.

No. 2627.—Carburetter for 19.6 h.p. Vulcan.

WOULD any owner of a 19.6 h.p. Vulcan five-seater touring car, 1912 model, fitted with Longuemare carburetter, oblige with experiences of petrol consumption; also with S.U. or any other carburetter?—R.L.P.

No. 2628.—S.U. Carburetter on 12-16 h.p. Wolseley.

I SHOULD be much obliged if owners of 1912 12-16 h.p. Wolseley cars, fitted with S.U. carburetter, would tell me what mileage they average per gallon. Also, if petrol consumption is cut down, they find the engine very difficult to start up.—F.H.

No. 2629.—11.9 h.p. Humber.

WOULD any readers give their experience of this car as to its reliability and comfort? Is it suitable for a lady? Do the cylinders carbonise quickly, and what is the petrol consumption? I should specially appreciate an indication of its weak points.—T.T.S.

No. 2630.—R.M.C. Car.

I AM thinking of buying an R.M.C. car, and would be glad to hear the opinion of an owner who has driven one at least 20,000 miles. I continually hear praise of these and other cheap American cars, but when I enquire the mileage it usually turns out to be under 5,000, which, in my opinion, is no test at all.—AMERICUS.

No. 2631.—Warland Dual Rims.

I SHOULD be glad if any owner-driver who has had experience of these rims for 5,000 to 10,000 miles would say whether he has had any trouble with rust (1) behind the detachable flange, (2) between the bead of the tyre and the rims, and (3) at the spot where the detachable section of rim comes away, after leaving the wheels untouched for about a month. I should be glad to know that water does not get in, at the bolt holes, or round the bead of the tyre.—G.D.B.

No. 2332.—24-39 Wolseley 1913 Model.

I SHOULD be much obliged if any owner who has had one of these 1913 models in use would give me his experience. Is the carburetter satisfactory and easy to adjust? What mileage per gallon on petrol and oil? Is the car a good hill-climber? Does the self-starter act all right? If electric lamps are fitted, how many volts required; is the lighting satisfactory and what firm? Are the coachwork and springing of car good? Are the standard wheels as fitted satisfactory?—HILLY COUNTRY.

No. 2633.—Harsh Front Springs.

WHEN I bought my car new in 1911 (a well-known French make), I found it bumped badly on any but a perfect road, and as it seemed to come from the front of the car, I well greased the leaves of the springs, with no better result. I therefore returned the car to the makers' London garage, and they tested it, admitted the defect, and eventually removed a leaf from each front spring. This made riding a trifle easier, but it is far from perfect, and unless the road is dead smooth any speed over the legal limit is extremely jolty. I have tried shock absorbers with little effect, and I do not feel inclined to spend money on an expensive pair. The back of the car is perfect, and the leaves of all the springs are well lubricated with grease and graphite. Any help will be greatly appreciated.—H. E. SERCOMBE.

QUERIES AND REPLIES.

No. 2634.—Insurance Policy Rebates.

I AM negotiating about an insurance policy, and am entitled to receive rebates as follows: 25% for taking first £5 of risk, 15% for no claim for two years, and 15% for insuring two cars, totalling 55%. The insurance broker calculates the premium by deducting the rebates successively thus:

Premium	£20	0	0
25%	5	0	0
	£15	0	0
15%	2	5	0
	£12	15	0
15%	1	18	3
	£10	16	9

whereas 55% of the whole premium is £20 less £11 = £9. Certainly anyone inexperienced in detail would expect a rebate of 55% on the full premium. I should be glad to know whether the broker's method of calculation is correct and general to most of the insurance companies, as, if so, the amount of the first rebate selected for deduction makes a material difference to the result.—X.

The method referred to is that universally adopted by all insurance companies. The first item to deduct is the 15% for insuring two cars, from the balance remaining the 25% for owner taking the first £5 of the risk, and, lastly, from the balance again the 15% bonus. The order in which these deductions are to be made is usually shown on the proposal form. If the various deductions were added together and taken off the gross premium it would sometimes show that no premium whatever was payable. Taking the querist's own case for an example: Let the gross premium be given at £20. 1, insuring two cars, 15%; 2, for taking the first £50 of the risk, 60%; 3, owner only driving, 10%; 4, bonus, 15%; total, 100%.

Week-end and Touring Notes.

An Historical Bit of Bedfordshire. By R.G.

A short trip, which might prove attractive to the motorist visiting Bedford, but probably well enough known to the Bedfordian, has suggested itself to me as embracing many delightful little sylvan spots, together with much of historical and architectural interest. Taking the Bromham Road, a mile of fairly good surface, crossing the Midland Railway, sees us clear of the town, and after negotiating a bad corner, which should be taken carefully, as we are on a main road (the tarmac surface of which is no doubt responsible for youthful and hot-headed motorists being inclined to take the corner much faster than they intended), we are soon passing the last houses in the town, in this direction, followed by the one-mile post to Bedford. Just past this post is a by-road, off to the left, which I should advise being taken (the main road can be regained further on), so as to traverse the charming, long and straggling village of Biddenham. A few very pretty modern villas are first encountered, after which the road turns to the left and we are coursing through the old village. About halfway up the village, on the right hand side, is the thatched post office, which is worthy of notice. In the pretty little church, with its ivy-covered tower surmounted by a squat pyramidical roof, at the far end of the village, beyond the turning which we take to regain the main road, is a specimen of church embroidery of the date 1542. Taking the above-mentioned turning, a few minutes suffices to regain the main road, where we turn to the left and are soon crossing the ancient long structure known as the Bromham Bridge, which is really more of a causeway to protect the road from the constant flooding in the winter seasons than a bridge. There are many of these bridges to be found crossing the Ouse at various points on its course. A few yards past this bridge (which once possessed a chapel, remains of which can be seen in the old mill house) we encounter a guide post pointing to Kempston and Wootton, and a few yards further on take the sharp turn to the right for Bromham. Having traversed a steep little pitch we find ourselves in one of the most charming little dells imaginable, very beautifully wooded, with Bromham Park on our right. Crossing a pretty little sylvan bridge over a stream, we ascend another short but, perhaps, less steep hill, between high banks mostly wooded on one side, then round a curve to the right, and so into the charming little village of Bromham. The Hall was once the residence of Sir Lewis Dyve, who held Newport Pagnell, some ten miles distant, for the King, in the Civil Wars. We see the church of St. Owen peeping from among the trees on our right from the top of the hill we have just ascended. It contains monuments and brasses of the Dyve family, and also of the Trevors, their successors at the Hall. I think anyone who knows the county, visiting this village in the summer, will agree that Bromham might well be placed first on the list among Bedford villages for its delightful little gardens. Nearly every cottage, mostly thatched, and peeping from among the foliage, is set back from the road to provide for a charming little garden, well-stocked with many coloured sweet peas, hollyhocks, a great variety of roses, crimson and pink ramblers festooning wire archways, sunflowers, etc. I mention these chiefly as being particularly visible to the motorist as he crawls, and I should strongly advise him to be prepared to crawl through this sylvan arcadia. Towards the end of the village the road bears round very sharply to the left.

About half a mile further on is a turn to the right down a bank, which we pass, continuing straight on under the railway bridge, a short distance past which one obtains a very good view of Oakley Hall, the one-time residence of a former Duke of Bedford. The road now takes a dip, ending in a sharp right-angled turn, at the bottom, which has to be carefully negotiated, as the road just here is very narrow. Another rise presents itself, followed by another dip, two difficult corners, and we are soon passing the first houses of the large village of Stevington. The very picturesque old cross will be noticed, but of it the natives are unable to supply any particulars. Possibly it has been a market cross at one time. Another idea suggests itself, viz., that it may have been an Eleanor cross, as there is one of these erections at the village of Cardington, two miles the other side of Bedford. Crawling up the main street, one can occasionally see a woman or girl sitting in the doorway of a house, weaving Bedford lace. There used to be a castle here, built by Baldwin-de-Wake in 1281, of which nothing remains with the exception of a few elevations and depressions in the ground to the west of the church. The latter is well worth a visit, with its Saxon stonework in the tower, both outside and within. The side chapels, either side of the chancel, it will be observed, are now in ruins. Inside will be found curious carvings on the bench ends, one of which represents two men drinking out of a large bowl, which may perhaps have some reference to the church ales endowment. Just outside the east end of the chancel, and at the edge of the churchyard, is a holy well, of great note at one time, and so much frequented by pilgrims that a hospitium was built for their reception.

Returning from the church, we take the first turn to the right just beside the "cross," and ascending a moderately long slope we obtain a very fair view of the surrounding country through which, as we observe, runs the Great Ouse, better known as "The Ouse." This is the fifth longest river in England, and probably one of the most picturesque, fringed as it is by willows, rushes, and reeds, and with beautiful beds of water lilies on its surface. The village we see across the river in a northerly direction is Pavenham, evidently at one time the site of a Roman camp. Referring again to the Ouse, the poet Cowper speaks of it thus:

"Ouse, slow winding through a level plain
Of spacious meads with cattle sprinkled o'er."

We can now, if we wish, partly follow the course of the river and

Week-end and Touring Notes (*Continued*).

obtain very pretty glimpses of it at times through the trees. Take the first turn to the right where the road forks, and we find ourselves spinning down leafy lanes, and so on through Pavenham itself, another charming little Bedfordshire village, perhaps more generously wooded than others in the neighbourhood, and straight on, crossing the river at Stafford Bridge. We now take the first turn to the right, and pass through Oakley village, taking the first turn to the left at the foot of the village. The road is very prettily wooded here, and affords a grateful shade in hot weather. We now proceed round a bend to the right past the church, and once more happen on a pretty bit of river scenery close to Oakley Park—the old bridge of five arches in the foreground, and a little further upstream a pretty weir over which the trickling water scintillates in the sun. Crossing the bridge, and negotiating two more sharp turns, a rise in the road brings us back once more to our old route, where, turning to the left, we make our way home through Bromham.

Before reaching the Bromham Bridge, we can take the sharp turning to the right at the corner of a house on the main Bedford to Newport road, where there is a direction post, and vary our return journey to Bedford by going through Kempston, passing the old church, and taking the first turn to the left some distance past the church, then straight ahead through old and new villages.

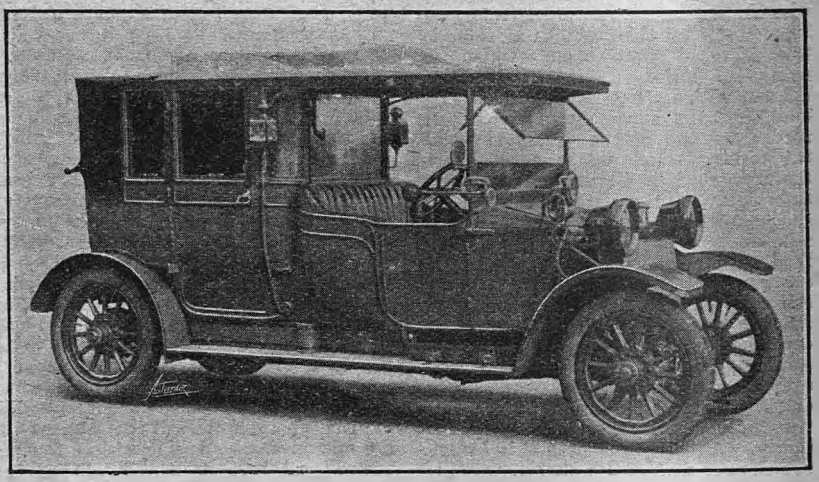
After leaving Stevington, an alternative route to that returning through Pavenham, Oakley, Bromham, etc., is by way of the road to the left at the fork just over the hill. From here we obtain a good view of another part of the county, and drop down into Chellington. Run straight through this village and on to Harrold, passing alongside a peculiar causeway, constructed just wide enough to accommodate a foot passenger or led horse, and known as a packhorse bridge, constructed, of course, for the same purpose as the Bromham Bridge.

Crossing the Nun's Bridge, so named through having been erected by a former prioress of Harrold, we observe Harrold Hall on our left, a beautiful mansion, on the site of which the former priory is supposed to have stood.

The village stands a little distance from the road, and possesses a curious old round market house. Proceeding, the road rises somewhat, and a sharp turn to the right takes us through the picturesque little village of Little Odell past the Mad Dog Inn. Most of the houses are thatched, and the village has a very healthy position on the side of the hill with a pretty view, looking across the river and surrounding country. The same view obtains along the road to Odell, pronounced "Odle" by the inhabitants. At the far end of the village we pass the beautiful church, a fine specimen of Perpendicular architecture, and the old seventeenth century castle built by the family of Alston.

From here we have a good stretch of fast, open road to Sharnbrook. The massive tall church tower we see on our right about a mile before reaching the latter place is Felmersham Church, a fine specimen of Early English architecture and much admired by experts, a precursor of the beautiful Fen churches the river passes on its lower courses. Sharnbrook is an exceedingly picturesque old-world village—it might almost be called a town. It is famous more, I believe, for its river fishing than for anything else. The only building of any note in the vicinity is Colworth House, which lies to the north, and was built in the eighteenth century by the family of Anthony. On entering the village we turn sharp to the right, and, running down the main street, turn sharp to the left through a little sylvan dell, then over a bridge crossing a stream, and up a short steep pitch, taking the first turning to the right again, and, continuing, obtain further glimpses of the river. A short distance further on brings us to the main Kettering to Bedford Road, which we gain by taking the right-hand turn.

We pass within about a mile of the castle of Bletsoe. The great Elizabethan monument in the church was erected to a former St. John, cousin of Henry VIII. There are also other historical monuments in the church. Shortly after passing through the village of Milton Ernest we climb Milton Hill, and obtain another very



A 38 h.p. Lanchester limousine landaulet, which has just been supplied to Mrs. Eshelby, Birkenhead, by Messrs. Hooper and Sons, Ltd., Slater Street, Liverpool. The equipment of the car includes a C.A.V. dynamo lighting outfit.

Week-end and Touring Notes (*Continued*).

charming view, which includes the town of Bedford and bits of the river. We are soon coasting down to the level again and on through the village of Clapham, a long straggling village running parallel and close to the river. The entry to the village for some distance is rather monotonous by reason of the rows of new workmen's cottages, but the upper part of the village, near the church, is quite pretty.

The church possesses a very fine massive tower which dates from Saxon times, and can be seen from miles away to the west and south. Its only fault is that it is somewhat out of keeping with the little church of later date beside it. The belfry, I should have mentioned, is Norman.

Dr. Henry Hammond, the learned seventeenth century divine and chaplain to Charles I., was confined in a sort of semi-imprisonment in a manor house which stood close to the church, as was also Gilbert Shelden, afterwards Archbishop of Canterbury.

In less than two miles of good tarmac surface we are once more back in the town, known to the ancient Britons as Bedicanford, or the fortifications on the ford, to-day as Bedford, the home of the Adams car.

Flashes (*Continued*).

We learn that Sir Thomas Lipton has just taken delivery of a new 40 h.p. Mercédès car, and that Prince Rupprecht of Bavaria has just ordered two 25-30 h.p. Mercédès.

Mr. C. S. Allfrey, late of the 3rd Battalion Somerset Light Infantry, has recently joined Messrs. Markham and Prance, consulting motor engineers of Dudley House, Southampton Street, Strand, London, W.C.

As the Oakland Motor Car Co., Ltd., 169, Shaftesbury Avenue, London, W.C., are not included in the London Telephone Directory, we are asked to state that their telephone number is 523 Regent.

Owing to rebuilding operations, Messrs. H. M. Hobson, Ltd., of 16, Pall Mall, London, S.W., sole concessionnaires of Delahaye and Excelsior cars, have taken temporary premises at 9, Grafton Street, Bond Street, London, W.

The Hillman Motor Car Co., Ltd., Coventry, have just opened showrooms at 107, Great Portland Street, London, W. In addition to Hillman private cars the company's 10 h.p. motor waggon and Electra stationary engines are on view, and a large stock of spare parts is carried.

With a view to facilitating prompt deliveries in the North, the Tormo Manufacturing Co., 67-68, Bunhill Row, London, E.C., have opened a branch depot at 8, Peter Street, Manchester, where they will keep a representative stock of F. and S. ball bearings and Tormo steel balls.

The Zenith Carburetter Co., 17, Harp Lane, London, E.C., inform us that after having made long and careful tests they have found that benzole is eminently suitable for use in their carburetter and equal to any such high density spirit, and in most cases their carburetter will give splendid results with this spirit without any alteration whatever. If it be found, however, that the engine does not seem to work quite as well on benzole as on petrol, there is no need to fit an extra air inlet or to weight the float, all that is required being to fit slightly smaller jets, which the company are always pleased to send for trial on application. One essential feature when using heavy fuel is the provision of a very efficient heating arrangement, if one do not already exist, in order to vaporise the heavier spirit properly.

Sir Charles Friswell has returned from his trip to South Africa and India, where he has been in the interests of Messrs. Friswells, Ltd.

Mr. G. N. C. Mann (of Messrs. Mann, Egerton, and Co., Ltd.), who underwent an operation for appendicitis recently, is progressing satisfactorily towards recovery.

Mr. W. J. Mayer, lately, connected with Brasier car interests in this country, has secured the British agency for Le Gui cars, and has taken temporary premises at 137-143, High Road, Chiswick, London, W.

We are informed that Mr. Loiser, until recently joint managing director with Mr. Paul Brodtmann of the Continental Tyre and Rubber Co. (Great Britain), Ltd., has resigned that position, and that Mr. Brodtmann is now in sole control.

His Highness the Maharajah of Bikaner has placed with the Hollingdrake Automobile Co., Ltd., of Stockport, an order for three complete La Buire cars. He has left everything entirely in the hands of the firm named, and the coachwork will be carried out in their own factory.

The London and Parisian Motor Co., 97, Davies Street, Oxford Street, London, W., the well-known concessionnaires for Hotchkiss and Delage cars, have established one of the best equipped and most spacious garages in London, in Newcastle Place, Edgware Road, only a few minutes from Oxford Street. Special features of this garage are a waiting room, well furnished with comfortable couches and divan chairs, a billiard table, writing desk, telephone, etc., also newspapers and magazines. Ample provision for effecting ordinary small repairs and a thoroughly well equipped washing floor are also among the features of this establishment. Special stress is laid upon the system of car maintenance, by which motor car owners can secure expert service all the year round at a very modest fee. Each car maintained is thoroughly cleaned immediately upon its return for the night; it is filled up with petrol, water, etc., and carefully looked over, so that it is ready to start out at a moment's notice next morning. The maintenance fee covers everything, including the whole garage service for the chauffeur. Car owners can thus be relieved from the responsibility and expense of renting a private garage with its worries of water, lighting, rates and taxes, telephone service, etc.

"The Autocar" Share List.

The following table of some of the companies connected with the motor, motor cycle, and allied trades, is not published for the benefit of speculators, but for the information of investors. The speculative buyer is referred to the daily financial press.

Issued Capital.	Amt. of Share	Name of Company.	Present Prices.		Last Year. Highest	Last Year. Lowest.	This Year. Highest	This Year. Lowest.	Last Div.	Div. Payable
£									%	
2,520	1/	Abingdon-Ecco, Ltd.	1/9	2/-	3/-	2/3	3/3	3/-	Nil	Nov.
45,000	£5	Alldays & Onions (£3 paid)	3⅛	4xd.	4⅛	3/16	3¾	3⅜	1/6	Ap/Oc
50,000	£5	,, ,, 6% Cum. Pref.	5⅛	5⅜xd.	5 1/16	5⅛	5⅜	5⅜	2/6	Ap/Oc
209,802	10/	Argylls, Ltd.	5/6	6/-	6/-	4/-	5/9	4/9	Nil	Dec.
150,000	£1	Belsize Motors, Ltd.	26/-	27/-	28/1¼	25/-	27/6	26/-	12½	My/Nv
100,000	£1	,, ,, Cum. Pref.	19/9	20/3	20/9	20/-	20/3	20/-	6	Fb/Au
44,771	£1	Bowden Brake, Ltd.	4/6	5/6	7/-	3/1½	5/-	5/-	Nil	Dec.
766,982	£1	Birm'gham Sm'l Arms, Ld.	48/9	49/-	53/3	46/3	50/-	48/9	20	Mr/Sp
203,150	£5	,, ,, Cum. Pref.	5⅛	5⅜	5 3/16	5 7/16	5⅜	5⅛	5	Mr/Sp
75,000	£5	Brampton Bros. Cum. Pref.	4 sellers		4⅛	3 11/16	4	3⅞	6	Oct.
100,000	£1	Brooks, J. B., & Co., Ltd.	35/3	36/-	37/6	31/-	36/6	35/-	15	My/Nv
100,000	£5	,, ,, Cum. Pref.	5⅜	5½	5⅝	5¼	5 7/16	5¼	5	My/Nv
100,000	£5	Brown Bros. Cum. Pref. ..	4⅛ bid		5	4½	4⅛	4 1/16	6	Ap/Oc
380,000	£1	Charron Par. Pref. Ord. ...	8/7½	9/4½	11/6	8/-	9/6	7/9	7	Ju/Dc
200,000	£1	Clément-Gladiator	3/- bid		3/-	1/6	3/-	2/1½	Nil	Dec.
100,000	£1	,, ,, 6% Cum. Pref.	12/-	14/-	14/9	10/4½	13/6	12/6	6	Ju/Dc
55,000	£1	Components, Ltd.	6/9	7/3	6/9	4/-	7/9	6/1½	Nil	Dec.
25,347	£1	,, ,, 7% Cum. Pref.	13/- bid		15/-	11/4½	13/-	12/-	7	Dec.
275,000	£1	Darracq, A., & Co., Ltd. ..	13/6	13/10½	18/4½	8/9	15/-	9/9	Nil	Ju/Dc
375,000	£1	,, 7% Cum. Pref. Ord.	12/6	13/6	19/1½	11/10½	16/-	13/-	7	Ap/Oc
159,229	£1	De Dion-Bouton, 7% Ord.	8/-	9/-	11/3	8/9	8/9	7/6	6	Dec.
1,000,000	£1	Dunlop Rubber	36/-	38/-	56/9	27/6	39/6	35/6	12½	Ap/Oc
200,000	£1	,, ,, Cum. Pref.	19/9	sellers	21/-	17/-	20/-	18/6	6	MJSD
312,735	£1	,, ,, Income Stock	17/6	18/-	19/-	15/6	19/-	17/6	5	Ju/Dc
624,995	£1	Dunlop Parent Co. 8% Ord.	15/9	16/3	18/7½	10/-	18/-	13/9	10	Ju/Dc
994,990	£1	,, ,, 5% Cum. Pref.	12/9	13/3	16/9	10/6	15/1½	12/7½	5	Ju/Dc
499,962	£1	,, ,, Deferred	9/6	10/-	15/-	6/3	10/1½	8/-	Nil	Ju/Dc
99,977	£1	Enfield Cycle	21/6	22/-	19/9	13/9	21/9	18/-	5	Oct.
24,985	£1	,, ,, Cum. Pref.	21/-	22/-	21/3	20/6	23/-	21/-	7	Fb/Oc
292,904	£1	Humber, Ltd. (New)	12/9	13/3	7/6	3/7½	14/-	6/9	Nil	Nov.
331,495	£1	,, ,, 6% Cum. Pref.	17/-	17/4½	11/-	6/9	17/9	10/1½	Nil	Nov.
50,000	£1	James Cycle	14/6	15/-	6/6	5/-	15/-	6/6	Nil	Oct.
100,000	£5	Lucas, Joseph, Ltd.	9⅜	10	9⅞	9	9 9/16	9⅛	15	Ap/Nv
100,000	£5	,, ,, Cum. Pref.	5⅛	5⅜	5⅜	5⅛	5⅛	5⅜	5	Mr/Sp
73,385	£1	New Hudson Cycle Co. ...	26/6	27/-	24/6	14/6	28/-	24/6	10	Nov.
18,033	£1	,, ,, Cum. Pref.	19/6	20/-	20/-	18/-	19/6	19/6	6	Mr/Nv
50,000	4/-	Premier Cycle	5/-	5/1½	5/-	3/-	5/3	4/4½	15	Sept.
125,000	10/-	,, ,, Cum. Pref.	8/-	8/1½	8/9	6/9	8/1½	7/3	7½	Sept.
31,000	£1	Riley (Coventry), Ltd.....	5/6	6/3	8/9	5/3	7/4½	5/3	Nil	Feb.
200,000	£1	Rolls-Royce	44/6	45/6	47/3	36/3	48/6	45/-	30	Jn/Ju
138,668	£1	Rover	39/-	39/3	31/3	12/6	40/-	30/9	10	Nov.
100,000	£1	Rudge-Whitworth, Ltd. ...	24/6	25/-	24/-	15/-	25/3	22/6	5	Oct.
100,000	£5	,, ,, 6% Cum. Pref.	3¾	4	5 1/16	3⅞	4	3⅝	*12	Oct.
41,621	6/-	Siddeley-Deasy	10/9	11/3	10/6	6/-	10/9	8/10½	8½	Dec.
50,007	£1	Singer & Co., Ltd.	16/3	16/9	19/6	6/6	19/1½	16/-	Nil	Oct.
70,000	£1	Star Engineering, Ltd.	14/3	sellers	18/6	10/6	17/-	13/10½	5	Mar.
69,157	£1	,, ,, Cum. Pref.	17/-	bid	18/-	15/4½	17/6	17/-	7	Mar.
87,550	£1	Stepney Wheel	31/-	32/6	35/-	30/-	32/6	31/-	20	Mr/Oc
120,000	£1	Sunbeam Motor Car	54/-	bid	59/-	37/6	56/6	52/-	25	Nov.
30,000	£1	,, ,, 6% Cum. Pref.	22/-	23/6	23/3	20/4½	22/6	22/6	6	Ap/Nv
80,000	£1	Swift Cycle	21/9	22/3	21/9	13/-	24/-	20/9	6	Dec.
100,000	£1	,, ,, 6½% Cum. Pref.	17/-	17/6	17/3	14/10½	17/-	16/3	6½	Ju/Dc.
80,000	£1	Triumph Cycle	73/-	74/-	71/6	43/9	74/6	68/-	30	Nov.
50,000	£1	,, ,, 5% Cum. Par. Pref.	23/-	24/-	23/6	20/7½	23/3	21/6	6¼	Nov.

* Including all arrears.

Humber Ordinary have been exceptionally strong, but have reacted a little below best. Argylls, Rovers, Sunbeams and Triumphs firmer. Rather a falling off in business.

"The Autocar" Diary.

April.

9, 16 and 23.—Examinations for R.A.C. Driving Certificates, Pall Mall, 9 a.m.
9.—Institution of Automobile Engineers. Paper by Col. R. E. Crompton, "The Wheel and the Road."
19.—Coventry and Warwickshire M.C. Cycle Car Trial.

May.

8, 11 and 12.—A.C. de la Sarthe et de l'Ouest. Le Mans Meeting.
11 and 12.—Targa Florio Race.
18.—Opening of the Russian Automobile Exhibition.
24.—Cardiff C.C. Annual Hill-climb.

June.

4 and 6.—Tourist Trophy Races, Isle of Man (see *The Motor Cycle*).
7.—Shelsley Walsh Hill-climb.
June.
10-17.—Austrian Alpine Tour.
18.—Cardiff M.C. and South Wales A.C. Open Hill-climb at Caerphilly.
21.—Cardiff M.C. and South Wales A.C. Open Speed Trials at Porthcawl.

July.

12.—Grand Prix Race. Picardie Circuit.
19 and 20.—R.A.C. of Belgium Grand Prix Race.
28.—Grand Prix de France and Coupe de la Sarthe. Le Mans.

August.

10.—Mont Ventoux Hill Climb.

September.

21.—Coupe de l'Auto, Boulogne Circuit.
25.—International Stock Car Race, Isle of Man.

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