

THE AUTOCAR

A Journal published in the interests of the mechanically propelled road carriage.

EDITED BY H. WALTER STANER.

No. 917.

SATURDAY, MAY 17TH, 1913.

VOL. XXX.

The Autocar.

(Largest Circulation.)

Registered as a newspaper for transmission in the United Kingdom.
Entered as second-class matter in the New York (N.Y.) Post Office.

Three Editions weekly (every Friday).

The THREEPENNY EDITION, printed on Art Paper.

The PENNY EDITION printed on thinner paper.

The FOREIGN EDITION, price 3d., on thinner paper for transmission abroad.

Publishing Offices:

20, TUDOR STREET, LONDON E.C.

Telegrams: Autocars, Fleet, London.

Telephone: No. 6720 Holborn (5 lines).

Editorial Office:

HERTFORD STREET, COVENTRY.

Telegrams: Autocar, Coventry.

Telephone: No. 10 Coventry (5 lines).

CONTENTS.

	PAGE
NOTES	877-878
USEFUL HINTS AND TIPS (ILLUSTRATED)	879
ELECTRIC SELF-STARTERS	880-882
ON THE ROAD	883-885
THE CALCOTT LIGHT CAR (ILLUSTRATED)	886-887
THE TENTH ANNUAL LONDON TO EDINBURGH RUN	887
BROOKLANDS WHITSUN MEETING (ILLUSTRATED)	888-893
LEAVES FROM A SPORTSMAN'S NOTE-BOOK	897
THE 20 H.P. GERMAIN (ILLUSTRATED)	898-899
CARBON DEPOSIT IN CYLINDERS	899
MILLENNIUM MOTOR CAR JACKS (ILLUSTRATED)	900-901
THE 30-50 H.P. SIX-CYLINDER ARMSTRONG-WHITWORTH (ILLUSTRATED)	902-904
THE 1913 12-16 H.P. SUNBEAM (ILLUSTRATED)	904
SPRINGS	905-906
THE 14 H.P. LA LICORNE (ILLUSTRATED)	907-908
THE NEW 16 H.P. DARRACQ (ILLUSTRATED)	909
CORRESPONDENCE	910-914
FLASHES	915-916
SOME QUERIES AND REPLIES	917-918
WEEK END AND TOURING NOTES (ILLUSTRATED)	919-921
"THE AUTOCAR" SHARE LIST—"THE AUTOCAR" DIARY	922

Subscription Rates.

British Isles: Home Edition, 16s. penny (thin paper) edition, 6s. 6d.
Abroad (thin paper edition), 24s. per annum.

An Index to Advertisements appears on page 5a.

Notes.

The Springing of Motor Cars.

Last week we published the paper on springs and the springing of motor cars read by Mr. G. H. Baillie before the Institution of Automobile Engineers, and in this issue we report the discussion.

This paper of Mr. Baillie's brings to a fitting close the 1912-1913 session of the Institution, and we must again congratulate the Institution on the very high order and great practical interest of the papers which have been read before its members during the session. So far as Mr. Baillie's paper is concerned, it falls into a different category from the more notable of its predecessors during the past session: their value de-

pended largely upon the fact that they were the considered statements of men who had specialised for a long period of years upon a particular subject. On the other hand, Mr. Baillie has taken up a much neglected subject upon which few people appear to have specialised at all except in a rule-of-thumb manner, and has tried to set forth clearly what the behaviour of a spring really is by conducting and recording a number of experiments on a single wheel sprung on to a model chassis. It is true that Professor Archibald Sharp dealt with the subject of pneumatic springs, and incidentally to some extent with the behaviour of metallic springs, when he read his paper upon his own invention, a particular form of pneumatic spring, but this paper of Mr. Sharp's did not profess to explore the ground which has been covered in Mr. Baillie's paper.

Many interesting points were brought out in the discussion, and Mr. Baillie undoubtedly added to the value and interest of his paper by more or less taking it as read and then dealing *extempore* with the more important features of his investigations. This practice of throwing up into a high light the main facts of an investigation is one which can be commended in every way.

Springs to Suit all Speeds.

Among those points which are of very general interest to motorists is the fact plainly shown in the diagrams which we published last week, and that is what may be called the lag of the car in relation to the axle. It will be noticed from these diagrams that when the wheel passes over an obstacle the frame of the car does not rise to its full height at the same moment, but somewhat later. This fact will, no doubt, come as news to many, as we believe the average occupant of a motor car, if asked whether he felt the bump at the same moment as the wheel struck it, would say that he did. Now, the reason this knowledge of the true action is important is that it may be taken that the faster the car is going the greater this lag may be: if the car is only just pushed over the obstacle the lift of the wheel and the car may be regarded as approximately simultaneous, but as the speed increases the car begins to get late and rises after the wheel. The matter is, obviously, further complicated by the fact that as the speed goes up, while this lag may be increased, the actions and reactions become very complex, and it is mainly from the complexity of these actions and reactions that the really comfortable springing of a motor car is by far the most difficult problem which has yet faced the makers of springs for road vehicles. It is comparatively easy to make a spring which will be satisfactory at any one speed: the difficulty is to make a spring which will be satisfactory at all the speeds within the range of the average road motor car. It should be clearly understood that we are not talking about excessive speeds now, but only dealing with the range of speeds compassed by cars of moderate power and when moderately driven. All people who have had

Notes.

any experience with a number of different cars are aware of the fact that the behaviour of the springs varies enormously, and, further, that the changing of springs on a given car will often make a tremendous difference for better or worse. It is quite the exception to find a car which has really got what one may call the best set of compromise springs—springs which are fairly satisfactory at all speeds.

The Effect of Pot-holes.

Another thing which was shown by Mr. Baillie's investigations, and which, again, should lead to improvement in the long run, is the fact that the shock of dropping into a two-inch hole is more violent than that of striking a two-inch obstacle. We all know by our own bodily feelings that the effects of a pot-hole are far more uncomfortable than those of running over a loose stone, but we do not remember having seen the fact scientifically recorded previously.

The Lubrication and Protection of Springs.

Another very interesting diagram which we published last week (fig. 9, page 862) is well worth further examination. It shows graphically the difference in the flexibility of a greased and a rusty spring. The most interesting part of the two curves is the bottom, as it shows so plainly that the lubricated spring is sensitive to the small shocks and gives to them, while the rusty spring does not move at all till the weight or shock is practically doubled. This brings out a point which must have often struck those who have given thought to the subject of springing, and that is the unfortunate fact that springs should be so sensitive to lubrication for their comfortable working. Even the most careful owner cannot be continually going through the tedious operation of lubricating his springs by forcing the plates apart and introducing grease or other suitable lubricant between them, as he knows quite well that two or three wet drives will rapidly undo his handiwork. There is no doubt that one of two things should be done: either springs should be made which are not sensitive to rust and which work equally well when they are rusty, or proper provision should be made to protect them from rust and to provide them with a simple and easy means of lubrication. It is true that a few cars have springs to which little lubricators are fitted on the top plates, and oil put into these does penetrate to a very considerable extent between the leaves. These are vastly better than the ordinary springs, which have no means of lubrication other than that of the laborious and time-wasting type which most people have to undertake if they would have the full comfort of their springs. We have often wondered that in these days of clever mechanical refinements practically no attempts have been made properly to protect and properly to lubricate the springs, and this is certainly remarkable when we consider that for their efficient working they depend upon protection from rust and upon adequate lubrication.

Supplemental Springs.

Theoretically the author made a strong case against supplemental springs, now so generally used, but he admitted at once that, while such things were in theory unnecessary, in practice the worst of them appear to improve the springing of the average car, and he regarded this as a reproach upon the chassis makers—an opinion in which we think the average motorist will not be disinclined to join. At the same time, we know that some of the best car manufacturers have given immense attention to the subject of

springs, and one firm at least has a record of investigations which have resulted in what were at one time rather poorly sprung cars developing into some of the best sprung cars upon the road to-day, yet even they would be the first to acknowledge that, considering the time and trouble they have devoted to the subject, the result is really scarcely proportionate.

Too Much Rule of Thumb.

It is significant that the majority of the parts of a modern motor car are made by firms who started with the industry and who specialise upon these parts. Now, so far as the springs are concerned, we believe we are right in saying that not one motor car manufacturer makes his own springs: he buys them from the old-established spring manufacturers, who have been making springs for all sorts of vehicles from a light spring cart up to a heavy main line railway locomotive. Rightly or wrongly, the impression that the motor car manufacturers have is that the vast majority of springs are manufactured more or less on a trial and error basis. It appears that very seldom do they find that they can get comfortable springing for a car by merely specifying to the spring makers the weight upon each axle: they find it necessary to have two or more sets of springs, all of them capable of carrying the weight, but differing in their number of plates, period, and so forth. Whether this trial and error work is a fault of the spring makers or not we do not venture to say, but it is at least significant that less advance has been made in the development of the springing of motor cars than in that of any other part of the vehicle, and, incidentally, it would appear that the spring makers are a somewhat somnolent lot, as none of them appear to have taken the trouble to attend the reading of Mr. Baillie's paper, or if they did so they preferred not to add their quota of knowledge to the discussion.

The Similarity of Springs for Horse-drawn and Motor Vehicles.

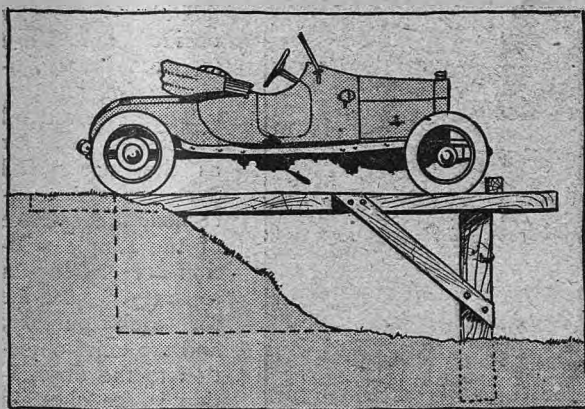
It is interesting to consider that the plate spring is one of the parts of a motor car which in principle and general appearance is as much like the horse carriage spring as anything could be, and, pursuing this thought, it is certainly not without interest to note that the author's recommendation of what we may call for the moment the ideal compromise in springs, is, also, a recommendation of one of the oldest practices in connection with horse carriage springs. It will be remembered that he suggested that everything pointed to the fact that, probably, as good a compromise as could be obtained with present knowledge was to have a flexible main spring with a reserve spring which came into action and supported a portion of the load when the main spring had been deflected through a certain distance. Springs of this type can be seen on hundreds of carts in different parts of the country, and we believe they work quite well, as they only come into action when the cart is heavily loaded, and yet allow moderately flexible springs to be used, so that when the cart is driven light it is reasonably comfortable.

We must congratulate Mr. Baillie on having prominently drawn attention to this very important subject of springs. It is a subject which becomes more and more important every day, because there is no doubt that in many parts of the country roads are becoming more and more trying for wheel traffic simply because of the pot-hole state into which they so rapidly deteriorate owing to the bad methods of construction and maintenance.

Useful Hints and Tips.

Inspection Pits, and a Simple Substitute.

IN the construction of an inspection pit it is important that the position chosen be such that the pit can be well drained. Surface water drains are usually arranged about eighteen inches below the ground, and consequently if a pit three or four feet deep be made it cannot be connected with them. The alternative is to roof over the pit, but even if this be done some water is bound to find its way in, for which reason a small sump should be made at one end to enable the water to be bailed out with a bucket. Such an arrangement is better than forming a bank and digging the pit in it so that the bottom of the pit is above the drains, as one often desires to use the pit when the car is in an undrivable condition, with a result that it has to be pushed up what may be a gradient of



A substitute for a pit which can sometimes be arranged.

in 6. The simple substitute illustrated herewith can be constructed in many private gardens, in those, that is, where the ground slopes considerably or a form of terrace exists. It is much cheaper to construct than an ordinary pit. It is much lighter, and it requires no emptying.

As petrol fumes descend, a pit may become "waterlogged" with invisible petrol fumes, which are not only dangerous to work in, but have been the cause of more than one fatality through accidental ignition when the pit was being used. We remember one case of this kind in some works in Coventry. Some petrol had leaked into the pit and evaporated. Subsequently a match was struck close to the pit, and a violent explosion resulted, with the consequence that the man working in the pit was killed.

Cleaning Oil Filters.

With different makes of engines the arrangement varies for filtering the oil which has passed through the bearings and before it is again pumped up to them. Therefore, what we are about to say does not necessarily apply to all engine oil filters, though it applies to very many.

Our attention was first brought to the matter by reading in one of the most complete instruction books, issued by one of the largest makers, that when the filter was taken out for cleaning the gauze should not be immersed in petrol. Now, we confess we had always used petrol for this purpose, as we had found it quite the best available fluid for quickly and thoroughly cleaning the filter. We, therefore, communicated with the firm in question, enquiring why this embargo on the use of petrol was made, and the reason for it

was very interesting and instructive. The filter in question was so arranged that, while it was perfectly easy to cleanse it externally, internal cleansing was not so easy, and the consequence was that if it were immersed in petrol all the oil was washed away from it externally, and any very small particles of fluff which might be adhering to it were washed through the meshes of the gauze into the interior of the filter, where they remained. Now, the oil pump drew from the interior of the filter, and, consequently, these minute particles, which had hitherto remained adhering to the exterior of the filter, got into the oil which the pump took up and in time were likely to block the oil pipes.

It so happened that unconsciously we had partly foreseen this objection, because, although we used petrol for the cleansing process, we always injected it through a syringe into the filter, so that the cleaning was from the inside towards the outside, as this is the principle which should be adopted in cleaning filters; that is to say, one should study their operation and consider the course of the oil through them, and the cleansing should always be in the opposite direction. In other words, if the pump suck the oil from outside to inside the cleaning process should be in the reverse direction, *i.e.*, from inside to outside. As we have said, the filters themselves vary enormously, but the principle is always the same, and, therefore, when a filter is cleansed it should not only be cleansed both outside and inside, but the washing process should be in the opposite direction to the flow of the oil when the engine is running and the pump working.

In connection with this subject it should be remembered that the submerged filter is always more difficult to cleanse than the one which is above the oil level, as the submerged filter is almost necessarily at the lowest or nearly lowest level of the oil sump and, consequently, always surrounded by the dirtiest oil when the engine is at rest. On the other hand, with a filter which is above the oil level dirt will accumulate within it, but it will not, as it were, soak into it from outside, and this sort of filter is easier to clean for two reasons:

- (1.) It does not get so dirty.
- (2.) It can be removed for cleansing without running the oil out of the base chamber.

Support for the Axle Tie Rod when jacking up.

I have experienced much trouble in jacking up the back axle of my car owing to the presence of the differential tie rod, which stretches underneath the axle from side to side. I have been afraid to put the jack head under this rod for fear of bending or straining it, but lately I have cut a taper wooden block shaped so that it fits snugly between the rods and the axle casing at the outer end. This block is only slightly longer than the jack head, and is put in position before the jack is used. The head of the jack lifts the car through the rod, and the block, of course, prevents the rod from being bent upward. Previously it was necessary to be most careful in offering the jack to the axle, and usually the head was bound to be placed under one of the spring bolts—a somewhat precarious position, especially when a detachable wheel was being removed.—A.K.

"COMPLETE HINTS AND TIPS FOR AUTOMOBILISTS." Under this title "Useful Hints and Tips" have been reprinted from *The Autocar* in booklet form. The fifth edition now on sale has been thoroughly revised and brought up to date. The book can be obtained from *The Autocar* Offices, 20, Tudor Street, London, E.C., post paid 2s. 6d.

Electric Self-starters.

By J. Dalrymple Bell.

TO what extent the popularity in America of the electric engine starting system will be reflected in this country remains to be seen. Undoubtedly the perfection of the lighting dynamo will go some way towards creating a demand for some additional advantage for the somewhat considerable outlay necessary on such a lighting system, more especially if the expense be not very materially increased by such additional advantage.

Like many other problems, however, the addition of a self-starting equipment is not so simple as it would at first appear to be. The present day motor car electric lighting dynamo is the result of many years' development, and while it may with truth be stated that a dynamo is a reversible machine, that is to say it will convert mechanical energy into electrical, and *vice versa*, yet the very development which has made it suitable for electric lighting purposes at the varying speed of a motor car engine, has rendered it all the more unsuitable for converting electrical into mechanical energy, that is, for its use as a motor.

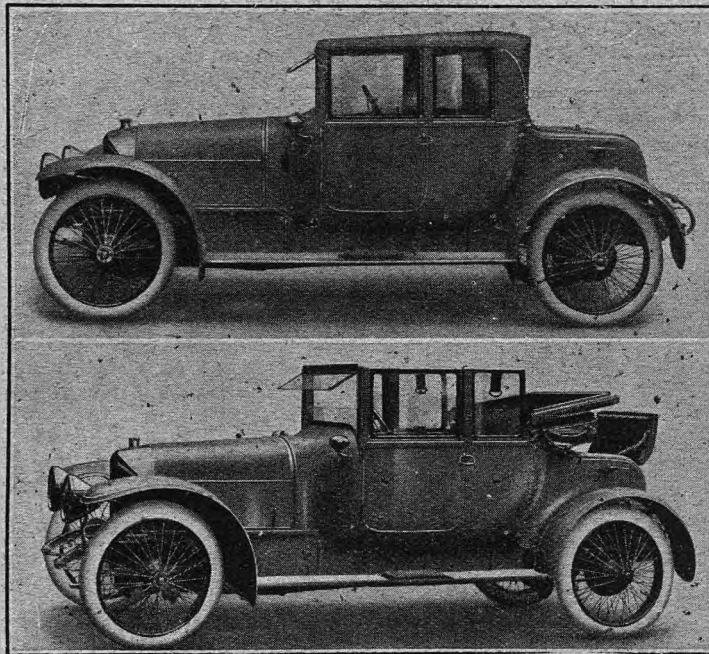
It may be taken that the ordinary electric lighting dynamo is quite unsuited for the purpose of turning the engine, and without alteration, amounting to reconstruction, it will do no more than is claimed for it, viz., charge the accumulator with which it is connected. But this goes halfway towards the solution of the problem of self-starting, for it provides a source of stored electrical energy, and this energy can be converted into mechanical energy by means of a suitable electric motor.

Apart from the electrical aspect of the lighting dynamo and its unsuitability to be used as a motor, there is another important mechanical requirement. An electric motor develops its power at a high speed. One horse-power is equal to one pound raised 550 feet in one second, or 550 lbs. raised one foot in one second, and given its choice, the electric motor would elect to raise the lesser weight through the greater distance; so that in the case of turning an engine, which amounts to a load more of the nature of raising the greater weight through the lesser distance, suitable gearing must be provided, and the gear ratio thus

necessitated renders the mechanical connection with the engine unsuitable for driving the dynamo. Taking these two important differences and requirements into consideration, obviously the most straightforward plan to adopt is to add an ordinary series wound electric motor for the purpose of starting alone, leaving the specially developed dynamo to do the work it is intended and designed to do.

It has been claimed that one machine will do for the triple purpose of starting, lighting, and igniting, but I do not consider ignition enters into the question at all, for given electric lighting, the ignition question merely becomes one of a choice between magneto ignition and battery and coil ignition. Every engine fitted with a magneto is essentially self-igniting.

The electrical difficulties, so far as the motor and dynamo are concerned, are capable of the simple solution of having a separate machine for each purpose, and the chief objection to the duplication is the question of space. The questions of difference of weight and expense hardly arise, for all things considered I doubt if there would be any difference on these two points, whether two separate machines were used or one capable of the two functions required. Even the question of space calls for the consideration that it



A 15 h.p. Crossley (Shelsley model) with a neat coupé body by Messrs. Alford and Alder. The first shows the car with the hood up and windows closed; the next shows the manner in which the side glasses can be used when the hood is down. The dicky seat is of special design, the back rest being formed by the top of the box, and the seat itself revolving into position inside the box from the front part thereof. The spare wheel is carried behind the squab of the main seat in a well, formed with a hole in the centre of the partition to carry the hub cap. The screen is operated by a central lever so that it can be raised or lowered with one hand. The car is finished in a suede grey with hood leather to match.

is often easier to find room for two small articles than a large one.

Given an electric generator which will adapt its output to the variations of speed at which it is driven, or given some arrangement which will drive the generator at a constant speed, the problem, so far as electric machinery is concerned, comes quite within the bounds of standard electric practice.

The question of gearing, however, presents some difficulties. Suppose one machine acts as both motor and dynamo, a reduction gear of at least 20 to 1 must be provided for it to drive the engine, while another gear with an increase of 2 to 1 must be provided for the engine to drive the dynamo. If two separate electric machines be used, these two gears need not be in combination, with consequent simplification. Common to both separate and combined motor and generator, however, the starting gear has

to do more than merely provide the large reduction. It must not permit of the engine driving the motor, for it is evident that if the engine were to retain anything like its normal speed, say, 1,000 r.p.m., it would be driving the motor at an excessive rate. This can, of course, be provided against by some over-running device so long as the engine goes ahead. But sometimes the engine, through a backfire, goes astern, and to provide against such happenings is not so simple. In some cases no provision is made for this possibility at all, but reliance is placed on reducing the likelihood of its happening to a minimum by ensuring that the ignition is retarded before the starter can be brought into operation. Reduction to a minimum is not, however, elimination, and slipping clutch devices are used in some cases.

In a recent editorial note in *The Autocar* the attention of manufacturers of cars was drawn to the necessity for providing a suitable drive for a lighting dynamo, and various alternative positions were suggested. The same suggestions might be extended to provision being made at the same time for electric starters.

In America the most common method of gearing the starter to the engine is by cutting teeth round the flywheel, and when the considerable and required reduction is remembered it would seem to be the obvious point of application. But there are two principal objections.

First, the cast iron of which flywheels are made is not the most suitable material of which to make a gear wheel, which in this case, it must be remembered, has to form an element of a clash gear. Secondly, although by virtue of its size it goes a long way towards providing the reduction, it does not go far enough. Unless a very powerful motor be used, with a consequent very large demand on the batteries, the reduction for an ordinary size of engine must, as has already been pointed out, be somewhere about 20 to 1. Now, take as an example a flywheel 16in. in diameter, and remembering its material is cast iron, it would hardly be advisable to cut teeth in it of a finer pitch than, say, 7 d.p. Then, sixteen inches being the diameter of the addendum circle, the number of teeth would be 110. Bringing the number of teeth in the pinion to its lowest limit, twelve, we only get a reduction of 9.1 to 1, which is less than half we require. To increase the reduction we must compound the gearing; so that by gearing to the flywheel a train of gear wheels is not eliminated.

and it becomes a moot point whether some form of epicyclic or worm reduction gear would not be more satisfactory.

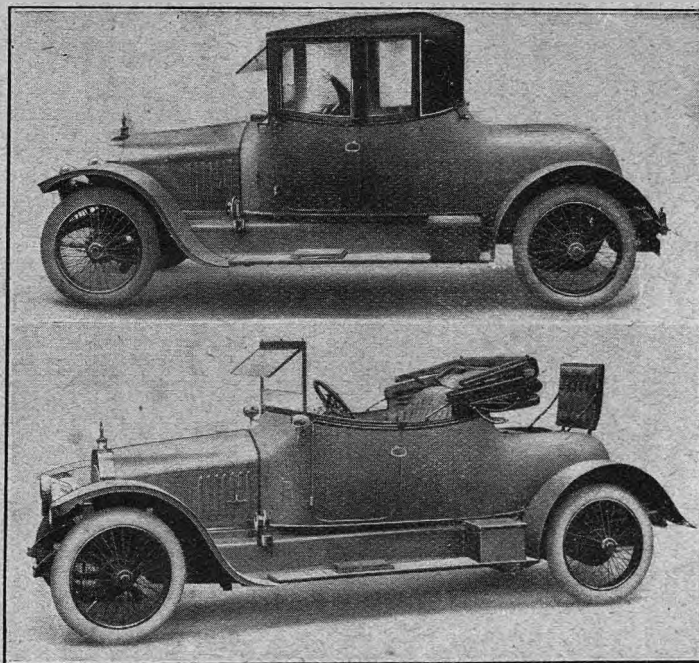
As regards the amount of power required. This, of course, varies with the size and condition of the engine, but an engine of moderate bore and stroke, say 110 x 130 mm., will require battery power to the extent of 2 h.p. But this statement must be qualified by adding that this amount of power will only be required for the initial effort, and that thereafter it will fall to about half that value, and 1 h.p. will keep such an engine turning at from 90 to 120 r.p.m. Now this is the weak point about the electric starter. The speed at which it turns the engine is no greater than it can be turned by hand, and, as is well known,

occasions do arise, rarely perhaps, when this speed is insufficient to start the engine without the administration of some stimulant in the form of priming. One of the most recent American developments is, in fact, the use of what is known in this country as dissolved acetylene for priming purposes in connection with electric self-starters.

Of course, greater speeds can be obtained by the application of more power, but this means greater weight and expense, and there is, of course, a limit as regards both. The weight of an electric starter may be put down as 200 lbs., that is, about 14 stones, and any increase in this respect is undesirable.

But the most objectionable feature brought about by increasing the power is the greater demand on the battery. The accumulator battery in connection with self-starters has been a cause of wonder and surprise to electricians. A cell of an 80 ampere hour capacity is only a large size ignition accumulator, and the ordinary discharge for such a cell would be given as, at most, units of ampères.

It has become almost universal to use a six volt battery. The reason for this is, partly, that this voltage suits the lamps, but chiefly because a six volt battery of, say, 80 ampere hour capacity, is lighter than one of greater voltage of the same capacity. I very much doubt, however, if the advantage in weight is not over-balanced by other disadvantages, the chief of which is that a motor to work on a six volt circuit cannot, considering restrictions as to size, be made so efficient as one employing higher voltages, and I think that a happy mean might be struck by using a 12 volt circuit, which would be about half-way between the 25 volt circuit at first used and the 6 volt one in use



A streamline coupé body by Alford and Alder on a 20 h.p. Vauxhall chassis. It will be noticed that this body presents no corners anywhere, all the lines are curves, giving a very clean run. The hood is constructed to fold away completely, leaving an ordinary screen, for the front pillars disappear into the front of the body. The car is finished in primrose and black and upholstered in buff colour leather.

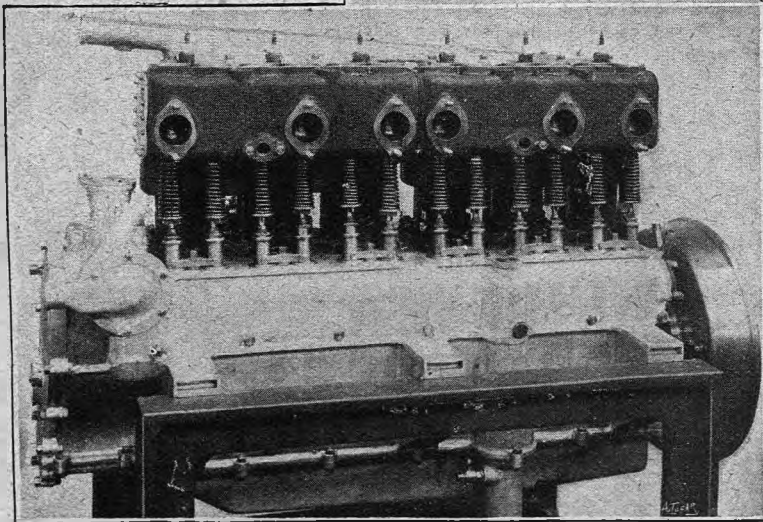
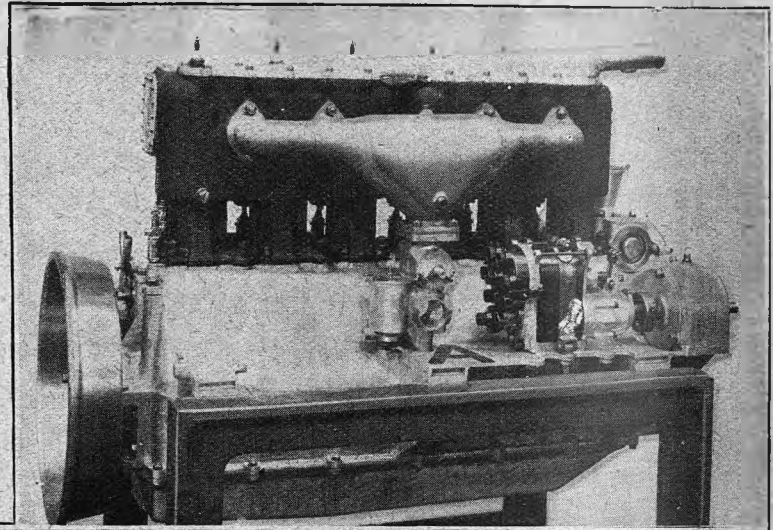
Electric Self-starters.

at present. However, we must take things as we find them, so let us consider the discharge necessary to give the required power from a 6 volt battery.

The initial effort required is somewhere about 2 h.p. This, of course, includes the somewhat large efficiency losses incidental to the use of small electric machines. Let the output of the battery be required to give be 1,500 watts. To give this at six volts pressure would require 250 amperes, and 1 h.p. will call for half this amount, 125 amperes, and as the capacity is 80 ampere hours, the battery should continue to discharge at this rate for a period of thirty-eight minutes.

That cells can be constructed to stand this heavy discharge has been proved, but, as has been said before, the fact that they do stand it has been a surprise. It must, of course, be remembered that the demand at this high rate is only momentary, and that the cells are always kept in their best condition for standing such heavy discharges, that is to say, they are always kept fully charged.

It is possible that the electric starter will prove to be a stepping stone to the petrol-electric car, for at the present time some electric starters have the motor dynamo built about or incorporated with the flywheel, and with this system no



The central illustration shows Mr. Louis Coatalen and Mr. D. Resta on one of the 1913 Grand Prix Sunbeam racers. Four of these have been entered for the race on July 12th, and will be driven by Messrs D. Resta, Lee Guinness, V. Regal, and Caillos. The two views of the engine show its normal general appearance. It has six cylinders 80 x 150 mm., the same as the standard 12-16 h.p. four-cylinder engine. Lubrication and water circulation are by pump, the former working at an average pressure of 40 lbs. per square inch. The carburetter is a Claudel Hobson with a water jacketed induction pipe, and the magneto a Bosch, type H.L. 6. The gear box and the gear ratios are standard, but the back axle has no differential. Goodyear steel wheels and Dunlop tyres have been adopted.

gearing at all is necessary. The flywheel carries, or is formed of, the armature of the motor, and suitable field magnets are placed about it, and from this to a complete system of electric transmission is a comparatively small step.

Although it hardly concerns the electric starter directly, there is a device which it might benefit designers to pay some attention to. I refer to the electro-magnetic clutch. There seems to be an erroneous idea that, because an electro magnet can be made to adhere to a heavy

weight with sufficient tenacity for that weight to be lifted, the expenditure of electric energy must therefore be considerable. It is not the magnet which lifts the weight, it merely holds it, and the energy required to excite the magnet is small. There should be no confusion between tractive force and attractive force. As an example, a properly designed magnet can easily be made to give a tractive force of 100 lbs. per square inch, and with an expenditure of one watt of energy six square inches of the polar surface of such a magnet can be excited, giving, of course, an adhesive power of 600 lbs.

Not only have clutches on this principle the very great advantage of being easily and simply operated, but the forces are all internal, or perhaps self-contained would be a better word. There is, for example, no end thrust to provide for.

Mr. C. H. Larette, the well-known sporting journalist, who wrote under the name of "The Old Athlete," died last week, having never rallied after an operation which he underwent early in March.

On the Road.

Free Luncheons. Rook Shooting and Motor Cars.

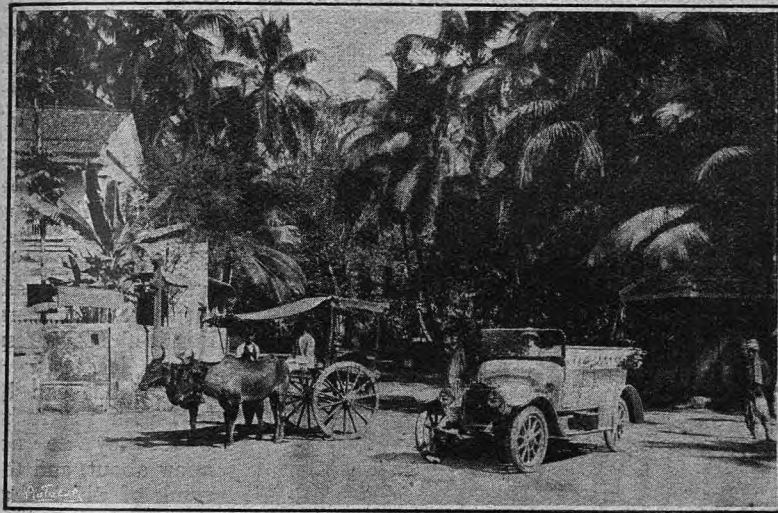
IN touching on the advantages of daylight saving a few weeks ago I made an error in advising Ireland to have nothing to do with taking her time from us. Of course, I meant exactly otherwise, forgetting that she would score where France lost, for, naturally, by adopting Greenwich time, evenings

me to do the work alone and draw my pay for it. But, since in David Harum we read that it is good for a dog to have fleas because it keeps him from brooding upon the fact that he is a dog, just so it is beneficial to those in authority over us—or over other motorists—to be reminded at times that they are but mortal and not the demi-gods that some make them out to be. Personally, I have a sincere admiration for my fellow-sinners, and I am much more drawn to men of like failings than to those in loftier spheres. It may be traces of original sin left in me, but I do love to see falls in High Places and to read of the slips of the Mighty. Perhaps because, unwittingly, it averages me and most of us up a little. Perhaps it is because we are jealous; anyhow, the fact remains, and it seems to be human nature.

Why all this rigmarole I know not, but let me go on to remark that evidently something is alive that I thought quenched for ever, because lately I have been receiving much literature on the late Victor tyre test. Of that well (stage-) managed business we were weary; we had all drawn our own conclusions, and most of us recognised that the astute Mr.

Yarworth Jones had scored all round the wicket, not merely in proving how good his wares were, but also by drawing attention to the high class people who used them and were proud to put their names down as witnesses to the fairness and equity of the competition.

But it seems that we have been mistaken in looking on the "scoop" as a closed thing, and, as an amateur

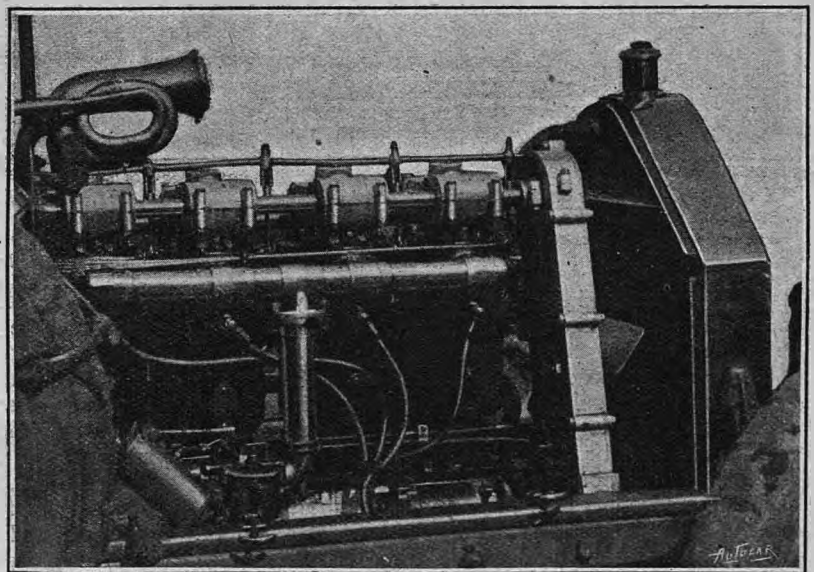


MOTORING IN INDIA. A 12 h.p. Talbot in the suburbs of Bombay. The ox-wagon on the left affords an interesting comparison between the two methods of locomotion.

in Ireland would always have twenty-five minutes more of daylight—no little advantage when the way home lies over snipe-bogs and uncertain roads. A correspondent from Belfast kindly pointed out my mistake; that I lost his letter must be my excuse for not having written to thank him for it and to hope with him that the valuable Bill to this effect may go through Parliament with no amendments.

I have of late been taking a holiday in the correspondence columns, by which I mean to say that nobody has been attacking me much, although I have not noticed that I have been avoiding contentious topics more than usual or have ceased to call attention to abuses; yet the silence is unholy, and I cannot hope that all men are of my opinions as yet. I am quite aware that some of those who differ from me profit by taking no notice of my criticisms; indeed, it is an established fact that there is no slumber as deep as that of ignorance.

It was not until the new Chinese Government invited England to pray on behalf of its new Parliament that many of us took to wondering if our own did not require much the same treatment, and undoubtedly if I were the managing director of a big business I should call the happy days those in which the shareholders took no interest in the doings of the concern and left



The Horsley disc valve engine fitted to a car which has for some little time past been undergoing road tests, with satisfactory results we are informed. It may be remembered that this engine was described in "The Autocar" of Feb. 15th. The valve has a flat surface, and rotates, inverted, under the head of the combustion chamber.

On the Road.

in these matters, it would appear that Mr. Y.-J. has a certain amount of reason on his side in re-opening the affair. Into the details of the squabble I am not going, beyond mentioning that too many luncheons at smart restaurants may make for peace but must militate towards indigestion.

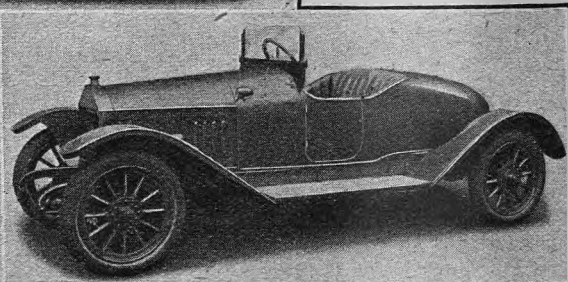
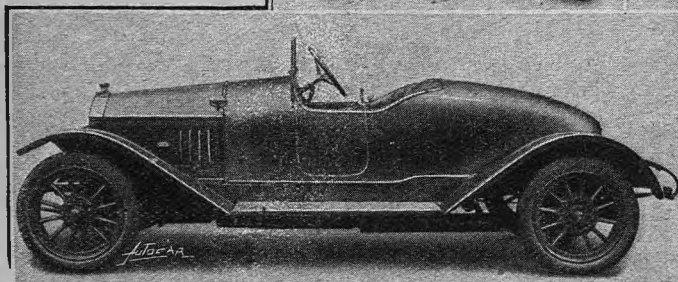
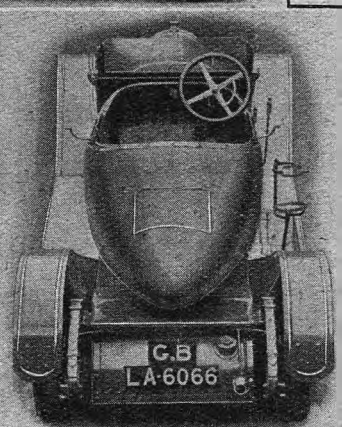
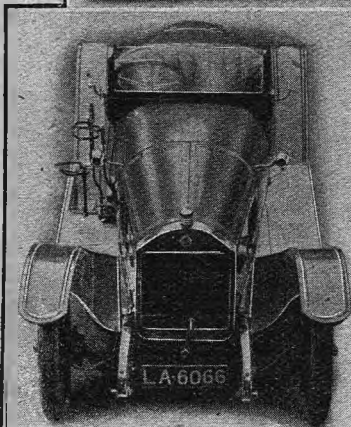
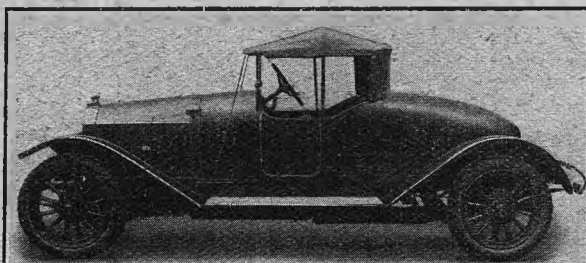
This subject of large luncheons must be my excuse for a digression. Luncheons, or lunches—I do not know which is the bigger—are getting a regular disease in the motor business. I do not attend them because I am merely a country man, but from what I read in the papers one cannot launch a new starting handle, sparking plug, horn, back lamp, spanner, or chauffeur's billiard room without inviting one's friends, and some enemies, to a middle-day dinner, so long, so costly, and so ornate that, while some of the guests cannot write anything but good after it, the rest of them cannot certainly be capable of any harder exertion than a Turkish bath and a lack of appetite for the evening repast.

Personally speaking, I am not con-

on, and that art critics do not have to plank down their shillings as we do at the Academy. Because most of the first class slang all plays that are not written by about three people only, the majority of the second patronise what they do not sneer at, and the discontent of the last lot at all pictures—except when the artists are dead several hundred years since, or the critics know they must be good because everybody says so—is becoming a serious question to all painters, I believe it is now being discussed in private what steps shall be taken to show up the ignorance and ineptitude of these ridiculous strutters.

I do not imply for a minute that I look for all motor-lunchers to bite the hands that feed them because other critics have that habit. But I think

the motoring public has the right to ask for more discrimination in the lay press, or at least for a silence that can be felt, with regard to what they do not know about, and the result of which they cannot possibly forecast. It is very hard to blame outright, but with a little practice it is quite easy to damn with



An 18 h.p. Sava car with a streamline body designed by the owner, Mr. F. H. B. Samuelson, Breckenbrough Hall, Thirsk, for whom the body was built by Messrs. E. Maule and Son, of Stockton-on-Tees. The bonnet and dash are standard and obviously lend themselves well, not only to this particular style of body, but to any type of flush-sided, two or four seater. The finish is in blue, with white lining on the bonnet, wheels, and mouldings.

structed for consuming two heavy meals a day if I am to do any work while the sun is up. I wish I were so formed, and I envy those who can do it, so to speak, on their heads. But, at the same time, this "styming of the spleen"—if I may put it that way—cannot be good for the critical faculty, and I think readers who may be on the look out for new inventions ought to be informed in what circumstances and conditions the accounts of these were written. Cars, they used to say, ran better at night; possibly, also, works are twice as big, new ideas are twice as promising, and prospects are twice as rosy after a good lunch as before it. If it is easy for the rich to be good, it is very much easier for the replete to be satisfied.

I often wonder if all motor critics are aware of the facts that theatrical critics have stalls given them, that literary *ditto* do not buy the books they have to write

faint praise, although one may easily get into trouble unless one be properly edited. For this purpose, then, laudatory lunches are rotten, and our leading motoring organisations should be invaluable. Yet, for some reason or other, we do not get perfect satisfaction, though we have ample machinery for the purpose.

The R.A.C., and its *congerie* of associations and clubs, exists for the purpose of encouraging automobilism; and how can automobilism be encouraged better than by proving the value of inventions pertaining to it and rejecting the bad? How can the cause of automobilism be better helped than by assisting unknown and poor brains to take their entitled places for the benefit of motorists generally? And how can the cause of automobilism be helped better than by seeing that vested interests and mere wealth

do not crush out by sheer weight of metal the striving and deserving newcomers? How? How, indeed? (No prizes offered.)

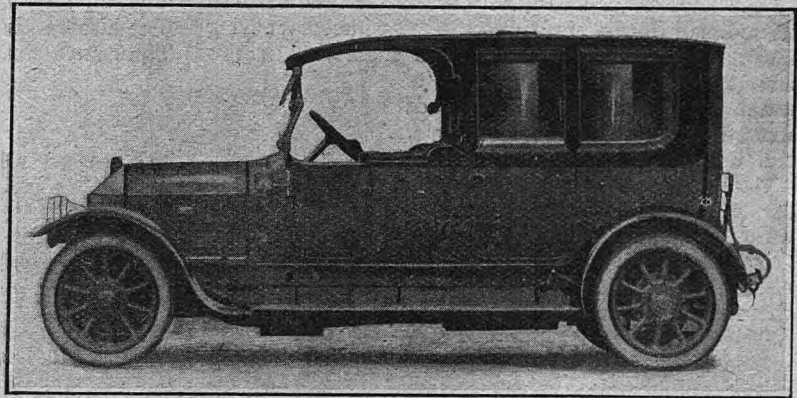
We will now, with no further ado, pass on to the advantages of the motor car in the matter of rook-shooting. Rook-shooting, almost more than any other sport, is a scattered pursuit, and very often without the aid of the car, many nests are left entirely unvisited from spring to spring. Which, of course, is hard on the rooks, for we are always told that unless they are shot they will desert or die, or, at any rate, go. Of course, one might visit distant rookeries in carriages, but that is a dangerous game, and necessitates someone extra to hold the horses. Or one might bicycle, in which case the bringing home of the slain would be a fine art, and possibly lead to domestic recrimination.

Personally I like to play the Lady Bountiful with dead rooks, possibly because I do not care for their taste. Otherwise the slain should be taken in bunches under the back of the car and trust to luck that they will be found still attached on arrival. Never, on any account, allow them near the upholstery or the foot-rugs. Remember, because a rook is dead, life on him is not necessarily extinct. I knew a man once—as a matter of fact, I know him still—who fastened many young rooks on to his exhaust pipe; that is to say, someone else did it for him, and his remarks on the way home were really equivalent to the odour that caused them—until he found it out.

Motoring tales of that friend of mine would fill a large book, and since I have got so far without touching (much) on contentious topics I will take this opportunity to relate a few of them. He was a very early motorist, there is a photograph of him sitting with his well-known sweet smile—the same smile he will have when he reads this—in a car that looks only about half as big as he is himself. But before he was a motorist he was a cyclist, and before he was a cyclist

he took a great deal of interest in cycles and their riders. The house of his parents was an imposing mansion, and one end of it overlooked a road much used by cyclists. Now in those days cyclists had nearly as much trouble with their machines as motorists had later, so he and his little brother and sisters devised this pretty idea. They got a small steel spanner and tied it to a long string and waited for a victim. As

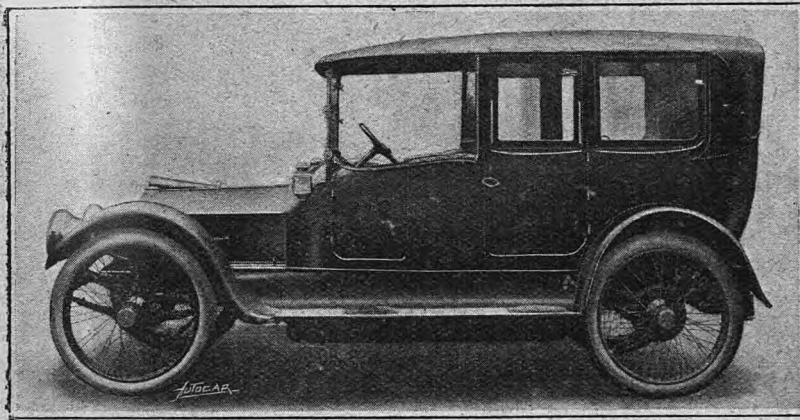
On the Road.



A 26 h.p. Metallurgique chassis carrying a limousine body by Vincent, of Reading, and which is to be shipped to New York. Occasional seats are provided, and the fittings include a roof ventilator, C.A.V. dynamo lighting set, and Sankey steel wheels. The colour scheme is unusual, being a delicate mauve colour with deep mauve relief, black valances, and domed wings.

soon as a cyclist came by and his back was turned, *clang* would go that spanner into the street—this in the shades of evening, for choice—and back again it would be hauled by the authors. Directly the cyclist heard the noise of falling metal he would stop, dismount, return, and search in the gathering gloom for the spanner or the something that had jumped out of his toolbag and must be found. Sometimes my young friends would come down and assist him; sometimes not. This went on for months with complete success, and only ceased when in a careless moment they volunteered to help a victim who had been had before. After which the cream of the joke disappeared to a large extent.

When my friend grew up he and all his brothers had cars, and took a vast interest in criticising each other's purchases. One day the eldest bought a new and lovely Daimler and invited the others to go for an early run. They went prepared. For the first few miles all went well except that the owner could not account for an extraordinary metallic clink somewhere near the differential, and much time was spent in stopping to look for it. This, I might remark, was caused by my friend in the back seats simply hitting two spanners together in time to the beat of the engine. Then followed fearful explosions behind, which became so violent that the magneto, the carburetter, and the silencer were each inspected. Later on the puzzled owner solved the difficulty by looking round at an inconvenient moment and discovering the brother lighting a firework cracker tied on with a piece of string to the hood. Then he knew. OWEN JOHN.



A 25-30 h.p. Armstrong-Whitworth colonial model, with a cabriolet body which has been made at this company's Manchester coachworks, and will, we think, be regarded as a credit to that establishment. The body is finished in dark blue picked out with a fine line of pale blue. Two very neat collapsible seats are fitted which fold up flush with the back of the driver's seat. The car is equipped with a C.A.V. electric lighting outfit, Klaxon horn and J.M. shock absorbers, and has Dunlop detachable wheels with 1020 x 120 mm. Dunlop tyres. It has a ground clearance of 11½ in., and was recently delivered to a customer in Valparaiso.

The Calcott Light Car.

A Full-sized Car in Miniature. Four Cylinders, 65 × 110 mm. Three Speeds. Bevel Drive.

THE Calcott light car has just been introduced by Messrs. Calcott Bros., Ltd., Coventry, the well-known makers of pedal bicycles and motor cycles. The design of this car throughout is strictly on the lines of a full-sized car, as will be realised immediately by an inspection of the accompanying illustrations. It has a four-cylinder engine, 65 × 110 mm. bore and stroke, leather to metal cone clutch, three speeds forward and reverse by gate change, and bevel drive.

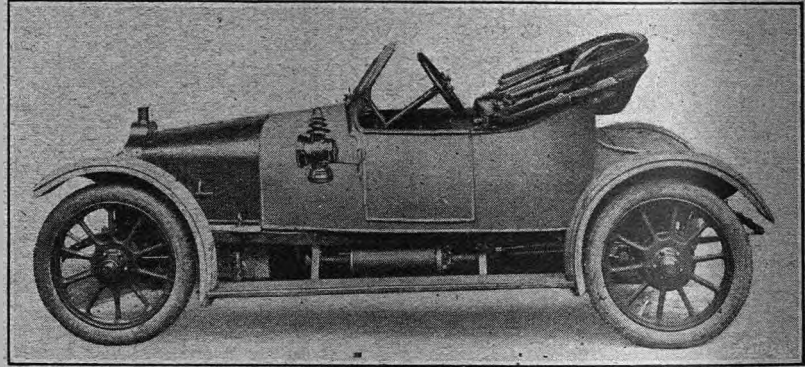
As will be seen, the four cylinders of the engine are cast *en bloc*, with the induction passage, leading from the Zenith carburetter on the offside, cast with the cylinders. The exhaust trunk is a separate casting and bolted to the near side of the cylinders.

The adjustable valve tappets and the valve springs are enclosed by a detachable cover plate. The single camshaft runs on ball bearings, and the magneto driving spindle is also carried on a ball bearing in the arm of the crank case. A Bosch magneto is provided, and the drive is taken through a flexible leather coupling, and two serrated discs which afford a ready means of setting the ignition timing. The magneto is placed low down on the near side, so rendering access to the valves unimpeded. The crankshaft is made from a solid forging, and is provided with three bearings. The diameter of the journals is 1 3/8 in., and all the bearings are lined with anti-friction white metal.

The leather to metal cone clutch is self-contained in the flywheel, so that no end pressure is put upon the crankshaft, while under the leather are four first intention springs to provide smooth take-up. Between

the clutch and gear box is a universally jointed shaft 12 in. in length between the centres of a universal joint in front and a flexible sliding joint at the back.

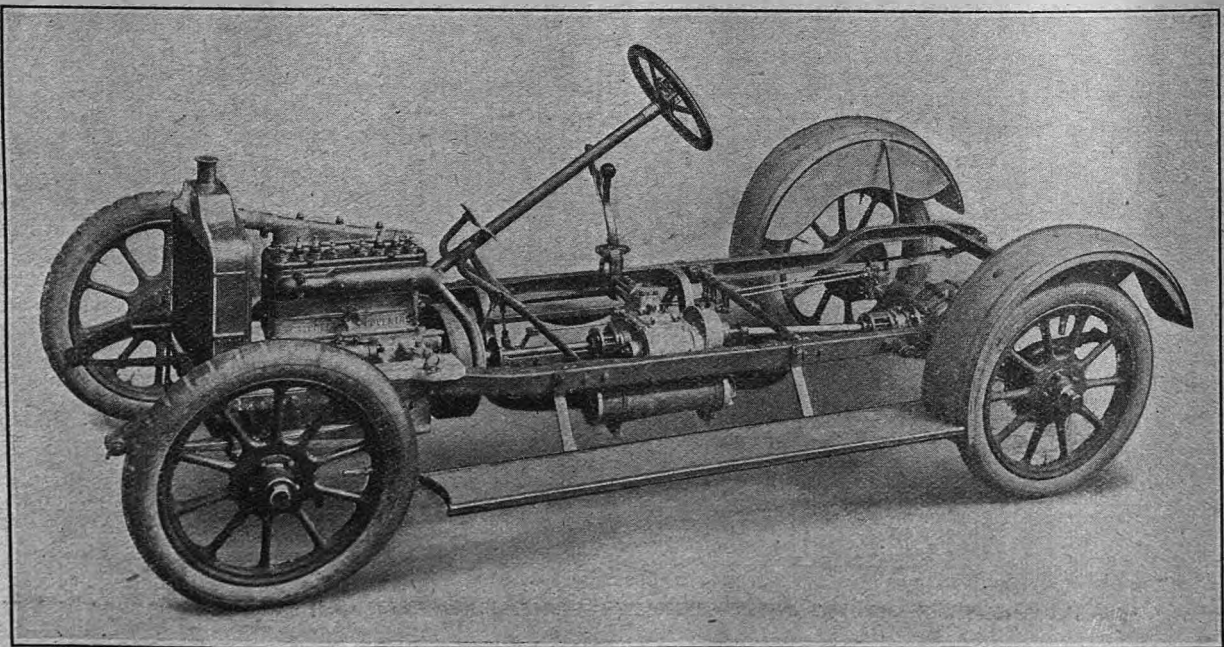
The construction of the gear box is distinctly unusual, for the two end covers are cast in one and bored to receive the ball bearings of the gearshafts. The centre of the box is, in fact, only a cover for the



Near side view of the Calcott light car with standard body, hood and screen.

gears. This arrangement is said to make it quite easy to provide a ball bearing on each side of the constant mesh pinion. The striking levers are contained within the box, and the gear lever is mounted on a bracket extension, so rendering it isolated from the frame. The striking rods in the gear box are mechanically interlocked, so that it is impossible for any two gears to be in mesh at the same time, while the gear lever is carried on a ball-ended reduction lever, thus obviating any liability of the sliding shaft to bind.

The propeller-shaft runs unenclosed from the back of the gear box, and is provided with a universal joint at the front end and a sliding flexible joint behind.

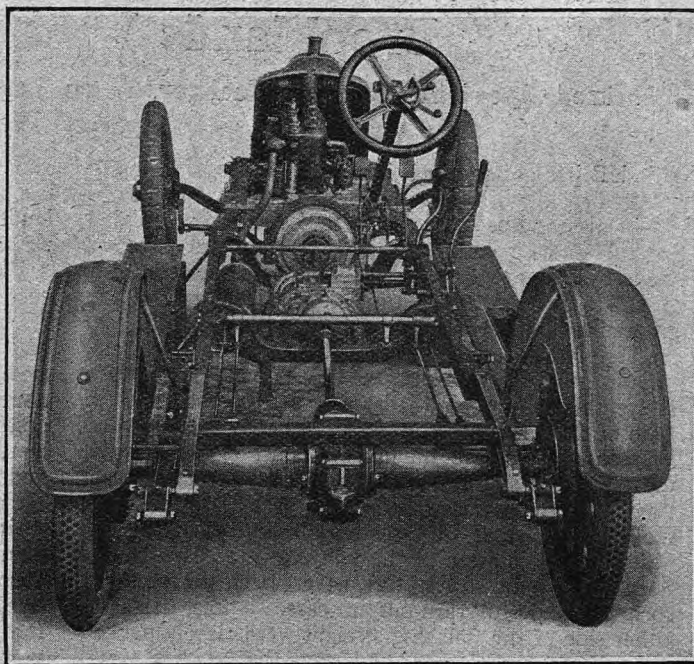


Near side view of the Calcott light car chassis.

As before mentioned, the rear axle is fitted with bevel drive. The small bevel pinion is supported by a bearing on each side of it, while both the pinion and the crown wheel have ball thrust collars. The weight of the car is not carried upon the driving axles, but from a mild steel sleeve projecting from the axle casing; the wheels run on Hoffmann's combined ball thrust and roller bearings. The substantial design of the back axle casing will be noticed in the rear view of the chassis. It will also be seen that an oil filling level orifice is provided, capped and fitted with two wing nuts. Both foot operated and hand brakes are mounted on the rear axle. They are of the internal expanding type, and are enclosed by dust-proof pressed steel plates. Sankey pressed steel wheels are fitted as standard, with 700 x 85 mm. tyres.

The lubrication is by skew-driven oil pump working in a sump and forcing oil to troughs in the paths of the big ends and to all the main bearings, the oil ways being cast with the crank case.

As will be noticed, the steering column is well raked, but what is not so obvious in the illustrations is that the column is made rigid by a steady bracket secured to the dash. Steering gear is of the worm and sector type, of case hardened steel, and running in phosphor bronze bushes. Semi-elliptical springs are fitted back and front, and the frame throughout is pressed

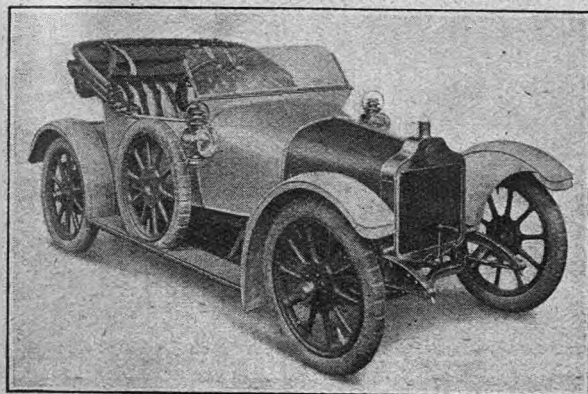


Rear view of the Calcott light car chassis.

steel with pressed steel cross members. The car is sold complete with a two-seated body, wind screen, hood, spare wheel, five lamps, and set of tools, the price being £185

The Tenth Annual London to Edinburgh Run.

THAT popular annual event, the London to Edinburgh run organised by the Motor Cycling Club, started from Highgate on Friday evening last week. The route was along the Great North Road via Barnet, Hatfield, Welwyn, Baldock, Biggleswade, Buckden, Stilton, Stamford, Grantham, Doncaster, Ferrybridge, Tadcaster, and York. After this point this year, in which the tenth anniversary of the inauguration of the run is celebrated, the route was altered. Upon leaving York the road to Boroughbridge was taken, after which the competitors proceeded along the whole length of Leeming Lane as far as Scotch Corner. Here the turn to the left was taken, and the route via Bowes, Brough, and Penrith to Carlisle was followed. The final stage to Edinburgh was by



Three-quarter front view of the Calcott light car. It will be noticed that substantial wings are fitted with flanges and inside shields.

way of Langholm, MossPaul Inn, Selkirk, and Galashiels. The weather was fine at the outset, but heavy banks of mist were encountered all through the night and as far as Newark. After Doncaster the roads were wet and greasy; in fact, very little dry road was met with afterwards. Near Penrith, and on the way to Carlisle, a tremendous thunderstorm was encountered, while more rain and a heavy hailstorm were experienced while crossing MossPaul summit. The new route included much beautiful scenery.

The following cars completed the journey, and presumably qualify for a gold medal:

Charles Jarrott (official car, 20 h.p. Crossley), J. Van Hooydonk (Phoenix), Dr. E. W. Brewerton (12 h.p. Métallurgique), Barnard R. Banks (10-12 h.p. Albruna), F. W. Turner (12-20 h.p. Benz), F. C. Westall (10-14 h.p. Grégoire), A. J. Sproston (20-25 h.p. Studebaker), E. Birch-Reynardson (Beeston Humber), W. R. Norris (10 h.p. Morris-Oxford), A. Bray (12 h.p. Foy Steele), and W. Whittall (15 h.p. Argyll).

Of the two new cars, the Richmond, driven by C. J. Myson, was late in starting owing to not being finished till the last minute, and the A.C. failed at Newark through tyre trouble. Mr. Jarrott's car was driven by Messrs. Henderson and Don. Another comparatively new car, the Foy Steele, which among others was entered for the return journey, ran with clocklike regularity and almost dead to time at every check.

The following cars attempted and completed the double journey: Mr. Jarrott's Crossley, Mr. Bray's Foy Steele, Mr. Whittall's Argyll, and Dr. Birch-Reynardson's 20 h.p. Beeston Humber.

Mr. F. C. Westall was disqualified at Edinburgh for being twenty-two minutes ahead of time.

Brooklands Whitsun Meeting.

Mixed Sport in Dismal Weather. Two Races Abandoned on Account of the Slippery Track.

ONE has got so much into the habit of associating Brooklands with fine weather that it comes almost like a shock to find a meeting—and a Bank Holiday meeting at that—as much as partially spoilt by a depressing drizzle. Such was the fate of the Whit-Monday fixture which toward the end of the programme had eventually to be abandoned, owing to the slipperiness of the track. It says much, however, for the growing popularity of Brooklands as a place where things happen that are worth seeing that, in spite of the threatening rain of the early morning, and its realisation before the midday start of the events, the crowd was not far short of a record one. Rarely, if ever, have there been so many people in the paddock, and though there have been days on which the population of the half-crown enclosures has been denser, the track has never been the scene of such a wonderful turn-out of cars. The fields on either side of the finishing straight were closely packed with all manner of cars, and what the number would have been if the regulation Brooklands weather had been in force it would be difficult to guess.

Incidentally, it may be that a small side light upon the reason why so many of the outside public patronise the racing is thrown by the view which we overheard expressed by a very shrewd-looking old gentleman, who was being exhorted by a friend to hurry to the paddock to see what promised to be an exciting finish. "The races," said he, "do not interest me in the least. I come here to look at a show of cars that puts a dozen Olympias into the background. By wandering round casually and looking at the new things I have collected any amount of information and ideas for my new car, and there are ever so many that I shan't even have time to look at."

Probably very few people share this particular point of view, nor would we wish in the least to suggest that one should neglect the programme of events, but the fact remains incontrovertible, that each Brooklands meeting does provide the most up-to-date and interesting collection of cars possible to imagine. Many of them, of course, belong to the heads of the trade,

and these are doubly worth inspection. We mention the point because if Olympia is worth a shilling, Brooklands is surely cheap at the half-sovereign it costs to roam at your will (members' hill excluded).

The Whitsun meeting was to have been made especially interesting by the inclusion of a Benzole Handicap, carrying a first prize of one hundred pounds and a cup, presented by the R.A.C. Owing to the weather this event was not run off, but it had its effect, none the less, and that in a rather disagreeable and quite unexpected manner. For the first time in the history of the trade one heard it suggested that there had been "pulling." Since starters in the Benzole Handicap would be rehandicapped in accordance with their performances in previous races, the incentive was obviously present. Whether any driver was venal, or unsportsmanlike enough to fall a victim to the temptation, it is not for the writer to express an opinion, but the cold fact is that several *habitués* of the track had no hesitation in affirming it. It would be ten thousand pities if there were any grounds for such suggestions, as hitherto motor car racing has, in England at all events, stood almost by itself as a thoroughly straightforward sport; one hopes, therefore, that there will never arise another occasion for such innuendoes to be made; nobody wants to have an inquiry held after every other meeting as to the driving of some unfortunate or other.

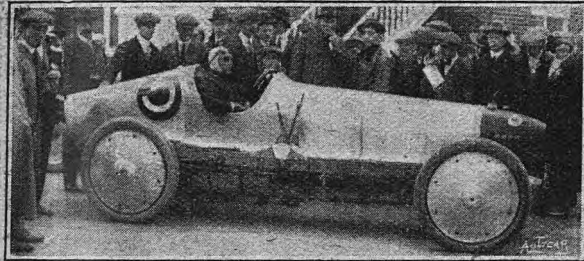
And now for two small points of criticism. *The Autocar* has made several from time to time in the past, and has noted with great gratification that they have received the attention of the authorities. No. 1 is that all bores and strokes and cubic capacities of competing cars should, in the programme, be expressed in the same units. It is quite absurd to find one car dimensioned in millimetres and another in inches, for few of us make a habit of carrying slide rules or conversion tables about with us. Besides, to use inches in one case only is quite to negative the utility of the information given by the engine dimensions.

Point No. 2 is in connection with the numbering of the cars. With the present big fields of machines that



The start of the 100 m.p.h. Long Handicap.

ook very much alike, numbers which are unreadable at more than 150 yards distance are worse than useless because merely confusing. Why not dispense with the gaiety that characterises the garb of the driver (often completely hidden except for his head) and daub the bonnet with colours. Counting in black and white one has, with the primaries, five easily distinguishable



Mr. R. S. Witchell on the 18.8 h.p. Straker-Squire, winner of the tenth 100 m.p.h. Long Handicap.

colours, giving ten different combinations in two at a time. Here are, therefore, fifteen clear ways of painting the bonnets, and if more are wanted what is more simple than getting another ten by using, say, vertical stripes (broad, of course), instead of horizontal stripes, and another ten by diagonals. This is admittedly a most tentative suggestion, but almost anything would be better than the present system, which to any but the knowing eye robs the racing of much of its interest.

First Race.

THE WHITSUN PRIVATE COMPETITORS' HANDICAP. Distance, 5½ miles. Starters:

	Bore and stroke.	c.c.	Start. m. s.
Paul Mayer (59.6 F.I.A.T.) ...	155×160	12,076	scr.
C. V. Stewart (30.1 Sunbeam, 6-cyl.) ...	90×160	6,107	scr.
R. R. Shersby-Harvie (30.0 Rolland-Pilain) ...	110×165	6,272	scr.
O. D. Pollak (17.9 S.C.A.R.) ...	85×140	3,178	0 44
McL. N. Staigt (17.9 S.C.A.R.) ...	85×140	3,178	0 44
Hon. Ralph Beckett (23.8 Grégoire, 6-cyl.) ...	80×120	3,619	0 44
G. B. S. McBain (15.9 Delage) ...	80×149	2,996	1 4
Neville Hardy (17.9 Vauxhall) ...	85×102	2,315	1 20
G. N. Cadbury (18.8 Straker-Squire) ...	87×120	2,853	1 26
Donald Cohen (15.9 Grégoire) ...	80×160	3,217	1 40

This was an absolute gift for Cadbury's Straker-Squire, but in justice to the handicappers it must be pointed out that they fixed its start under the impression it was a standard car, whereas it had actually got a racing camshaft. No one ever looked like catching it up, and it won by a length and a half of the straight. The Rolland-Pilain, which finished third, travelled exceedingly well, and gives promise of doing great things. Result:

1. Mr. Cadbury's Straker Squire.
 2. Mr. O. D. Pollak's S.C.A.R.
 3. Mr. Shersby-Harvie's Rolland-Pilain.
- Speed, 66½ m.p.h.

Second Race.

A MOTOR CYCLE HANDICAP.—See *The Motor Cycle*.

Third Race.

THE ELEVENTH 100 M.P.H. SHORT HANDICAP. Distance, about 5½ miles. Starters:

	Bore and stroke.	c.c.	Start. m. s.
P. C. Kidner (24.0 Vauxhall) ...	3¼×5.9	278*	scr.
Eric Loder (59.6 Benz) ...	155×200	15,095	0 6
Paul Mayer (59.6 F.I.A.T.) ...	155×160	12,076	0 26
L. R. L. Squire (Straker-Squire) ...	87×120	2,853	0 26
R. Robertson-Shersby-Harvie (30.0 Rolland-Pilain) ...	110×165	6,272	0 26
C. A. Bird (15.9 Sunbeam) ...	80×149	2,996	0 26
Gordon Watney (48.6 Mercedes) ...	140×150	9,237	0 32
A. S. Henderson (52.1 Isotta-Fraschini) ...	145×130	8,586	0 40
Percy E. Lambert (15.9 Singer) ...	80×149	2,996	0 40

N. S. Hind (35.7 Berliet) ...	120×140	6,334	0 50
G. T. Cain (15.7 Calthorpe) ...	79½×150	2,978	1 10
H. E. Mills (22.4 R.M.C.) ...	95×114	3,232	1 10

This was a most exciting event, culminating in a wonderful finish—quite one of the best that has ever been seen at the track. Even from the coign of vantage—the eminence, may we say?—of the press box it was almost impossible to say which car was first under the line. Up the finishing straight the 24 h.p. Vauxhall came along at an astonishing pace, and another six feet of distance would have reversed the result. The big Benz failed signally to do itself justice, and, what with belching black smoke from its exhaust, never seriously got going. The Isotta also gave up on the first lap. The Singer led the field practically from the start, soon overhauling the long markers. The Vauxhall was said to have lapped at 96 m.p.h. Result:

1. Mr. Percy Lambert's Singer.
 2. Mr. Kidner's Vauxhall.
 3. Mr. Squire's Straker-Squire.
- * Speed 81 m.p.h.

Fourth Race.

A MOTOR CYCLE HANDICAP.—See *The Motor Cycle*.

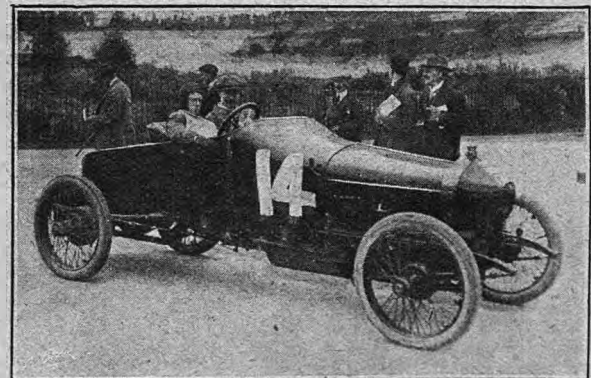
Fifth Race.

THE TENTH 100 M.P.H. LONG HANDICAP. Distance, about 8½ miles. Starters:

	Bore and stroke	c.c.	Start. m. s.
P. C. Kidner (24.0 Vauxhall) ...	3¼×5.9	278*	scr.
C. R. Engley (89.5 F.I.A.T.) ...	190×185	20,981	scr.
Eric Loder (59.6 Benz) ...	155×200	15,095	0 9
M. Campbell (59.6 Darracq) ...	155×140	10,567	0 27
L. R. L. Squire (18.8 Straker-Squire) ...	87×120	2,853	0 39
R. Robertson-Shersby-Harvie (30.0 Rolland-Pilain) ...	110×165	6,272	0 39
C. A. Bird (15.9 Sunbeam) ...	80×149	2,996	0 39
C. V. Stewart (30.1 Sunbeam, 6-cyl.) ...	90×160	6,107	0 39
Gordon Watney (48.6 Mercedes) ...	140×150	9,237	0 48
W. R. McBain (52.9 Lorraine-Dietrich) ...	146×180	12,054	0 48
Percy Lambert (15.9 Singer) ...	80×149	2,996	1 0
L. Coatalen (15.9 Sunbeam) ...	80×120	2,413	1 15
N. S. Hind (35.7 Berliet) ...	120×140	6,334	1 15
H. E. Mills (22.4 R.M.C.) ...	95×114	3,232	1 45

*Cubic inches.

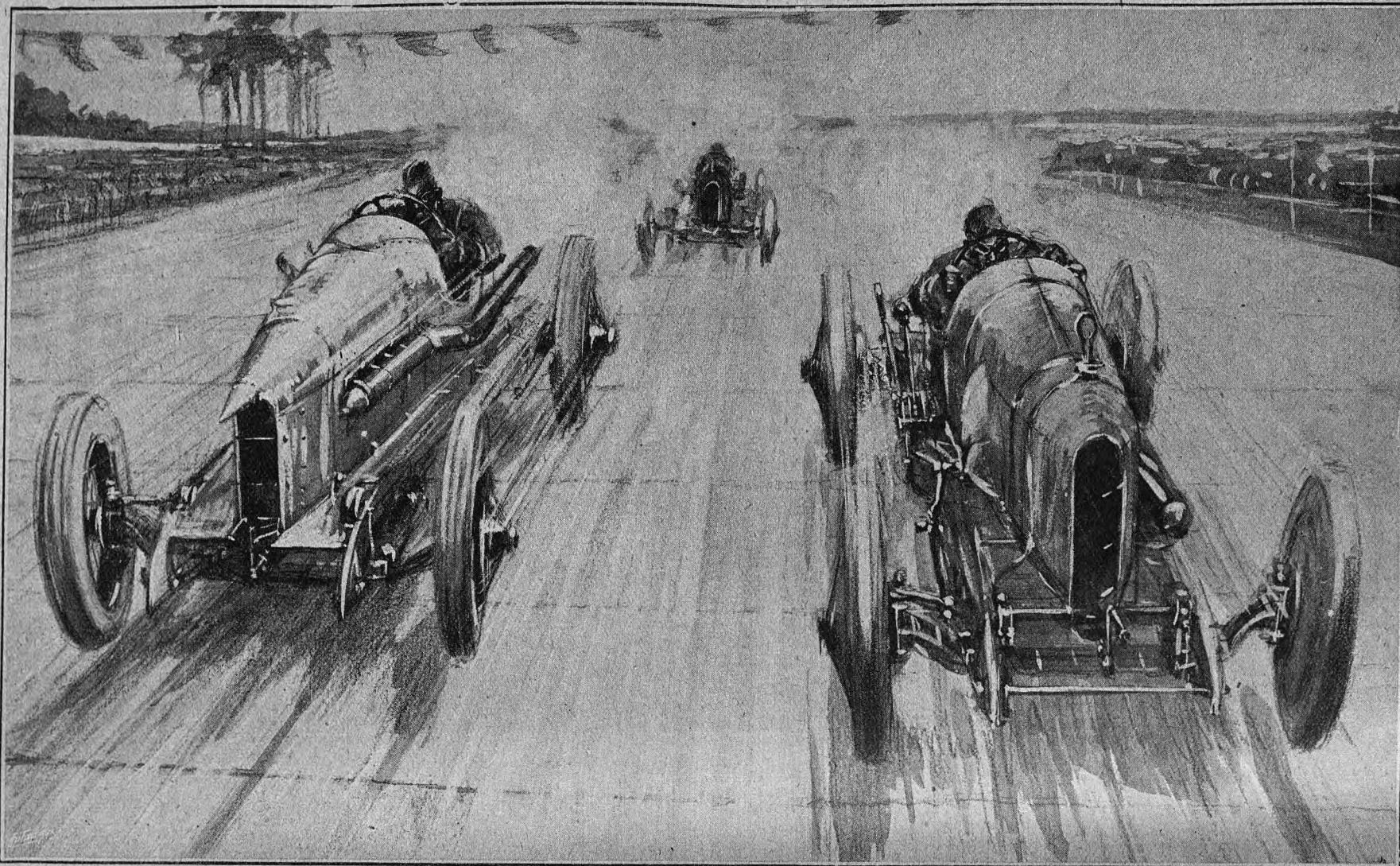
Amongst the most interesting cars in this event was the new short stroke Sunbeam, which ran exceedingly well and obtained a place, appearing to be almost, if not quite, as fast as its long stroke stable companion, having an exactly similar chassis to the Grand Prix type. The 89.5 h.p. F.I.A.T. is the famous old "Mephistopheles," which was brought over to England to beat Newton's Napier. It



Mr. G. N. Cadbury, winner of the Whitsun Private Competitors' Handicap, on his 18.8 h.p. Straker-Squire.

betrayed a great disliking to start, and had to be ignominiously pushed before it could be got going. The Benz was again disappointing, the Rolland-Pilain much slower than before, whilst the R.M.C. dropped out at the end of the first lap. On taking the fork for the second time Coatalen nearly forgot himself, and just managed to turn out of the straight in time. The finish was again excellent,

At the Brooklands Whitsun Meeting.



A CLOSE FINISH IN THE 100 M.P.H. SHORT HANDICAP. Mr. Percy Lambert driving a 1912 Grand Prix Singer (80 x 149 mm.), with 40 secs. start, just winning from Mr. A. J. Hancock on the scratch car, Mr. P. C. Kidner's 24 h.p. Vauxhall (98.5 x 150 mm.), an entirely new model. Mr. L. R. L. Squire's 18.8 Straker-Squire (26 secs. start) was only a few yards behind.

Lambert being just pipped on the post after making and holding a considerable lead. Result:

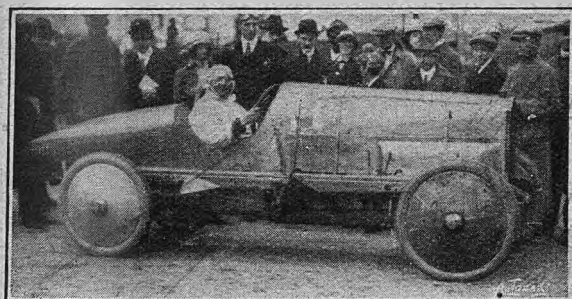
1. Mr. Squire's Straker-Squire.
 2. Mr. Lambert's Singer.
 3. Mr. Coatalen's Sunbeam.
- Speed, 82½ m.p.h.

Sixth Race.

THE NINTH 70 M.P.H. LONG HANDICAP. Distance, 8½ m.p.h. Starters:

	Bore and stroke	c.c.	Start. m. s.
O. D. Pollak (17.9 S.C.A.R.) ...	85×140	3,178	scr.
K. Yano (15.9 Hispano-Suiza) ...	80×180	3,619	scr.
McL. N. Staigrt (17.9 S.C.A.R.) ...	85×140	3,178	scr.
W. Turner Smith (15.9 Stoewer) ...	80×120	2,413	scr.
E. Herington (15.9 Ariel) ...	80×150	3,016	scr.
Hon. R. Beckett (23.8 Grégoire, 6-cyl.) ...	80×120	3,619	s.c.r.
S. N. Beattie (17.9 S.C.A.R.) ...	85×140	3,178	scr.
W. M. Dickson (20.1 Vauxhall) ...	90×120	3,054	scr.
R. R. Smith (15.9 Armstrong-Whitworth) ...	80×135	2,714	scr.
G. N. Cadbury (18.8 Straker-Squire) ...	87×120	2,853	scr.
W. G. Tuck (11.8 Humber) ...	69×130	1,944	0 39
W. O. Bentley (12.1 D.F.P.) ...	70×130	2,001	0 39
W. Turner Smith (13.9 Stoewer) ...	75×89	1,929	0 51
S. G. Cummings (13.9 Cummikar) ...	75×150	2,651	1 30
H. J. Poole (10.4 Majola) ...	65×100	1,527	2 15
R. W. A. Brewer (8.9 Pilot) ...	60×110	1,244	2 15
Neville Hardy (8.9 Morris-Oxford) ...	60×90	1,018	2 15
T. B. Andre (8.6 Marlborough) ...	59×100	1,093	2 51

Compared with the previous races this event was very poor sport, as Tuck's Humber made light of its work and never



Mr. W. G. Tuck on the 11.8 h.p. Humber, which was first in the 70 m.p.h. Long Handicap, and second in the 70 m.p.h. Short Handicap, being put back to scratch in the latter event.

stood a chance of doing anything else but win. As it was, it crossed the line with hundreds of yards to spare and at little more than half throttle. Cadbury's Straker-Squire was set back to scratch from 1m. 3s. The "little fellows," namely, the Pilot, Morris-Oxford, and Marlborough were rather disappointing.

1. Mr. Tuck's Humber.
2. Mr. Pollak's S.C.A.R.
3. Mr. Cummings's Cummikar.

Speed, 67¾ m.p.h.

Seventh Race.

THE FIRST CYCLE CAR HANDICAP. Distance, 5½ miles.

	Bore and stroke.	c.c.	Time.
Fraser Nash (G.N., twin) ...	84×98	1,086	scr.
C. M. Whitehead (G.N., twin) ...	84×98	1,086	scr.
J. C. Humphries (Arden, twin) ...	85×85	965	18s.
H. Boissy (Baby Peugeot, 4-cyl.) ...	55×90	855	23s.
J. Buckingham (Chota, single) ...	89×120	747	28s.
J. V. Carden (Carden, single) ...	85×85	482	46s.

What ought to have proved a very interesting race was decidedly disappointing. The Carden, which is started à la motor cycle with a "run and jump in," and is a weird little projectile, was refractory in the paddock, and sacrificed all its start. The G.N.'s, one a regular miniature Watney-Mercedès with disc wheels and so forth, had no serious difficulty in getting through the field, and, with the exception of the Peugeot, seemed the sweetest running.

1. Mr. Nash's G.N.
 2. Mr. Whitehead's G.N.
 3. Mr. Buckingham's Chota.
- Speed, 42¼ m.p.h.

Eighth Race.

The Whitsun Sprint Race was abandoned, the track having by this time become very wet.

Ninth Race.

THE ELEVENTH 70 M.P.H. SHORT HANDICAP. Distance, 3 miles. Starters:

	Bore and stroke.	c.c.	Start. m. s.
O. D. Pollak (17.9 S.C.A.R.) ...	85×140	3,178	scr.
K. Yano (15.9 Hispano-Suiza) ...	80×180	3,619	scr.
McL. N. Staigrt (17.9 S.C.A.R.) ...	85×140	3,178	scr.
W. M. Dickson (20.1 Vauxhall) ...	90×120	3,054	scr.
S. N. Beattie (17.9 S.C.A.R.) ...	85×140	3,178	scr.
C. L. E. Geach (16.7 Sava) ...	82×140	2,957	scr.
W. G. Tuck (11.8 Humber) ...	69×130	1,944	scr.
G. N. Cadbury (18.8 Straker-Squire) ...	87×120	2,853	scr.
W. O. Bentley (12.1 D.F.P.) ...	70×130	2,001	0 13
W. Turner Smith (13.9 Stoewer) ...	75×89	1,929	0 17
H. E. S. Huth (22.4 Ford) ...	95×102	2,996	0 17
Donald Cohen (15.9 Grégoire) ...	80×160	3,217	0 28
S. G. Cummings (13.9 Cummikar) ...	75×150	2,651	0 30
R. W. A. Brewer (8.9 Pilot) ...	60×110	1,244	0 45
Neville Hardy (8.9 Morris-Oxford) ...	60×90	1,018	0 45
T. B. Andre (8.6 Marlborough) ...	59×100	1,093	1 0

This, as usual, was a very lively affair, but suffered by having too many competitors, whom it was next to impossible to distinguish. Tuck's Humber, having been penalised thirteen seconds and set back to scratch, made a fine show of speed and put up a wonderful fight with Bentley's D.F.P. After crossing the line it performed the hair-raising evolution of turning completely round twice under the shelter of the big banking above the railway straight, finally heading gravely enough towards the desired direction. At one time it appeared possible that it might involve itself with other cars—of which there were a great many coming along—but, fortunately, nobody was any the worse. The Humber and the D.F.P. were practically dead heaters. Speed 57¼ m.p.h.

1. Mr. S. G. Cummings's Cummikar.
2. Mr. Tuck's Humber.
3. Mr. Bentley's D.F.P.

After this race the meeting was abandoned, but the flying handicap was performed in magnificent style and under very bad conditions of wind and rain by Messrs. Hawker and Gordon Bell.

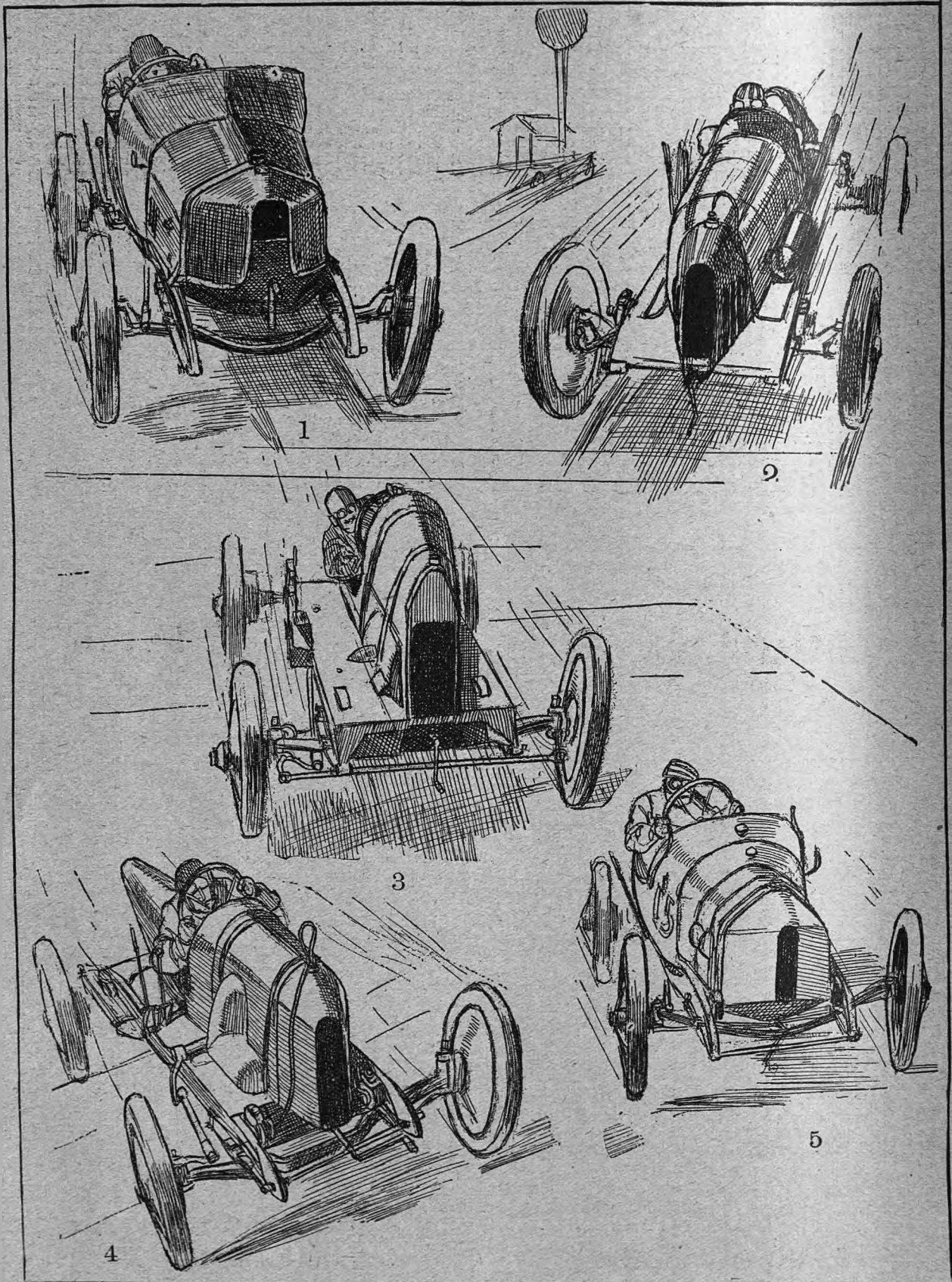
Notes and Comments.

It certainly has by now been accepted by the majority of automobile engineers that the splendid position of the British motor industry is largely due to the possession of the finest racing track in the world. When, however, doubters who have no experience of Brooklands, press for details of improvements carried out there, it is often none too easy to reply convincingly and tersely, because Brooklands teaches care for every petty detail rather than the badness of one feature or the virtue of some other portion of a chassis.

One of the truest proverbs in our language is the oldest—"If at first you don't succeed, try, try, try, again," and the technical history of the track is

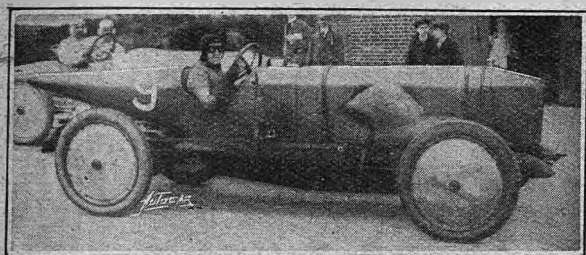
summed up in that sentiment. Thus constantly are found cases where cars driving 40 m.p.h. at Easter can accomplish 60 at Whitsuntide. Taking the case of a small car to show how it is that Brooklands work has a really beneficial effect on the touring model, it is usual to find that such things as freeing the hubs, caring for the alignment of all shafts, seeing that the brakes free themselves completely, and altering the springs to do away with "bounce" may add 10 m.p.h. without anything done to the engine. And this, to the ordinary road traveller, means—when the knowledge gained is applied to the touring vehicle—a certainty of more miles to less petrol and greater hill-climbing powers. Firstly, the track shows speed,

Winners at Brooklands on Monday Last.



(1) Mr. G. N. Cadbury's touring Straker-Squire, winner of the Whitsun Private Competitors' Handicap. (2) The racing Straker-Squire, driven by Mr. R. S. Witchell into first place in the 100 m.p.h. Long Handicap. (3) Mr. Tuck's 11.8 h.p. Humber, winner of the 70 m.p.h. Long Handicap. (4) Mr. Percy Lambert's Grand Prix Singer, successful in the 100 m.p.h. Short Handicap. (5) Mr. S. Cummings's Cumikar, first in the 70 m.p.h. Short Handicap.

and speed shows efficiency, while efficiency means satisfaction to the user. Take the case of the 11.8 h.p. Humber at the Whitsun meeting. Here we have a car with an engine only 69 mm. \times 130 mm. bore and stroke, yet capable of lapping at 70 m.p.h. easily.



Mr. Percy Lambert on the 15.9 h.p. Singer (80 \times 149 mm.), winner of the 100 m.p.h. Short Handicap.

Taking the wind resistance as gauged by eye alone, this means at least 25 h.p. without any consideration of transmission loss, so this latter must have been reduced to something extremely small. The new Vauxhall, 98.5 \times 150 mm., really is little less extraordinary in that it can do a lap at 103 m.p.h. from a standing start; but one is becoming accustomed to miracles with engines of the three, four, and five litres capacities. Cadbury's Straker-Squire again is an example of marvellous efficiency, and so are the racing Sunbeams; but the way in which the efficiency of the cars is obtained by detail rather than by special fittings is made plain from the fact that an examination of each chassis disclosed no peculiarity whatsoever, save perhaps a special carburetter, and, of course, all possible dodges for cutting down air resistance.

It is unfortunate that rain spoiled the completion of last Monday's programme, because it so greatly limited the field of observation of form. Especially is the Sprint Race to be regretted, in that each car is usually doing its absolute best, which is often not true of early races in a programme, because competitors have a natural inclination to keep a bit in hand for subsequent events of the day, and do not wish to push their cars to their limit at the start.

Rather an interesting chassis, which probably lost a fine opportunity by the abandonment of the Sprint, was Mr. Coatalen's 80 \times 120 mm. Sunbeam, since this has an old "short" stroke engine to which all the knowledge gained in the tuning up of the 80 \times 149 three-litre cars has been applied, and it is said to be able to lap at 86 m.p.h., the extra 29 mm. stroke on the larger chassis thus being seen to account for about 9 or 10 m.p.h. We understand, however, there is no likelihood of the 80 \times 120 mm. model being put on the market.

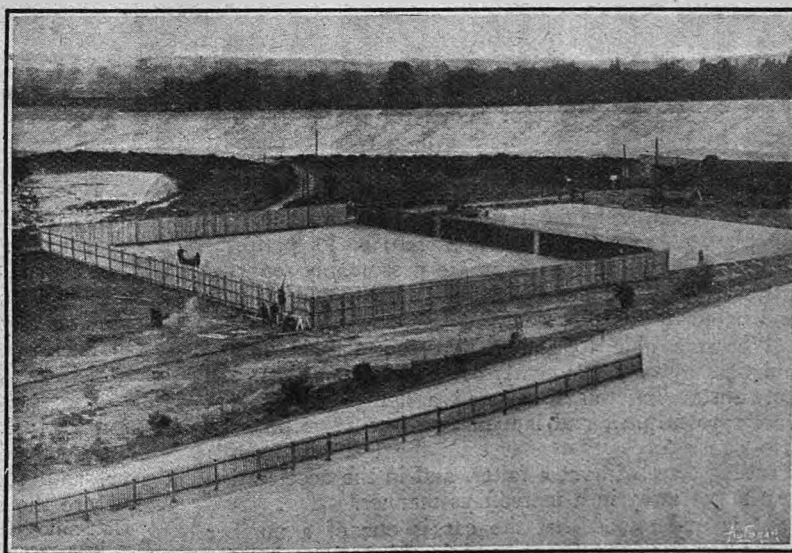
The two big 90 h.p. F.I.A.T.'s were disappointing, because, although they are far from new, high speeds have been attained by them—more, perhaps, from brute force than from internal finesse. Mr. Mayer's car, though it hardly looked like winning, put up a good lap in the first race, but the half compress-

ion screwed itself into operation on the second round, reducing the pace to a crawl of 40 m.p.h. or thereabouts.

Studying the cars at the last two meetings, it seems that the chief difference from last season is that the majority, rather than the minority, now recognise the benefit to be obtained from really well made streamline bodywork. There are, too, more well warmed carburetters, and much more attention is being given to springing. Quite a short time ago it was exceptional to find a car holding the cement steadily at over 60 m.p.h., but now the exception is the bouncing chassis. There were, by the way, one or two very bad "exceptions" of this kind on Monday, so bad, in fact, that one wonders whether the track authorities might not fittingly exercise some authority to prevent the entrance of obviously unsafe vehicles. A certain American chassis, which has been coaxed by its skilful owner to do half as much again as its designer intended, is so bad that it appears to walk with legs rather than move on wheels, and it must be kept on the track purely by the driver's skill.

The next meeting, on June 21st, ought to be one of the best ever held from a viewpoint of technical interest, since the giants of speed missing from the Easter programme have now come out and made their *début* for this season. It seems probable that a period of record and re-record is about to commence, with Talbot, Vauxhall and perhaps Sunbeam as chief operators; though bad for the handicaps, this is good for racing, because it means close finishes between the really fast cars, and who cares who wins if there be a hotly contested duel down the straight?

The dangers attendant on using petrol as a cleansing agent without taking precautions have been frequently illustrated with more or less serious results. A short time ago in the North of England two men lost their lives through petrol fumes igniting from some woollen materials passing through wooden rollers. Quite recently an Irish chauffeur lost his life by carelessness. He cleaned his hands with petrol, and without drying them struck a match, with the result that he was so terribly burned that he subsequently succumbed to his injuries.



A view of the six new tennis courts, near the paddock, which are now almost ready for play at Brooklands.

Attempts upon Records.

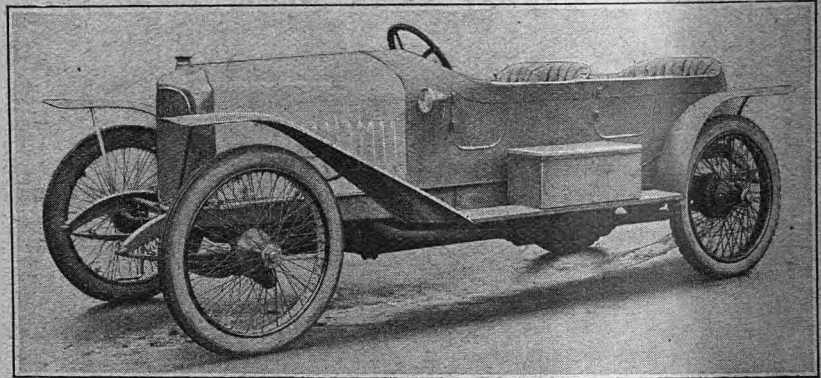
ON Saturday last week an attempt was made by Mr. Percy Lambert on the 25 h.p. Talbot to recover the hour and other records recently acquired by the Peugeot. Although the weather was perfect as far as the spectators were concerned, the high wind which was blowing was against any record-breaking attempts from the outset. Nevertheless the Talbot Co. decided to start, and at eleven o'clock Mr. Percy Lambert started off for the short records before a very large crowd, mostly assembled at the home end of the finishing straight. It will be remembered that when the last record was put up by this car Lambert kept much lower on the banking than was expected, but on Saturday the car swung round the curves in a position little lower than that adopted by Goux, and accordingly struck all those holes which have accumulated at the top of the banking despite the efforts of the track authorities.

A peculiar characteristic of the Talbot engine is the exceedingly irregular exhaust, the note of which varies in a manner suggesting that it is missing fire very badly, this being particularly noticeable as the car shrieked by the spectators below the members' bridge. As the car flashed out from under the bridge it gave two great ounces which threw Lambert off his seat, swerved a bit, and then shot down into the railway straight, leaving a long trail of light-coloured smoke till it could be seen swinging round the top of the far banking.

Unfortunately, the wind not only prevented the car attaining the required speed, but, acting upon the discs on the front wheels, it rendered the steering decidedly tricky, especially when coming out from behind the members' hill. This became so bad that, after the failure of the attempt on the short record, the car was pulled up in the aviation ground bay and

the discs were removed when the wheels were changed and the car was inspected prior to the attempt on the hour record.

Again, however, misfortune intervened, as something happened to one of the cylinders after a few laps had been covered, and the attempt was abandoned. Without dismantling the engine it was impossible to say what part had given way, but Lambert was of the opinion that a cylinder crown had been blown out. So a gang of men pushed the car up an



Mr. J. Higginson's new Vauxhall which made fastest time of the day at the Lancashire A.C. hill-climb at Waddington Fells. The engine has four cylinders of 98.5 x 150 mm. bore and stroke, and it will be seen that the radiator is of a new pattern for Vauxhall cars.

inclined plane constructed of planks into the Talbot lorry which had brought down tyres and spare parts, and it was returned to the works to be prepared for a more favourable opportunity. The failure of the attempt was the more unfortunate because the paddock was crowded with cars which were "tuning" for the Whitsun meeting, and which were unable to get any practice until the track was reopened after the Talbot had finished running. As a consequence there was a certain amount of discontent, and the finishing straight was crowded with cars doing short sprints to the fork and back.

On the Track.

ON Thursday last week a most interesting test was conducted by Major Lloyd for the War Office authorities. A 20-25 h.p. Crossley chassis, furnished with a four-cylinder engine (102 x 140 mm.), made what appeared to be a splendid showing as regards speed, weight carrying, acceleration, and hill-climbing. The actual data in regard to its performances are not available: they are presumably reported only to the War Office direct, but much could be seen and noted by those present.

We were able to gather that the actual running weight of the car was nearly 6,000 lbs. (53 cwt.), and notwithstanding this it covered a flying half mile at nearly 50 m.p.h., and lapped at about 38 m.p.h. for two consecutive laps. It took the test hill from a standing start without a falter, and in the acceleration test it got away in a marvellous manner.

It is understood that the car is one of a number made for the War Office, and is chiefly intended for the transport of aeroplanes. A special feature consists in the twin Rudge-Whitworth back wheels made

specially for military purposes, and shod with Dunlop tyres (920 x 120 mm.)

The Benzole Race, which, like the Sprint Race, had to be abandoned owing to the wet state of the Track on Monday, will, subject to the approval of the donors of the prizes, be run off under similar conditions at the next meeting on Saturday, 21st June. Any entrant will, of course, have the option of withdrawing should he wish to do so, but it is expected that the field will be substantially the same as for Whit-Monday.

On Tuesday the 16 rating (80 x 120 mm.) Sunbeam car which was entered for the Benzole Race, successfully attempted certain records in Class C, using benzole as fuel.

In the case of the half-mile Mr. T. Hearn was the driver, and for the ten laps Mr. Coatalen drove. Below are the actual figures.

Half-mile (flying start) ...	20.70s. = 86.96 m.p.h.
Previous record: Humber (75 x 130),	23.81s. = 75.60 m.p.h.
Ten laps (standing start) 20m.	6.5s. = 82.55 m.p.h.
Previous record: Crossley (79.4 x 123.5),	1,374.62s. = 72.46 m.p.h.

The Targa Florio.

Success of an Italian Car in the 1,000 Kilometre Sicilian Race.

THOSE who have no knowledge of the circuit over which the 1,000 kilometre Sicilian race is run for the Targa Florio will be interested to know that it means driving a racing car over abominable unguarded roads, encountering carts drawn by mules and horses, and drivers who are not at all anxious to get out of the way. Despite these drawbacks to motor racing, thirty-five competitors left Palermo on the morning of the 11th inst., sixteen cars completed the first section, and ten completed the course inside twenty-four hours without serious accident. Nazzaro, driving a car of his own design and construction, won the event in 19h. 28m. 4cs. There is no doubt that Nazzaro's previous experience of the course had a great deal to do with his success; he drove a well-judged race. The runner-up, Marsaglia, an amateur driver of an Aquila, was at one time during the race, between Palermo and Girgenti, 30m. in front of Nazzaro. He arrived at Girgenti at midnight with one of his head lights broken and the other burning badly. He knew that Nazzaro was close behind, and drove his hardest, and although Nazzaro would in all probability have won in any case, the difference in time at the finish would have been less had not Marsaglia repeatedly suffered lamp troubles.

It is worthy of notice that Berra, who drove a big touring eight-cylinder De Dion, was fourth, although competing against specially built racing cars. The control at Girgenti was illuminated during the night by acetylene lamps.

The first to arrive at this point was Marsaglia, who had driven a distance of 720 kilometres from the start. The arrangement of the restart from Girgenti was as follows: The first to arrive restarted at midnight, the others with the same interval of time behind the first man as on their arrival, so that the first being sent away at midnight, the last did not get away until 7 a.m.

The order and times at the end of the first stage:

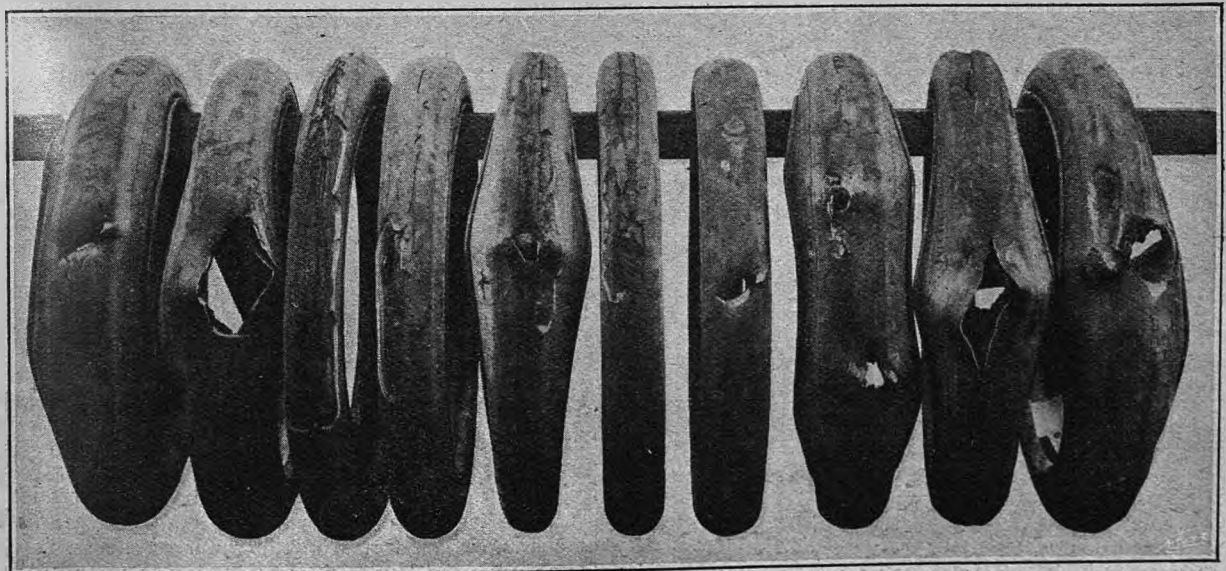
	h. m. s.
1. Marsaglia (Aquila)	13 4 13
2. Nazzaro (Nazarro)	13 34 44
3. Bordino (Lancia)	13 56 52
4. Giordano (F.I.A.T.)	15 3 34
5. Gloria (de Vecchi)	15 14 9
6. Stabile (Minerva)	15 16 37
7. Berra (De Dion Bouton)	15 22 19
8. Negri (Itala)	15 31 51
9. Sivocci (de Vecchi)	15 38 10
10. Lopez (Overland)	15 52.39
11. Diana (Isotta Fraschini)	16 15 57
12. Turner (Renault)	16 17 21
13. Conti (Isotta Fraschini)	17 37 8
14. De Romase (F.I.A.T.)	17 42 12
15. De Proserpi (Sigma)	18 27 12
16. Ingelese (Mercedès)	19 9 23

Great enthusiasm was displayed at the finish at Palermo, the cars being driven right through the town to the finishing point. Last year's winner, Snipe, covered the course in 23h. 37m. 19s. Therefore Nazzaro improved on this by 4h. 8m. 39s.

The final result was:

	h. m. s.
1. Nazzaro (Nazzaro)	19 28 40
2. Marsaglia (Aquila)	20 43 49
3. Gloria (de Vecchi)	21 48 4
4. Berra (De Dion Bouton)	22 22 55
5. Giordano (F.I.A.T.)	22 26 4
6. Sivocci (de Vecchi)	22 47 0
7. Lopez (Overland)	23 12 47
8. Bordino (Lancia)	23 43 25
9. Diana (Isotta Fraschini)	23 46 0
10. Stabile (Minerva)	23 59 4
11. Turner (Renault)	24 30 0

The Local Government Board has made an order assigning to the County Council of Kent a second index mark for motor cars in addition to the one already in use, so that cars registered in Kent will in future bear the letters KT, which will be additional to the originally assigned index letter D.



Some of the decrepit covers which were used in the Searle Unburstable tube demonstration (London-Brighton-London) referred to in "The Autocar" last week, photographed immediately after the test.

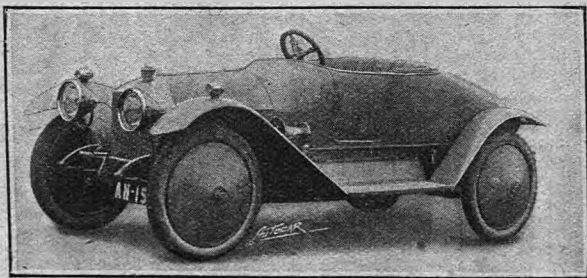
An Australian Reliability Trial.

First Four Places Secured by British Cars in a 570 Miles Inter-State Trial.

THE Australian motoring community has displayed a keen interest in the Inter-State Reliability Trial which has just been run off. It was the first and biggest thing of its kind ever attempted in Australia. Hitherto reliability trials have been of a purely local character, but on the recent occasion the motorists of the two most populous Australian States, Victoria and New South Wales, met in friendly rivalry. It is proposed to make the contest an annual one, the start taking place alternately from Sydney and Melbourne.

The total length of the course was 570 miles, and it presented difficulties undreamt of by the English motorist. For a large proportion of the distance the roads were practically unmade, being mere tracks through the bush, and when they were made the surface was often in a frightful condition. Mountains had to be climbed, rivers forded, bogs crossed, and all this under the extremely severe conditions of a non-stop reliability run.

The trial was spread over four days, the runs varying from 121 to 169 miles, so that there was no need for reckless driving. Speed was a factor which did not enter into the contest. The cars merely had to keep their schedule time, and were penalised for going faster. The result is a remarkable testimony to the reliability of the modern car. Out of twenty-one starters nineteen finished without mishap. Only one car was put out of action through a breakdown, and one had to retire through the illness of its owner. Eight cars scored the maximum number of points for reliability, and of these four were of British make. The first four cars were also British, arranged oddly enough in pairs, two Talbots being first and second, and two Vauxhalls third and fourth. Another British car which scored the maximum number of points was a Crossley, which came in sixth, followed by a Wolseley in the seventh place. The Victorians came off rather badly, as the first ten cars all hailed from New South Wales. A petrol consumption test extending over the entire course, and a hill-climb of a formidable ascent known as the Razorback, also formed part of the competition. The winning car took first place in the hill-climb and petrol consumption test, and thus scored the maximum number of points. All the cars were driven by their owners, and there was a genuine sporting element about the contest, heightened by the presence of a lady competitor, Miss Monk, who drove a Cadillac car.



A racy two-seated body built on an Austro-Daimler chassis for a Cambridge undergraduate by Messrs. Mann, Egerton, and Co., Ltd., of Norwich. The general outline of the design is streamline, and the pointed radiator, domed wings, disc wheels, and whalenose back, give the car an exceedingly racy appearance.

RESULT OF THE CONTEST.

The points scored in the whole contest were :

Competitor and car.	Reliability.	Petrol Consumption.	Hill-climb.	Totals
W. R. Glasson (15.61 Talbot) ...	500	200	200	900
G. F. Hill (15.61 Talbot) ...	494	193	190	878
Les. W. Pye (19.71 Vauxhall) ...	500	188	189	877
Boyd Edkins (19.71 Vauxhall) ...	500	177	183	860
Jules Maillard (19.90 Brasier) ...	500	182	150	832
R. A. Carter (15.41 Crossley) ...	500	126	194	820
J. Lawler (19.88 Wolseley) ...	495	151	162	808
Otto Camphin (21.39 Itala) ...	500	125	150	775
A. V. Turner (33.75 American) ...	498	150	116	764
V. C. Sharp (15.61 Star) ...	480	103	117	750
J. Railton (15.61 Star) ...	438	173	130	741
A. T. Tubbs (18.92 Bianchi) ...	500	90	145	755
J. Coghlan (21.39 Singer) ...	492	119	123	734
R. G. Carey (18.83 Ford) ...	400	150	71	721
R. A. Barrett (21.39 Westcott) ...	492	129	98	719
C. E. Liddell (22.40 Lancia) ...	434	125	158	717
F. R. Crouch (18.83 Metz) ...	500	100	73	673
Miss H. Monk (30.37 Cadillac) ...	415	133	116	664
A. C. G. Sharp (16.33 Empire) ...	424	103	17	644

HILL-CLIMB SCORES.

The following were the points gained in the hill-climb :

Competitors.	Time in secs.	Weight in lbs.	Points scored
W. R. Glasson ...	168	3,696	200
R. A. Carter ...	183	3,878	194
G. F. Hill ...	166	3,486	190
L. W. Pye ...	153	4,018	188
Boyd Edkins ...	146	3,724	183
J. Lawler ...	184	4,172	162
C. E. Liddell ...	144	3,598	158
Jules Maillard ...	192	3,046	150
Otto Camphin ...	186	4,214	150
A. T. Tubbs ...	171	3,290	145
J. Railton ...	234	3,360	130
J. Coghlan ...	204	3,808	123
A. C. G. Sharp ...	184	2,506	117
Miss Monk ...	186	4,677	116
A. V. Turner ...	145	4,067	116
V. C. Sharp ...	282	3,514	113
R. A. Barrett ...	183	4,256	98
F. R. Crouch ...	165	1,624	73
R. G. Carey ...	255	2,408	71

PETROL CONSUMPTION POINTS.

The result of the petrol consumption test was as follows :

Competitors.	Miles per gallon.	Ton mileage.	Points.
W. R. Glasson ...	27.3	45.5	200
G. F. Hill ...	28.2	44.1	193.3
L. W. Pye ...	23.8	42.9	188.8
Jules Maillard ...	22.7	41.4	182
Boyd Edkins ...	24.1	40.4	177
J. Railton ...	26.2	39.5	173
V. C. Sharp ...	22.7	35.8	157
J. Lawler ...	18.4	34.4	151
R. G. Carey ...	31.6	34.2	150
A. V. Turner ...	18.9	34.1	150
Miss Monk ...	14.4	30.2	133
R. A. Barrett ...	15.5	29.5	129
R. A. Carter ...	16.5	28.7	126
O. Camphin ...	15	28.4	125
C. E. Liddell ...	17.7	28.4	125
J. Coghlan ...	15.8	27.1	119
A. C. G. Sharp ...	20.9	23.6	—
F. R. Crouch ...	37.4	22.8	100
A. T. Tubbs ...	13.8	20.5	90

It has been said that the surface water from tar treated roads is responsible for fish being poisoned, but Mr. A. H. Hastie, Starborough, Edenbridge, has thrown a new light on the subject. He suggests that it is not a question of poisoning but of starvation. As a result of close observation he finds that the film or coating which forms on the water as the result of tar prevents the lava of insects coming to maturity on rising to the surface from the depths of the water, so depriving the fish of their customary food.

Leaves from a Sportsman's Notebook.

By J. Fairfax Blakeborough.

Extortionate Charges for Standing Room for Cars.

MENTION has been made in these notes of the somewhat extortionate charges made for the standing room for motors at race meetings. This extortion has this year spread to point to point race fixtures, and farmers have charged from 2s. 6d. to 5s. to owners of cars for allowing their cars to stand for an hour or two just inside a gateway where no possible damage could be done to the field. Occasionally the gate-entrance has become so bad that some drivers would not risk their cars in the deep ruts and through the quagmires. In such cases they have left their cars in by-lanes and field-roads hard-by where they could not possibly be of any inconvenience to anyone. Thus they have saved possible injury to their vehicles and the extortion with which no one complies without a feeling of protest. In one or two cases, however, the police have thought it wise to carry out the letter rather than the spirit of the law, and have brought cases against motorists who have not used the standing grounds provided for cars. There was such a prosecution at Bedale Court a few days ago, when a Middlesbrough motorist was fined 10s. and costs. At point to point meetings we are all present on the course chosen on sufferance. No charge is made; farmers grant permission for the horses to gallop over their land and the crowd to come and watch them, but they penalise only the motorist. I suppose they are quite within their rights in so doing, and one cannot blame them. Not so at regular racing centres, where one is not present on sufferance. That is quite a different matter, and, as has previously been stated here, the time will very soon come when all motor enclosures will be free to those paying for entrance to the paddock at any rate. This is as it should be.

Motoring and Decorum.

I am writing these notes on my way to Thirsk Races. One of my companions is a keen sportsman who usually goes racing by car. I was surprised to see him waiting on the station platform, but he explained the fact by saying he had been unwell for some days and did not then feel that he could stand travelling with the party he had invited some weeks previously to accompany him by car. So he had loaned them the motor and was making the journey by train himself because he thought it would be "quieter than going with that rowdy crew." (Those were the words he used.)

It is axiomatic that many folks are jubilant *en route* for a race meeting, but not always in the same temperament when homeward bound. Much depends on their success or failure to "spot" winners. Still whether they are light or heavy in pocket, I cannot say that I have ever noticed any more rowdyism in race-going motorists than in other classes. Speaking of decorum and

motoring reminds me that a Roman Catholic bishop in the Rhineland has forbidden the clergy in his diocese to ride in motors because he considers it out of keeping with that reserve and demeanour which should belong to the priesthood. I confess I quite fail to follow the bishop in his arguments, even granting a certain amount of levity belonging to Continentals which is inherent. I have always admired the clergy of the Latin obedience in that they were so thoroughly human. Here in England we know many who love a few days' racing, whilst in Ireland not a few of them are straight men across country with hounds, and are respected all the more because they enter into and enjoy the sport of the people amongst whom they live. If the Irish bishops see nothing indecorous in



Mrs. Mitchell Hedges, of Stoke Mandeville, in her 20-40 h.p. light Méallurgique car with Van den Plas body.

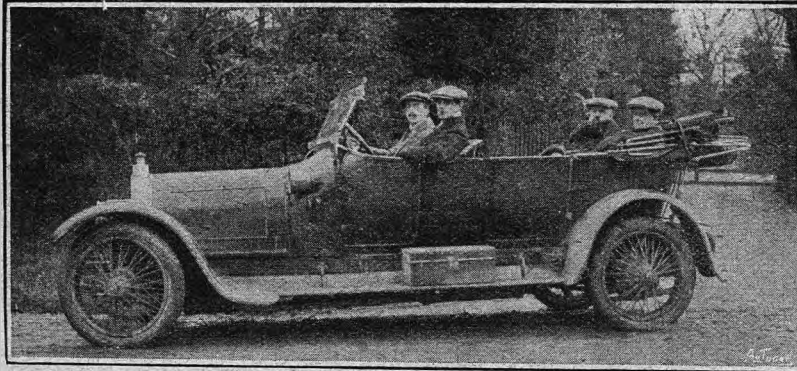
their priests following hounds—and we fully sympathise with them in their latitudinarian views—my lord of the phlegmatic Rhineland is undoubtedly stretching a point and also savouring of the Puritan when he forbids his clergy to travel in motors on the ground that they lose dignity or reduce their sacerdotal ranks by so doing.

I once heard the Archbishop of York say how necessary motors are to a busy bishop, and know that they enter not a little into the economics of his huge diocese; the Bishop of Durham employs a car for his visitations, and a number of other mitred ecclesiastics do likewise. I suppose they would come under the ban of the Rhineland bishop who, so far as his outlook upon this world's affairs is concerned, has not advanced with the times.

The 20 h.p. Germain.

Some of its Principal Characteristics noticed on a Short Trial.

It is sometimes assumed that if a car be provided with an engine of one particular pattern much of its general character is thereby lost for comparison with other cars having motors of a similar kind; but this is certainly not the case with Knight-engined chassis, the different makers who have taken up this design of motor seeming to be able to find different expressions in the way of fittings which have



The 20 h.p. Germain on the road.

an undoubted effect upon the performance. The 20 h.p. Germain is a car of a most desirable size, having a bore and stroke of 90 x 130 mm., that is to say, a capacity of 3,307 cubic centimetres, which means that the engine is well capable of hauling a comfortable body and a load of four or five people. If asked to pick out the most noteworthy characteristic of the car's running, we should say it was the extreme smoothness of the driving effort at moderately high speeds; thus we found, with its full load, the whole of the northern side of Hindhead could be taken at speeds varying from 28 m.p.h. to 40 m.p.h., entirely, of course, on the direct drive. At these speeds the sensation was that of an hydraulic lift, that is to say, a perfectly even steady pressure totally devoid of any suggestion of engine stress. It is impossible to get this same effect from a smaller car, however fast or however easily it may climb hills. The sensation referred to is usually most noticeable with big six-cylinder cars, but some quite large four-cylinder vehicles still do not contrive to possess it. It is no exaggeration to say that the 20 h.p. Germain is only very little inferior to much bigger six-cylinders in this respect. Its smoothness is not obtained by means of exceptionally low gearing either, as the same car with which our test was made easily attained 64 m.p.h. on Brooklands, and at this latter speed no more engine vibration was noticeable than at half the velocity.

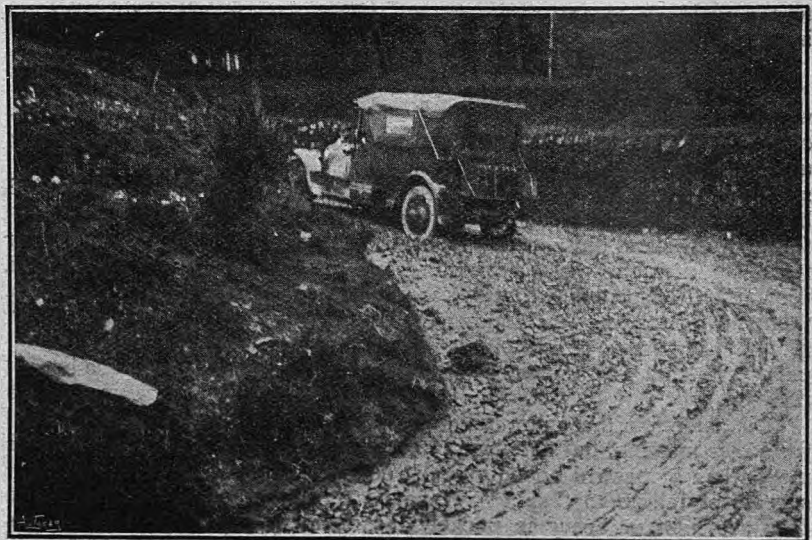
As a trial route the London and Portsmouth Road was chosen, and it was taken principally on the top gear, although the car is not designed for exaggerated direct drive work; thus in traffic it is usually more comfortable to drive on the

third speed if a driver prefer to get the best from his chassis and is not afraid of the operation of gear changing. One or two really steep hills were tried in the neighbourhood of Guildford, and showed that the second speed was a very useful ratio, being eminently adaptable for gradients up to 1 in 7 and 1 in 6. The trial of a guaranteed 1 in 4 gradient was proposed, but owing to a slight mishap with the

foot brake it was decided that considerable difficulty *might* be experienced in the subsequent descent; still, there is no doubt whatever that the car would have tackled the gradient quite easily on the low gear. The carburetter normally employed is the Zenith, and from this we were able to obtain very good acceleration with rather more quietness at the higher engine speeds than is given with other forms of carburetters not infrequently fitted to Knight engines.

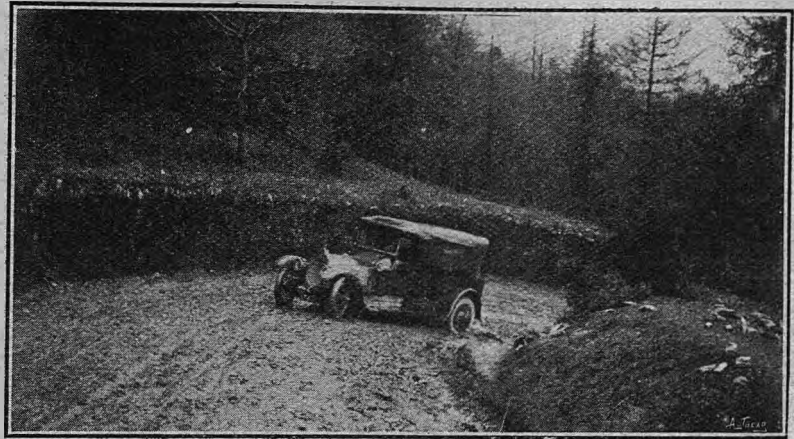
Turning to the other parts of the chassis, a noticeably good feature was the springing, which gave very little roll and at the same time was remarkably easy. The steering, too, was decidedly above the average in ease—in fact, we had only one fault to find with the car as a whole, and that was a decided difficulty in gear changing, though this was apparently due to an error in the adjustment of the clutch stop.

We have already mentioned the fact that there was a little trouble with the foot brake, and this, perhaps, ought to be explained, as it was in no way due to the design of this portion. Immediately previous to our trial the car had been overhauled, and in relining the brake Raybestos of rather too thick a section had been used. The only way to prevent it touching the drum was to slack back the shoes so that the operating links were in a position where they could not be brought into action. On another occasion we were able to try the brake and found it very smooth and powerful. As



The 20 h.p. Germain on Porlock hill, North Devon.

regards our hesitation in descending a steep hill with the side brakes only, this was not due to any lack of power but to a natural dislike to try any gradient of a really severe order without being sure of having an ample reserve of brake power. It will be seen, therefore, that we were practically driving with the side brakes only, and that we were able to do so with comfort proves their capability and power in emergency. Altogether we believe that the 20 h.p. Knight-engined Germain is a car eminently calculated to uphold the reputation of one of the oldest manufacturing firms in the industry.



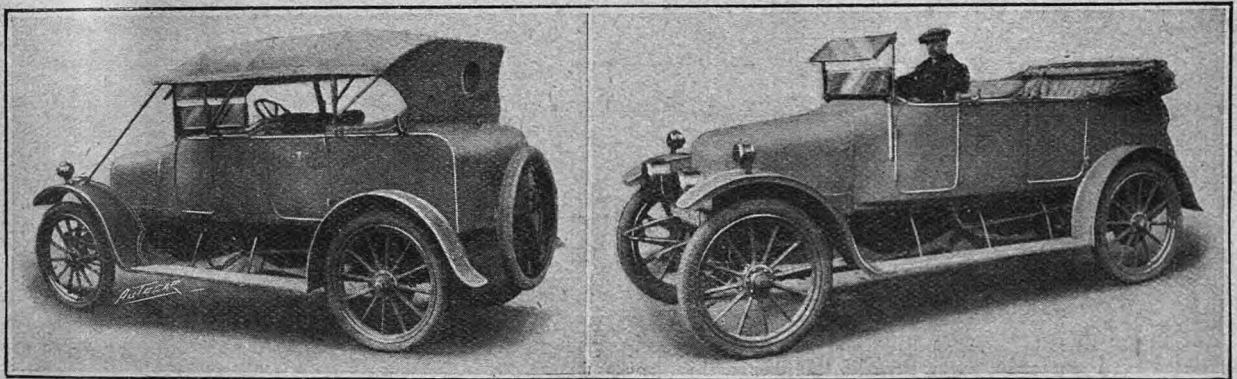
Another view of the 20 h.p. Germain on Porlock Hill.

Carbon Deposit in Cylinders.

IN a recent issue of *Internal Combustion Engineering*, which, it will be remembered, incorporates *The Automobile Engineer*, an interesting letter was published on the above subject. When taking down a three-cylinder air-cooled engine, which had a copper plug in the top of each cylinder, the writer of the letter found that the three copper plugs were practically clean, but that the cylinder heads and pistons were in a carbon encrusted state. He suggested that the cleanliness of the copper plugs pointed to the fact that if the tops of the pistons were copper-plated carbon deposit would not be formed upon them, or, if formed, would be quickly blown out through the exhaust. This was, of course, a perfectly natural assumption, though, we fear, unjustified.

We submitted the letter to an analytical chemist, who is also a practical motorist, and who not only owns and drives his own cars and motor cycles, but has had a wide experience of both exhaust gas analysis and the analysing of engine deposits. His opinion is as follows: "The reason of this phenomenon is that the copper plugs would be at a considerably higher temperature than the main body of the iron cylinder. The conductivity of copper for heat is about six times greater than that of iron, and this means that the plugs would get hotter much quicker and would keep hotter, because of the quickness with which heat could pass through them. Also, the copper plugs would be much thicker than the cylinder, and, there-

fore, would retain more heat and keep hotter also. So that probably all the time the engine was working the copper plugs would be much hotter indeed than the surrounding iron. Under these conditions the carbon deposit would be burnt off the plugs almost as fast as formed, if, indeed, it were ever deposited. The same phenomenon occurs if one takes two pieces of sheet iron and sheet copper the same thickness and size and places them immediately over a luminous gas flame. The iron does not get so hot as the copper, and soot forms and continues to form. The copper, on the other hand, gets red hot very quickly and the soot initially formed soon burns off. I think the same sort of thing occurs at or around the ordinary sparking plug in a cylinder. The sparking plug is very rarely coated with carbon deposit because there is a large bulk of metal which cannot cool quickly enough to allow the deposit to form. Compare again the deposit which I have found often on water-cooled engine exhaust valves, or on those of air-cooled engines which are not worked anywhere up to their limit, with the freedom from deposit that used to obtain on air-cooled motor cycle engines in earlier years. A motor cycle engine of six or seven years ago practically was always running with its exhaust valve red hot, so that no deposit could form. The copper-plating of the piston would do little good, because it would only change the surface and not the body of the metal."



A Stanley steam car with a body built by Messrs. Meace and Co., Clapham, London, S.W. The water tank at the back of the body is built into the panelling and partly under the upholstery, thus admitting low seats. The bonnet, as will be seen, is flush with the body lines, and has a blunt round front.

Millennium Motor Car Jacks.

Four Typical Examples Described.

TREATED by the average motorist as a matter of course, and only to be used as painful necessity arises, it is little wonder that the design and construction of motor car jacks have not received the attention they merit. This inattention may nevertheless be made a basis from which to judge

face of the operating bevel, which in turn is moved by the oblique bevel with the stem of which the operating handle engages. When the jack is extended up to the axle before lifting, the peg is put in the top pillar where convenient, and the screw ring spun down the thread until it engages with the conical surface of the bevel. The weight of the car is sufficient to afford grip between the two surfaces, while the arrangement enables the bevels to be encased, and the screw ring to be free for spinning to afford quick positioning and jacking.

No. 2 jack is a similar type, but has not the inner pillar for double extension. No. 1 is the latest Millennium jack, and is known as the Express, and we must say that it does not belie its name, as we have proved on the occasions on which we have tried it. Its operation is extremely simple, as the only effort required to raise a car is the movement of the hand lever in a water-pump-like manner for a few strokes, the leverages being so arranged that the effort is practically negligible. The lever is then

withdrawn and the car remains raised. To lower the car, the weight of which, by the way, is automatically transferred from the raising pawl to the worm gear at the side, it is only necessary to insert the long lever into one or other of the X-shaped slots in the worm and to turn the worm from left to right. This

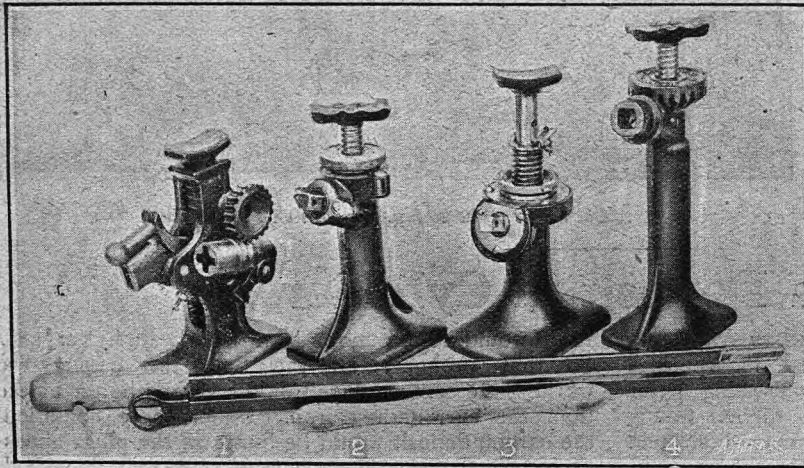


Fig. 1.—Four useful patterns of Millennium jacks.

of the reliability of the average jack, as one seldom hears complaints. A consideration of modern conditions, however, should show how important the matter has now become, and how a proper amount of care should be given to the selection of a jack suitable to its work.

Now that detachable wheels are almost universal, it is a *sine qua non* that a jack should be rigid, with a sufficient area of base and of sufficiently good material to withstand considerable stress. Also it must not be bulky nor heavy for the tool box, and must have a fair mechanical advantage to reduce manual labour when raising the car.

To turn from jacks in general, we purpose reviewing some of the numerous patterns of jacks which are sold under the title "Millennium." The four shown in the accompanying illustration are particularly intended for carrying on the car, but, of course, there are numerous other patterns for garage work. Dealing with them in the reverse order shown in the illustration, No. 4 is built to a simple straightforward design. The centre screw may be lifted bodily up to the axle, carrying the nut with it. This nut, which carries on its under side the bevel teeth which engage the operating bevel, is then spun down the thread until it bears on the top of the pillar and the bevel teeth engage. The jack is then ready for lifting. It should be noted that this jack (as well as No. 2) has peculiarly wide double tops, of which more anon.

Jack No. 3 is of a more elaborate type, having a hollow screwed barrel in which slides a pillar, whereby a double extension may be obtained. This inner pillar is held up to the axle by a cross peg engaging with holes drilled through it. The screwed barrel is held up to the axle by a threaded collar which has its under side formed in the shape of a conical extension. This forms the male portion of a cone clutch, the female portion of which is cut in the upper sur-

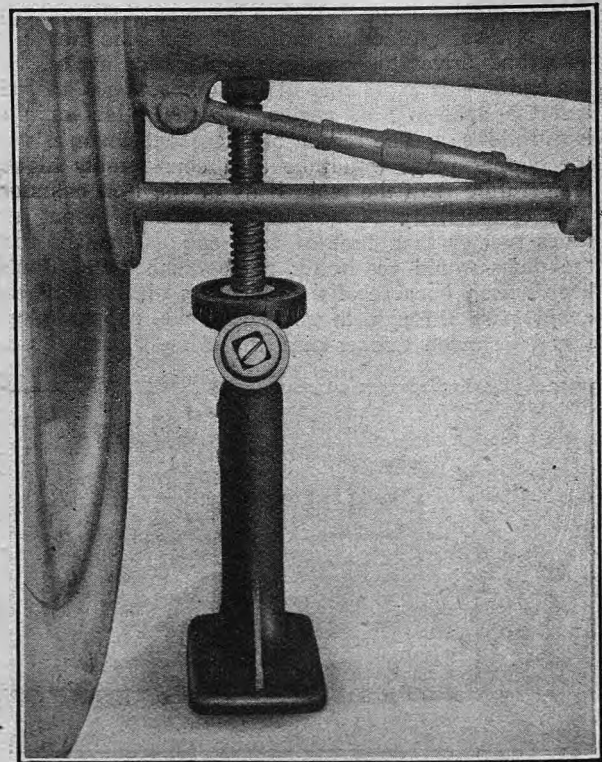
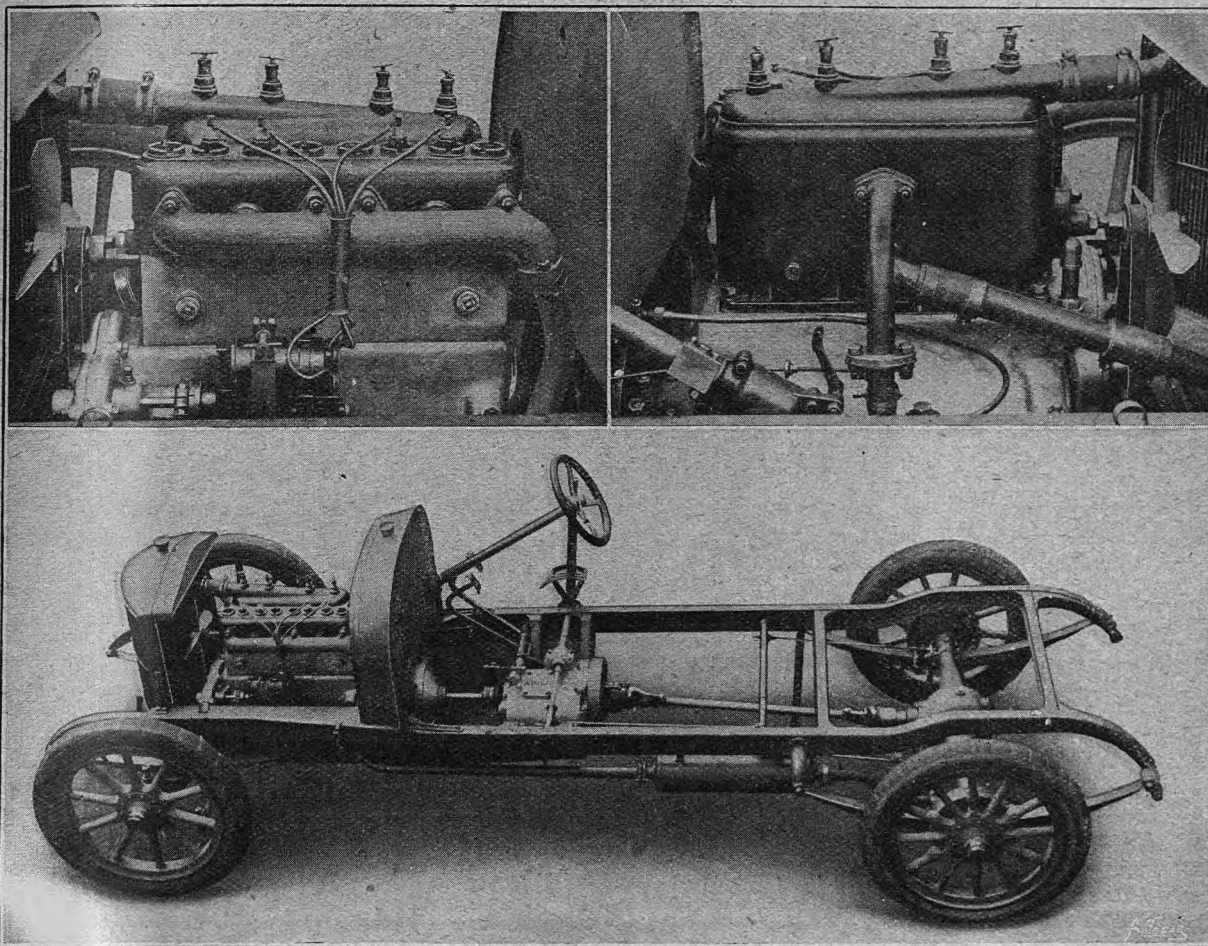


Fig. 2.—The application of the overhung head to an obstructed axle.

motion turns the worm wheel, which carries a gear wheel engaging with a gear rack cut on the vertical lifting pillar whereby the car is held raised. When the tyre touches the ground the lever may be depressed to disengage the worm from the worm wheel and allow the whole jack to shut down automatically, for the worm serves the dual purposes of worm and pawl. It is this worm and pawl gear which clicks when the front lifting pawl is in use for raising, for it should be borne in mind that the front pawl merely carries the load whilst the car is actually moving upwards.

Millenium Motor Car Jacks

Nos. 2 and 4. The necessity for this device arises in the case of cars which have awkwardly placed tie rods on the back axles which effectually prevent the jack from being placed centrally under the axle, with consequent risk of slipping and letting the car drop. The case is more awkward still when the brake gear also interferes, as shown in fig. 2. With the overhung or extended head, however, the depression for engaging the axle is sufficiently far out of centre to enable the jack to clear the obstructing gear and at the same time to allow the jack head to get a



THE NEW 16 H.P. ARIEL. This new model, recently introduced by Ariel Motors, Ltd., 324, Camberwell New Road, London, S.E., has a four-cylinder engine 80 x 150 mm., four speeds, and bevel drive. The engine lubrication is by pump through the hollow crankshaft, while thermo-syphon cooling is adopted with a V front radiator. The petrol tank is neatly embodied in the dash, as seen in the chassis view. The back springs are threequarter elliptics, underslung from the axle casing. The makers guarantee every chassis to run twenty-five miles per gallon of petrol, not to weigh more than 13½ cwt., to run from 4 to 55 m.p.h. on top gear, and to climb the Brooklands test hill, all on standard gears.

The instant the hand brings its downward pressure on the lever the pawl becomes automatically disengaged, as the load is being carried through the medium of the worm and worm wheel, which, of course, are irreversible.

Previously, attention has been drawn to the peculiar form of overhung or extended head fitted to jacks

bearing under the centre of the axle. Moreover, it is surprising what a small amount of overhang is sufficient to enable the jack to clear. The Millennium specialities are the production of Messrs. Lake and Elliot, Ltd., Albion Works, Braintree, whose Midland representative is Mr. J. B. Whitfield, Priory House, Priory Street Coventry.

Police Traps in Essex.

Just lately a regular epidemic of timing and fining has broken out in Essex. A few days ago no less than fourteen drivers were proceeded against at Chelmsford in connection with a trap of 4¾ miles between Ingatestone and Widford, fines being inflicted to the total amount of £33 10s. and costs £13 11s. 7d.

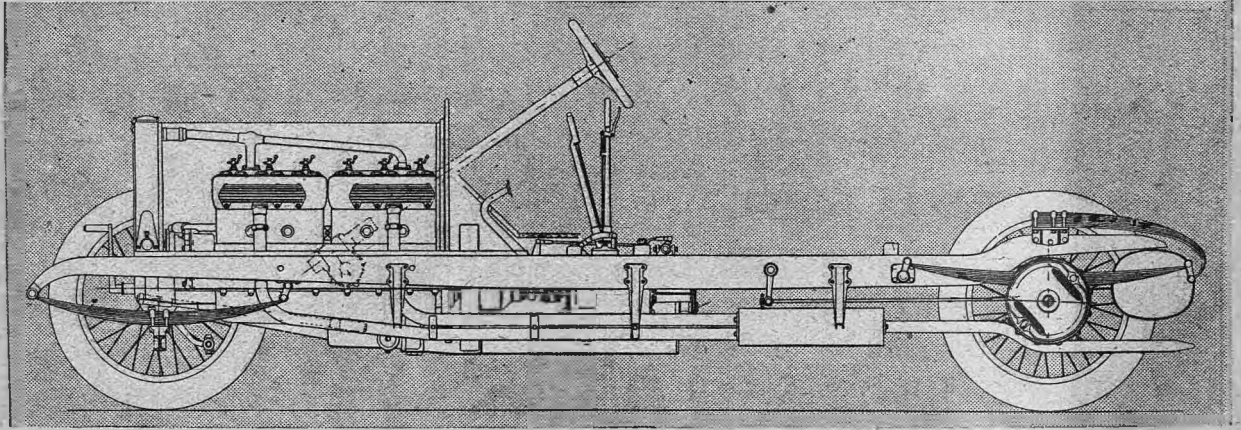
The maximum fine was £5 and the lowest 10s. but on what scale they are based it is impossible to divine. Motorists are advised, therefore, to shun Essex entirely, and to bear in mind this outbreak when registering cars or taking out motor car, dog, game, and other licences.

The 30-50 h.p. Six-cylinder Armstrong-Whitworth.

91 × 150 Bore and Stroke. Four Speeds. Helical Bevel or Worm Drive Optional.

THE six-cylinder model manufactured by the famous firm of Newcastle-on-Tyne has an engine with a bore and stroke of 90 mm. and 150 mm. respectively. The cylinders are cast in two blocks, from which the exhaust gases are led away by two ribbed castings and separate pipes connecting these to the silencer.

the camshaft and is forced to the main bearings and big ends through oil ways drilled in the crankshaft. Bosch dual ignition and a Zerith carburetter are fitted, particular care having been taken to secure equal distribution of the mixture to all cylinders by the arrangement of the induction leads and passages. The cylinder blocks are formed with internally cast passages,

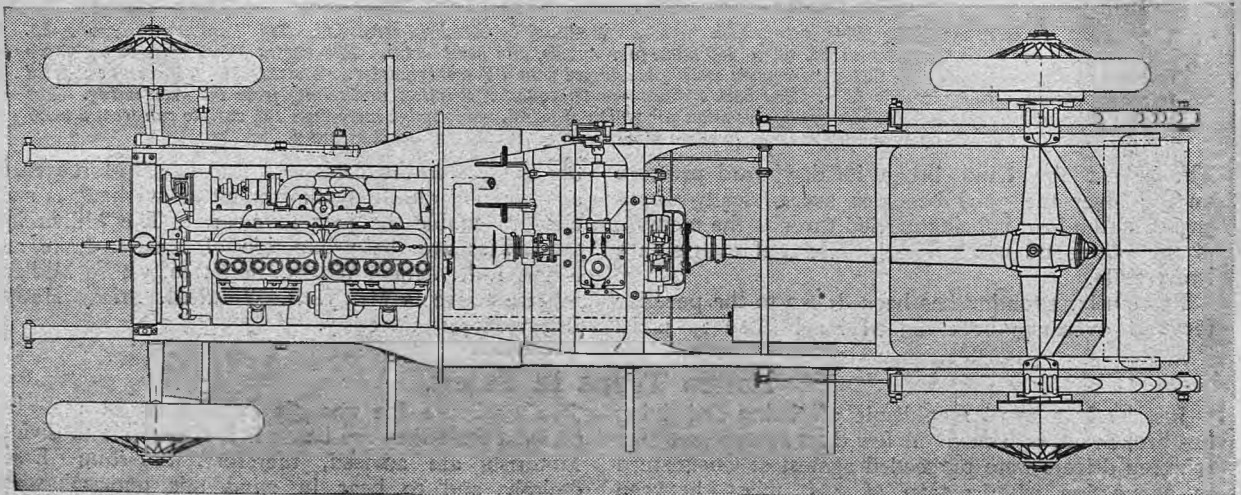


Elevation of the 30-50 h.p. six-cylinder Armstrong-Whitworth chassis.

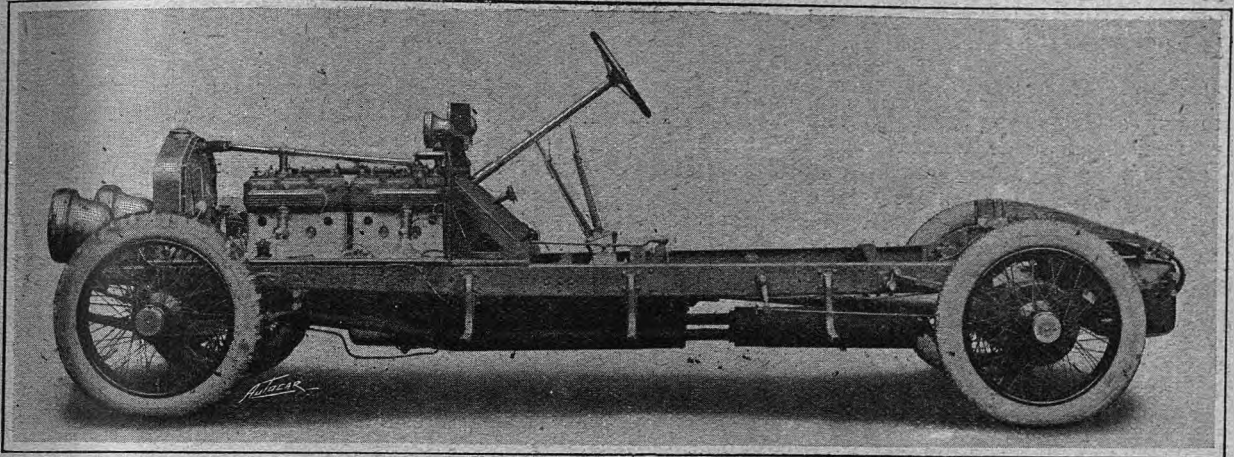
The valves, which are all on the near side, are neatly enclosed by aluminium cover plates, and on the same side driven off the distribution gear are the car-lighting dynamo and a small tyre pump, the ribbed cylinder of which is situated just in front of the forward exhaust pipe. The circulation of the cooling water is maintained by a centrifugal pump placed on the off side of the engine. The magneto is also situated on this side, both pump and magneto being driven off the same shaft. Silent chains are used for the distribution gear, there being two in front of the engine driving the camshaft and the pump and magneto respectively, whilst a third is employed to convey the drive from the camshaft to the shaft of the dynamo, oil pump, and tyre pump. The crankshaft runs on seven bearings. Oil is maintained under pressure by means of a rotary pump driven off the forward end of

each set of cylinders having an intake pipe flanged thereto at each end and connected at the middle by a Y-shaped branch from the carburetter. The throttle is controlled by means of a pedal working in conjunction with a hand control lever, ignition also being controlled from the quadrant on the steering wheel.

The clutch is of the multi-disc type, and is very small and neat in its arrangement. The gear box, which provides four speeds forward and one reverse, is also exceptionally compact with short stiff shafts; nevertheless, all pinions and bearings are of ample dimensions, the reduction in size being obtained by the ingenious design adopted. The layshaft is mounted underneath the main shaft, and both have sliding sleeves for the enmeshing of the various gears. The gear lever and the gate are carried on an extension of the gear box casting, thus securing great rigidity and



Plan of the 30-50 h.p. Armstrong-Whitworth chassis.



Near side view of the 30-50 h.p. Armstrong-Whitworth chassis. In front of the exhaust pipe of the front block of cylinder will be noticed the small air-cooled cylinder of the engine-operated tyre pump.

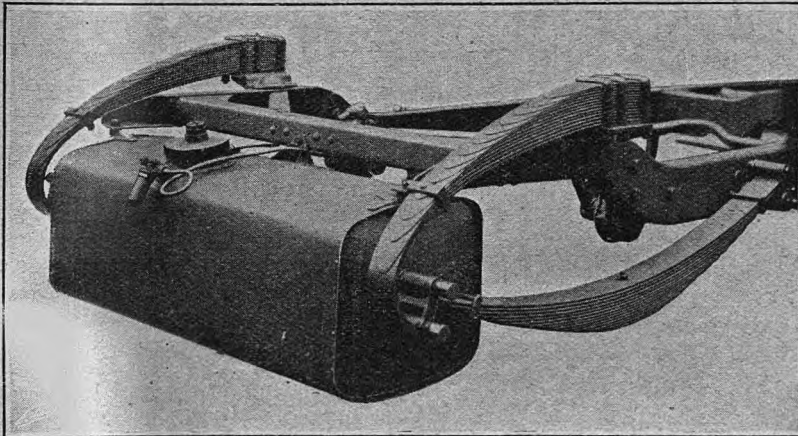
isolation from frame torsion. The reverse pinion is normally out of mesh and stationary, and is swung into engagement by an eccentric movement. The gate is somewhat unusual in that the direct drive and third speed are next to the position for the reverse, on the near side, so that in passing from reverse to first or second speed one has to cross right through the gate. In practice, however, no difficulty is experienced, and in the particular example which was under our hands recently the changes were effected quietly and easily.

The propeller-shaft is enclosed by a tubular torque and thrust member with a spherical head which trans-

mits the thrust to a stout channel steel cross member behind the gear box. The arrangement of the forward universal joint and the propeller-shaft brake is such as to reduce to a minimum the overhang on the gear box. For the final transmission, the alternatives of bevel or worm drive are offered, the former being recommended for high geared open touring cars whilst the latter is perhaps to be preferred for large closed bodies. In the case of the bevel drive particular interest attaches to the employment of helically cut teeth, it being claimed that the bevel is thus rendered silent, also size for size helical bevels should be capable of sustaining a greater load. In practice we found the transmission to be almost inaudible.

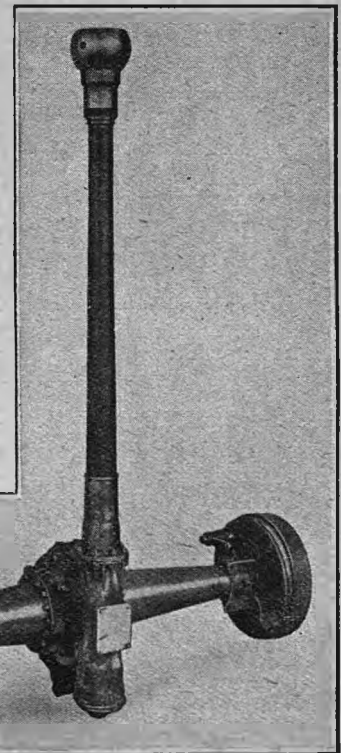
The frame, which is of channel steel, is upswept at the extreme rear both by a cross member and by short diagonal channel steel stays. The large three-quarter elliptic rear springs are shackled to the frame at their forward ends, a channel steel cross member being employed at this point, upswept in the middle to allow for the movements of the propeller-shaft casing. The front springs are semi-elliptics. A feature of the suspension is the way in which the springs are built up from a large number of thin leaves—a practice which accentuates their damping action and yet ensures great flexibility.

The petrol tank is secured to small extensions of the frame behind the rearmost cross member, and pres-



The rear part of the 30-50 h.p. Armstrong-Whitworth chassis, showing the way in which the side members of the frame are extended rearwards to support the petrol tank. In addition to being held at each end it will be seen that the petrol tank is also supported near the centre by means of a pressed steel bracket bolted to the rear cross member.

mits the thrust to a stout channel steel cross member behind the gear box. The arrangement of the forward universal joint and the propeller-shaft brake is such as to reduce to a minimum the overhang on the gear box. For the final transmission, the alternatives of bevel or worm drive are offered, the former being recommended for high geared open touring cars whilst the latter is perhaps to be preferred for large closed bodies. In the case of the bevel drive particular interest attaches to the employment of helically cut teeth, it being claimed that the bevel is thus rendered silent, also size for size helical bevels should be capable of sustaining a greater load. In practice we found the transmission to be almost inaudible.



The over-worm back axle of the 30-50 h.p. Armstrong Whitworth, and the propeller-shaft casing with its spherical head.

The 30-50 h.p. Six-cylinder Armstrong-Whitworth.
sure is maintained by an air pump driven off the gear box.

The steering gear is of the worm and worm wheel type, and the rake of the steering column can be set to any desired angle within certain limits. The external band brake behind the gear box is foot operated, and the rear wheel brakes, which are of the internally expanding type, are hand controlled.

Dunlop detachable wire wheels are fitted as standard with 895 mm. x 135 mm. tyres. The wheelbase is

11ft. 9in. and the track 4ft. 8in. The weight of the chassis is approximately 24½ cwt.

It will be seen that in this fine chassis no very unconventional features present themselves; nevertheless the details of design display such ingenuity and care as to deserve unstinted praise. Throughout the chassis, down to the smallest item, there is a complete absence of makeshift or afterthought, whilst the workmanship is of that high order which one expects from the world-famous Armstrong-Whitworth works.

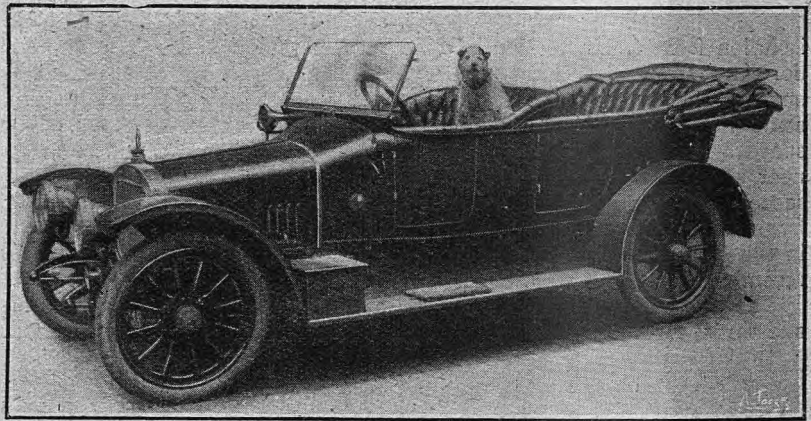
The 1913 12-16 h.p. Sunbeam

Some Notes on the Car and its Accessories.

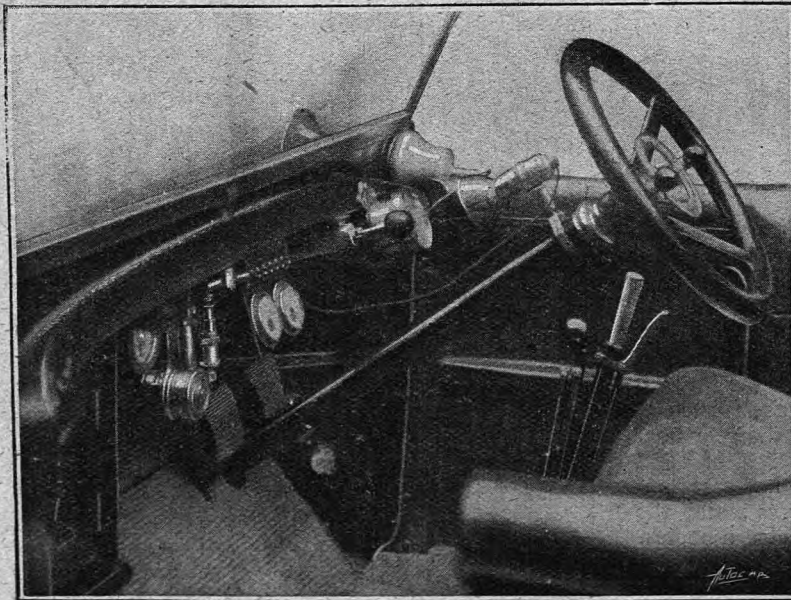
THE accompanying photograph shows the latest 12-16 h.p. Sunbeam with standard body and taper bonnet. In appearance the latter is most taking, and though at first the somewhat squat radiator did not appear to lend itself to the taper bonnet, the design grows upon one, and the lines are distinctly pleasing. The car runs beautifully, and to praise it we have only to say it is as good as last year's car of the same type. Although the particular car under review has not yet covered 3,000 miles it has been very severely tested, and has done all that has been asked of it in a most exemplary manner.

One of the finest performances we have to record was the climbing of Horse Block Trough Hill between Cranleigh and Shere in Surrey. This was taken in the dark, and a most successful ascent was made. The hill rises to 800 feet, and its upper portion, which has a gradient of 1 in 5, was deep in mud. Once we settled in ruts 8in. deep, and yet the engine pulled the car out of this slough of despond and reached the summit in magnificent form. The

road at the top leads on to Pitch Hill, and is labelled as "Impassable for motors." We emphatically do not recommend those who have any respect for their cars to attempt this hill.



A 1913 12-16 h.p. Sunbeam with the standard touring body. It will be noticed how well the taper bonnet and scuffle dash merge into the body.



The dash of the 1913 12-16 h.p. Sunbeam fitted with speedometer, petrol pressure pump, C.A.V. switchboard, oil pressure indicator, electric cigar lighter and pressure gauge.

The photograph of the dashboard shows how the accessories have been disposed. A board let in under the top of the dash carries the C.A.V. switchboard, the oil indicator, the electric cigar lighter, and the pressure gauge, bringing all these fittings within the full view and easy reach of the driver and his fellow passenger on the front seat.

Originally a dashboard lamp was fitted over the switchboard, but as this only illuminated the latter and the pressure gauge, it was discarded and a Cox-Walker steering column lamp fitted in its stead. This is a beautifully made accessory which lights the speedometer, clock, the whole of the dashboard, and all the mechanism between clutch and gear box. It never rattles and always stays exactly where it is put owing to the excellent ball joint with which it is fitted. The C.A.V. horn is let in through the lower portion of the screen, and is in an ideal and most accessible position. We cannot speak too highly of the C.A.V. electric lighting equipment. The lamps give a magnificent light and are a real pleasure to drive behind.

Springs.

The Discussion on Mr. G. H. Baillie's Paper before the Institution of Automobile Engineers. The Paper itself was given in "The Autocar" last week.

FOLLOWING the reading of Mr. G. H. Baillie's paper before the Institution of Automobile Engineers on Wednesday, May 7th (reported in *The Autocar* last week, pp. 859-63), a discussion took place.

The first speaker was Mr. Max R. Lawrence, who remarked that he thought the author's method of taking one spring and one wheel and one part of a motor car and studying the effect was original. The usual method in such matters was to make experiments on all four wheels with five or more springs, interacting upon each other and resulting in endless complication. It was difficult under such circumstances to sum up the results except in a general manner in so far as they affected the personal comfort of the passenger in the car. The springing of a motor car was always a matter of compromise, and he did not altogether agree with the author in saying that a spiral spring and external friction would have the same effect as a laminated spring with internal friction. He thought the friction between the blades of a laminated spring had the effect of altering the result very materially. The interaction of springs upon one another was one of the great factors in studying the balancing of a car properly upon its springs and getting it comfortable to suit the particular individual for whom the car was intended, because it was a fact that the personal element had a great deal to do with the comfort or otherwise of cars.

Mr. A. E. Berriman said that he thought Mr. Baillie had opened up a subject which, as he said, had received very little attention. One point that he brought forward and emphasised was of singular interest as a matter of general information. It was that which related to the sensitiveness of human beings to changes in the rate of acceleration, and not to acceleration or velocity as such. It was Mr. Mervyn O'Gorman who first drew his attention to this point when discussing the flight of aeroplanes at a great altitude. It was a matter of singular importance that a man might not in the least know in which direction he was going when in the air at a great distance from the surface of the earth, and, as Mr. Baillie had pointed out, he was not sensitive to velocity as such or to acceleration; it was only the changes in the rate of acceleration that affected him, and any change in balance either fore and aft or laterally was not noticeable. It was conceivable that an aviator might continue in a dangerous attitude without knowing it. That was interesting as a matter of information, and had a significance in regard to the question of suspension for motor cars. Mr. Baillie was singularly happy in his choice of a subject, because, after all, it was the suspension of the car rather than the springs as such that it was necessary to know most about. It was a difficult matter, however, to bring these general principles into a quantitative form. Designers were ordinarily in the habit of considering a spring as defined by its natural period or that a system of springs was so defined, but it was clear that when the car was on the road other considerations were brought in. The designer had to consider not only springs but wheel diameter and the speed at which the car would be driven. There was no more important factor in connection with the suspension of a car than the man who drove it. The effect of any given road depended upon how the car was driven over it. That led him to consider the possibility of thinking in terms of the applied forces on the axle and the natural periodicity of the springs. By means of the blackboard he illustrated this argument with a view to showing the necessity for a different method of springing for cars used for different purposes. Thus a car to be used on the road would require different treatment in regard to its springs from that of a car intended for racing on Brooklands track. As to the springing of cars for the road, he favoured the introduction of a frictional device solely for the purpose of absorbing the shocks caused by very small obstacles. Such a device he considered had some merit. It was in that light he had always regarded the helical spring attachment. The helical spring was a comparatively frictionless device when properly designed, and, therefore, was able to absorb these smaller shocks conceivably better than any sort of big leaf spring. The big leaf spring had its advantages in respect of the friction between the leaves. He thought the question of introducing many leaves was also one of extreme importance, as was also the question of tyre diameter, though it was well not to confuse the argument in regard to springs by any reference to tyres; obviously, the

large wheel proportionately reduced the shocks arising from the road. A small increase in diameter ought to effect a relatively great improvement in the comfort of the car. A matter that had not been touched on was that of tyre wear in connection with the suspension of a car. It appeared to him that a significant factor in tyre wear was the surface of the wheel, or tyre, leaving the road when the car was speeded up and coming into contact with the road again while the wheels were spinning after being so speeded up. The smaller the mass—and the mass included axle as well as car—the less tendency there was for the wheel to leave the road, and the less opportunity there was for the wheel itself to be speeded up, because the time interval for speeding up was less before the tyre hit the road again. It was this hitting of the road after the wheel had been speeded up while out of contact with the road that was likely to be the principal cause of tyre wear. The argument to be deduced from this was to make axles as light as possible consistent with strength, and also to remove the unsprung weight as much as possible. In this connection the Lanchester suspension was to be favoured. He had, also, always regarded the success of the Ford car, so far as its lightness upon tyres was concerned, as being largely due to its light axle. He had known instances where it had been employed on the Yorkshire Wolds on road surfaces that were very bad, and it had stood the wear exceedingly well, whereas other light cars under similar circumstances had failed, the chief difference between the two types of cars being the fact of the axle being lighter in the one case than in the other. The weight of the axle had a strong influence on tyre wear. Designers had to consider very carefully, in the question of springing, that there was a limiting factor in the height available for the springs. Still, it must be remembered that there was the outstanding fact that force could be applied from above as well as from below the springs. In going round a corner there was the centrifugal force. It was exceedingly uncomfortable to have springs that were too soft. For that reason it was particularly uncomfortable to have front springs that were too soft. It was one of the most extraordinarily awkward sensations imaginable to get round a corner in a car having springs of that character, as there seemed to be always a tendency to go into the ditch. In the suspension of a car he thought the cushions were not nearly enough considered by designers. It was the coachbuilder who was responsible perhaps for the abominable cushions on many cars, but one must not blame the coachbuilder entirely, for, after all, the general turnout of a car was an engineer's job, and the engineer was responsible for providing the height at which to put a reasonable spring. In his own experience, he had noticed one car in particular that was extremely comfortable solely because it had cushions 10in. deep that were excellently sprung.

Mr. H. E. Wimperis said the paper was not only interesting, but extremely timely, as this subject had received far too little attention. He asked whether the author would kindly supply in an appendix the details of the calculations upon which his curves were based. Personally, he would like to see the true inwardness of these calculations. He did not wish to accuse the author of obscurantism; nevertheless, the author, while giving acceleration curves, had not given the units, except as abstract units, and left his hearers in doubt as to whether the units were to be taken as inches or feet per second. This point was material when they came to consider what the author said in his paper on page 8. He asked the author to say whether he intended the units to be taken as feet or inches.

Mr. Baillie, after some consideration, said they might be taken as feet per second.

Mr. Wimperis: Oh, but that cannot be. (Laughter.) If that were so, the passengers would be shot up in the air.

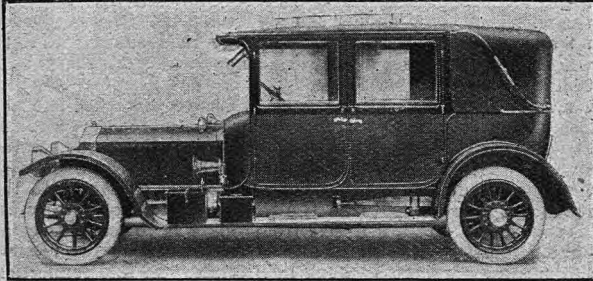
Mr. Baillie: They might be on the assumptions taken. (More laughter.)

Mr. Wimperis then proceeded to criticise the author's acceleration curves, pointing out that on the assumption that they represented feet per second per second, they would be impossible. He wished to divide the effect by twelve, and thus lessen their impossibility, but even then they would be open to very serious criticism. Another point to which Mr. Wimperis took exception was the use of such expressions as "weaker" and "stronger" as applied to springs. Springs might be more or less flexible, but they could not be called weak or strong. One of the speakers also referred to

Springs.

"soft" springs, whereas he meant "flexible." There was need for more accuracy of nomenclature in regard to this subject.

Mr. P. Armstrong said that in America it was the custom to make springs far more flexible than in this country, thus doing away with the minor vibrations—the small shocks—of the car. The springs took up these shocks quite rapidly, so obviating the necessity of having shock absorbers, but it was necessary to prevent the car being hurled upwards. A type of shock absorber, invented by an American, which filled the



A fine Rolls-Royce which has been delivered to Mr. F. A. King, Tyringham House, Newport Pagnell, by Messrs. Salmos and Sons, of that town. The body is a saloon landaulet, the fore part being on the lines of the totally enclosed body, the back part only being collapsible in the same manner as a landaulet hood.

bill, retarded the upward motion of the car but did not prevent in any way the compression of the spring. It was practically an embodiment in a mechanical form of the invention of Mr. Baillie's assistant, referred to in the paper.

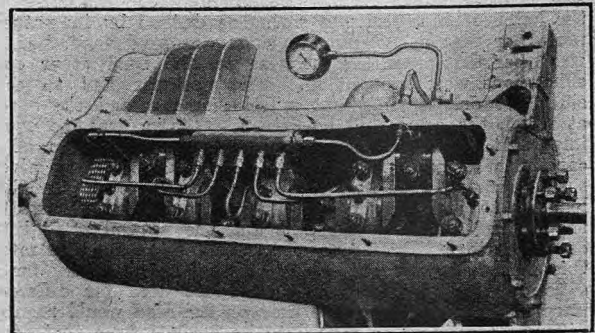
Mr. Cleaver spoke of the successful use of volute springs fitted to the buses of the London General Omnibus Co. with a view to overcoming difficulties due to irregularities of road surfaces on outlying routes. As the bus routes were extended further into the country the roads were found to be rougher, and the springing, which had been satisfactory on the comparatively smooth urban surfaces, was inadequate on the outlying routes. The problem consisted in providing reasonably comfortable springing for the buses, whether they carried a full complement of thirty-four passengers or only one passenger. The company had solved the problem by adding what were practically volute spring buffers. It should be understood that these were in addition to the ordinary leaf springs, and the principle embodied was more or less that advocated by Mr. Baillie, viz., a flexible leaf spring supported, when heavily loaded or stressed, by a secondary spring, the support in this case being a volute spring.

Professor Sharp recalled a paper which he read before the Institution some three years ago on pneumatic springs, and went over some of the points therein contained on the general principles of the springing of motor cars, pointing out that the "frequency" of a spring was the most important feature to be noted. He also emphasised the importance of suitable springing in so far as it affected the wear of tyres. This, he said, was also a matter that he had fully dealt with in the paper which he gave on pneumatic springs.

Mr. Lucas said he had two cars—one with big cambered double elliptical springs and the other with absolutely flat springs. The cars were of about the same weight, and similar in every other respect, but the difference in the riding between the two cars was simply astounding. The double elliptic sprung car, with plates which moved very much one over the other with a good deal of consequent friction, was very much more comfortable to ride in than the other. The double elliptic spring, which had practically gone out, might be considered again with advantage.

Mr. Baillie, in replying to points raised in the discussion, said he would supply as an appendix the calculations upon which his curves were based. He agreed with Professor Sharp in regard to what he said about the "frequency" of a spring being the point that should be first considered. In the interesting comparison made by Mr. Lucas he thought the difference between the two cars could be explained by measuring the "frequency" of the springs. It did not follow that a car rode easier simply because of the type of spring fitted; it might be that the frequency was lower in the one than in the other. He was interested in Mr. Cleaver's remarks respecting volute springs, and the experience related gave him (the author) fresh hope in that direction. As Mr. Wimperis had pointed out, the

actual motion of a car had practically nothing to do with the question of springing; it was the rate of change of acceleration that must be measured. The only way to obtain such records, perhaps, was by means of Mr. Wimperis's own instrument, if he would only make it recording. If they could get an acceleration curve they had all they wanted. In the case of a car going over bumps the whole thing was over very much too quickly to be able to find out what happened—when and at what period one got the jerk. He had sat on hard boards on his own car for the purpose of making observations on bumpy roads; it was extremely painful, but he could get no information of any kind. Mr. Armstrong referred to a device for checking the rise of springs. He (the author) did not believe in such devices, as they only gave a still bigger jerk in another place. "About this question of inches or feet, raised by Mr. Wimperis, I think they must be inches after all," remarked Mr. Baillie, amid laughter. He explained that he had never considered the question of actual units, but had looked at the matter from a purely comparative point of view. As regards the rate of change of acceleration, generally the rate of such change gave what was wanted. The question of tyre wear was brought up by Professor Sharp in his paper on "Pneumatic Springs" three years ago. There was no doubt that the unsprung weight was extremely important in its bearing on tyre wear. It did not follow at all that the type of springing that might be best from the point of view of the man in the car was best from the point of view of tyre wear. The weight of the springs themselves was quite considerable. He thought, therefore, that both the Lanchester and the Rolls-Royce cars must gain considerable advantage in comfort of riding and in tyre wear by making practically all the weight of their springs a sprung weight. Mr. Berriman said he found springs that were too soft very uncomfortable, especially in front. He (the author) had never noticed any discomfort in steering. The car referred to in the paper, which had extremely flexible springs, was the most comfortable car he had ever ridden in. It certainly had unusually flexible springs, but he did not think they were in any way too flexible. Referring to Mr. Lawrence's remarks on the use of spiral springs in addition to leaf springs, he said it did not follow that simply by adding any form of friction device to a spiral spring one obtained the same effect as with a leaf spring with friction between the leaves; but if one found out the law of friction in the leaf spring—that was to say, how it varied and was deflected—and then adopted a spiral spring with the same law, the effect of the two springs would be identical. In reference to the interaction of the four springs of a car upon each other, referred to by Mr. Lawrence, he (the author) started his investigations with a model of a front and back wheel and springs, but as there was so much to find out about the back wheel he thought it would be as well to take that wheel alone rather than find out what happened with the



The under side of the crank case of the 15 h.p. Crossley engine with the oil sump removed and showing part of the lubrication system. The oil is forced by a double spur wheel pump driven off the end of the camshaft into a small distributing tank, whence it passes to the five main crankshaft bearings through the various copper supply pipes shown. Any excess of oil pressure from the pump is returned through a relief valve.

front wheel, which would introduce the complication of a further jerk.

A vote of thanks was then accorded to Mr. Baillie for his paper.

The 14 h.p. La Licorne.

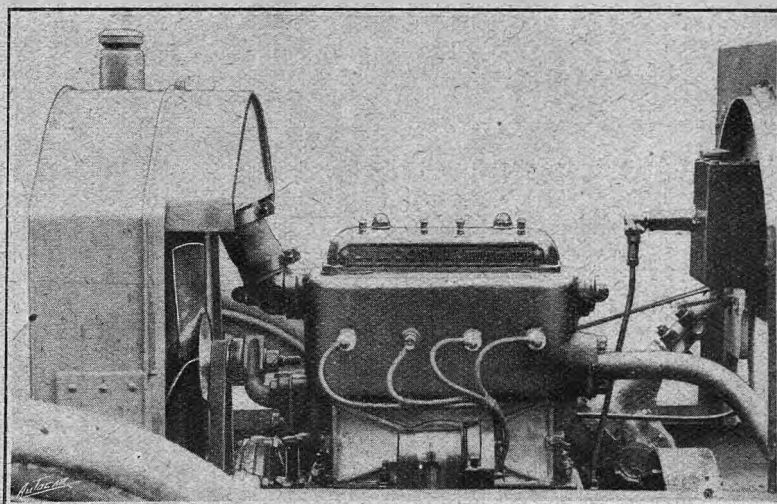
Four Cylinders, 75 × 120 mm. Four Speeds. Bevel Drive.

THIS make of car is one which, having by race and road established a sound name for itself in France, has under the auspices of Messrs. F. W. Berwick and Co., Ltd., 18, Berkeley Street, Piccadilly, London, W., since won an equally good reputation on this side of the Channel. The 14 h.p. four-cylinder chassis is a model designed particularly for 1913, with a four-speed gear box.

The frame is, as usual, of channel section steel in swept at the dashboard for easy turning and smartly upswept over the back axle. A downswept cross-member occurs beneath the radiator, and another nearly centrally takes the forward end of the torque member. The lower flanges of the longitudinals are flared to take the crank chamber and the gear box, and to form also a dust-excluding shield. The well-known Chapuis-Dornier engine is fitted, 75 mm. × 120 mm. bore and stroke respectively. The engine is very neatly cast *en bloc*, the inlet valves being carried in sleeves set in the cylinder heads, and enclosed by a cover as shown in the illustration of the engine. The exhaust valves are on the rear side as usual, and valve and tappet rods and tappets are all easily accessible by means of one detachable cover. The tappet rods for actuating the inlet valve rocking levers pass up through the cylinder casting, and are entirely enclosed. Both exhaust and inlet tappets bear upon the cams through rollers, the tappets themselves being provided with dashpot springs to keep tappet, tappet rod, and valve spindle in contact sufficiently to avoid noise. Thermo-syphon cooling is adopted, a big overhang tank being formed on the radiator, with short large diameter leads to and from. Big volumes of water surround the valve chambers. The Bosch magneto with fixed ignition timing is gear-driven from the camshaft on the left of the engine, and is accessibly placed. Lubrication is by splash alone, the lower portion of the crank chamber forming an oil bath into which the connecting rods dip and throw the oil to all the various parts. On the front of the dashboard is an oil tank containing a direct acting plunger pump

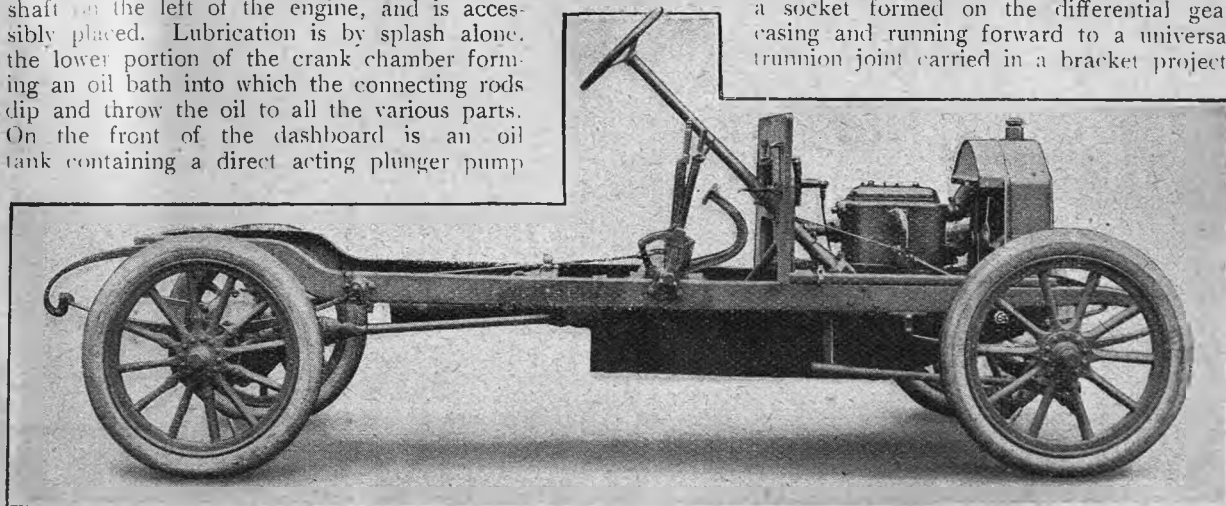
driven by an eccentric off the end of the camshaft and raising oil to visible drip feeds on the dashboard, whence it runs by suitable leads to the crank chamber, and there retains a constant level.

The drive is transmitted from the engine to the gear box through an internally coned leather-faced cone clutch with first intention springs-set beneath the leather. An easily detachable flexible coupling connects the clutchshaft with the forward end of the inter-



Near-side view of the engine of the 14 h.p. La Licorne. On the dashboard can be seen the lubricating oil tank containing a pump operated by a link rod from the end of the camshaft.

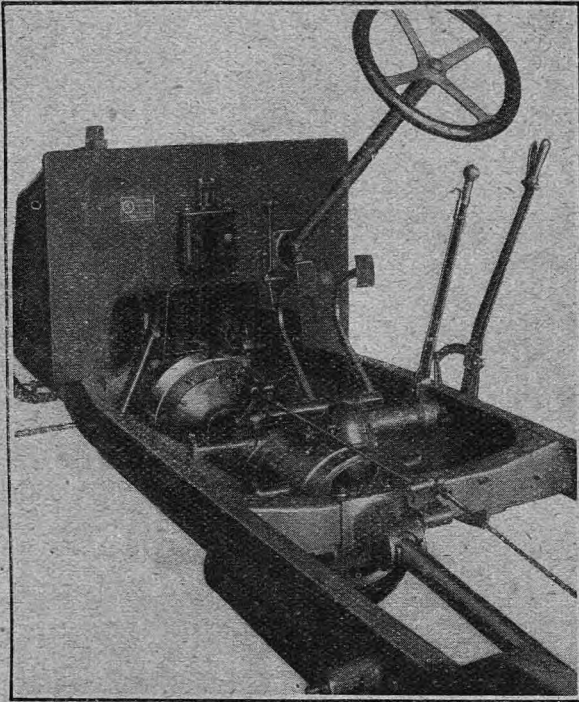
mediate gear sleeve. The gear box affords four speeds operated through a neat form of gate change, the striking and locking gear being all enclosed. A special feature is found in connection with the gear lever, which can be set at any desired angle within limits to suit the driver's convenience or the position of the front seat. The propeller-shaft is unencased, and has a well-designed universal joint at each end. A very stiff and efficient form of torque member is provided. It takes the form of a large tube set in a socket formed on the differential gear casing and running forward to a universal trunnion joint carried in a bracket project-



Off-side view of the 14 h.p. La Licorne chassis.

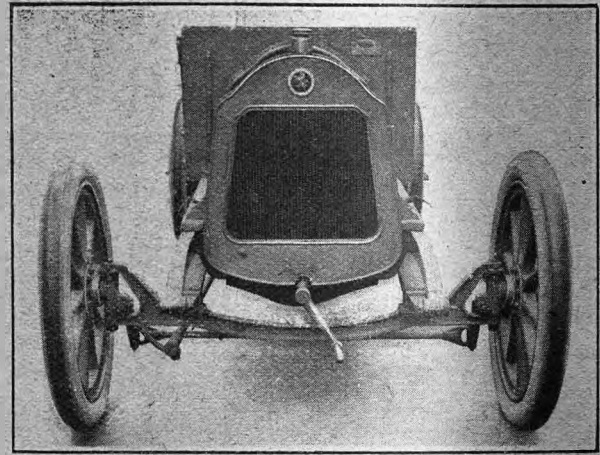
The 14 h.p. La Licorne.

ing rearwards from the central cross member. The drive to the back axle is by bevel pinion and crown wheels in the usual way, and a bevel form of differential gear. Means are provided for adjusting the bearings from without. The road wheel hubs are mounted on the ends of the live axles which



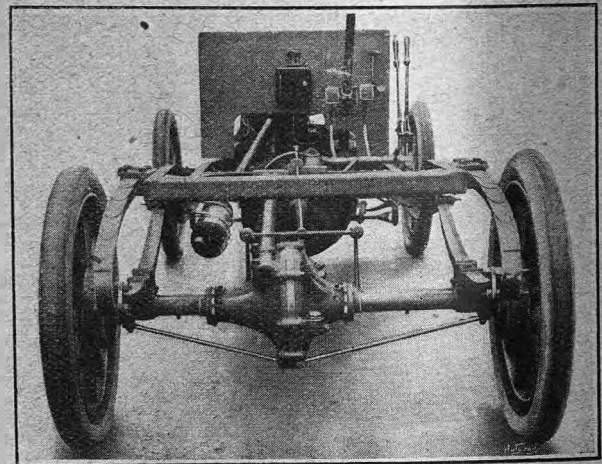
The amidships portion of the 11 h.p. La Licorne chassis, showing the anchorage of the tubular torque member and the manner in which the gear lever is carried on a bracket extending from the gear box.

run in ball bearings. An accessible oil level filler is formed on the differential gear casing, and the back axle, as a whole, is strengthened by the use of adjustable tension rods. The frame is carried on three-quarter elliptical springs at the back and semi-elliptics in front. The front axle is of robust section, the



Front view of the 14 h.p. La Licorne chassis.

steering pivots being fitted with ball bearings which take the load. The wheelbase of this car is 9ft. 10in., and the wheel gauge 4ft. 1½in. The wheels are 810 mm. x 90 mm.



Rear view of the 14 h.p. La Licorne chassis.

Charges for Water in Private Garages.

The Mid-Kent and East Kent Water Bill, which was passed last week unopposed by a Committee of the House of Commons, contains a special clause dealing with the charges for water used for washing motor cars in private garages. The object of the promoters is to prevent these supplies coming under the head of "domestic" supplies. It was alleged that there are a large number of private motor cars in the company's area, in connection with which an excessive quantity of water is used for cleaning purposes. The object of the clause was said to be to stop this waste by charging by meter, supplied and fixed by the company free of charge, with a minimum guaranteed payment of 10s. per annum. The Local Government Board, as a matter of fact, suggested the substitution of what is known as the Ipswich clause, in which a charge of 10s. per annum extra is made if a hose is used, but the committee allowed the company's clause as stated above.

On Wednesday in last week powers to a similar effect were granted to the Lymm Urban District Council.

Road Construction in Morocco.

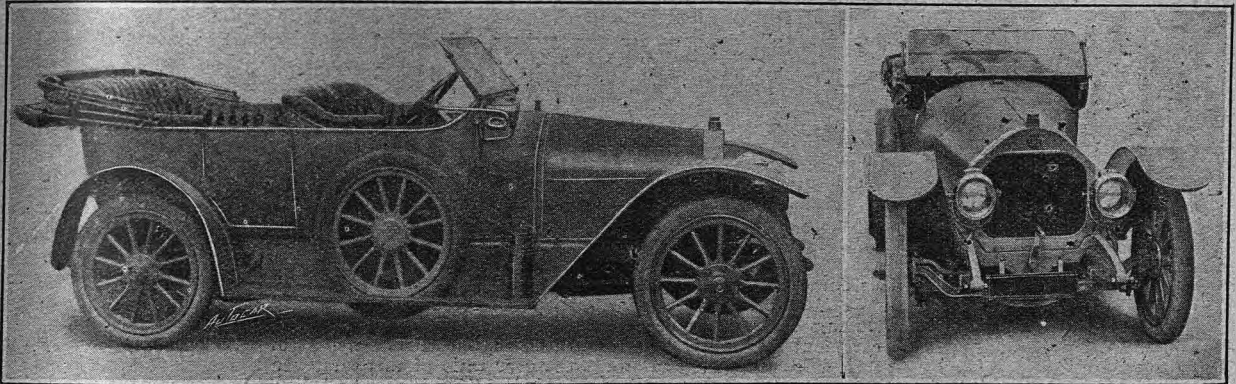
H.M. Legation at Tangier reports that during 1912 much progress was made in the construction of roads in Morocco in spite of the hostilities which occurred during the year, and that early in the year the tracks from Casablanca to Rabat, Mequinez and Fez had been made into roads good enough for rough wheel traffic—at any rate in dry weather. The roads around Fez are now fit for wheeled traffic if some caution be exercised; so also is the twenty-mile track to Sefrou, and several miles of the track to Slas Hiayna and Taza. The most important road constructed is a section fifteen miles long in the hills between Bab Tewka and Zagota. It is expected that other sections will be completed within six months, so as to make wheeled traffic possible from Fez to Mequinez and from Fez to Mehedia and Rabat. This will shorten the time taken on the journey from Fez to Rabat (127 miles) from seven days by the present means of communication to about a day and a half by car. The completion of these roads should create openings for both pleasure and commercial motor cars.—*Board of Trade Journal.*

The New 16 h.p. Darracq.

WE reproduce on this page photographs of the new 16 h.p. poppet valve Darracq built to the design of Mr. Owen Clegg. We gave some particulars of the chassis in our issue of March 22nd, page 498, but the first two illustrations here-with show a complete car, which is now on view at the Midland distributing depot, 280, Broad Street, Bir-

was only long enough to convince us of the liveliness of the new model.

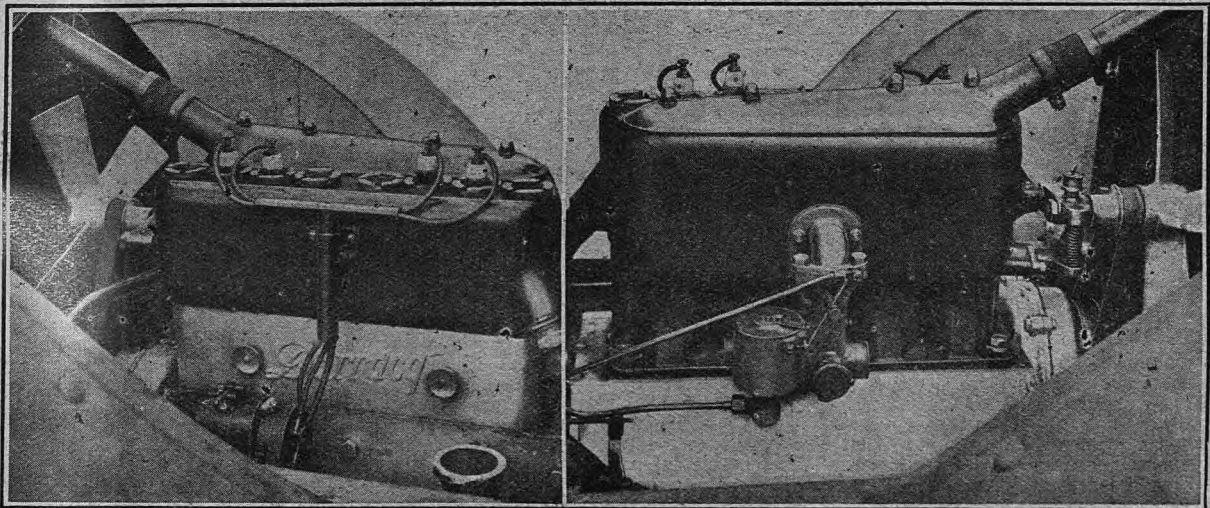
The two views of the engine show the very clean design which has been adopted, the main casting being of the *monobloc* type with the inlet and the exhaust passages cast within. There are two separate silent chains within the front casing, one driving the valve



Front and side views of the new 16 h.p. poppet valve Darracq with the standard touring body, hood, and screen. The engine is of 85 x 130 mm. bore and stroke. A four-speed gear box is fitted.

mingham. The engine is of 85 mm. bore and 130 mm. stroke, a four-speed gear box being provided and a 9ft. 9½in. wheelbase. The tapered bonnet and scuttle dash enormously improve the appearance of the car, though we are glad to note that the radiator still retains the Darracq individuality. We have made a short run upon it and found it very powerful, the ratio of power to load being, apparently, ample, and we hope after a longer trial to say more, as our test

shaft and the other the shaft which is common to the pump and magneto. The valves are enclosed by a single cover. The oil filler is very accessible, and the level can be tested without diving under the car, as the handle of the tap is within the bonnet. The carburetter is bolted directly on to the cylinder casting, and it will be seen that the mixture passes right through the jacket from the offside, upon which the carburetter is situated, to the near, or valve, side.



Two views of the poppet valve engine of the new 16 h.p. Darracq.

"There are about fifty motor cars registered in Bosnia-Herzegovina. Nearly all are of German make of medium quantity, from 16 to 25 h.p., and strongly built in order to stand the wear and tear caused by the rough roads and steep gradients of the country. Repairs can be executed at Sarajevo, Mostar, Tuzla, and Banjaluka. The Bosnia-Herzegovinian Automobile Club is about to establish twelve

petrol depots for the convenience of members. Tyres are kept in stock at Sarajevo, and are sent to any point in Bosnia-Herzegovina on receipt of telegraphic orders. Foreign members pay a yearly subscription of 35 kronen (£1 9s. 2d.). A local motor agent has intimated that, provided the conditions were suitable, he would like to introduce British-made cycle cars into Bosnia-Herzegovina"—Board of Trade Journal

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 CHALLENGE.

[19528.]—We notice that our letter No. 19485 to the Daimler Co. has drawn forth, on their behalf, a reply from Mr. F. W. Lanchester.

We welcome the advent of Mr. Lanchester. No one has a greater appreciation of his abilities than ourselves, and we believe that every work he undertakes is always conducted in a thorough and scientific manner.

We again thank the Daimler Co. for the facilities they have offered, and we assure Mr. Lanchester that we have no intention of evading "the whole issue." On the contrary, we are anxious to meet the Daimler Co. on this worm gear question. Our terms are perfectly fair and reasonable; we simply wish the Daimler Co. to carry out tests against us at the same time and under identical conditions, and we repudiate Mr. Lanchester's assertion that we are raising "technical objections."

Mr. Lanchester in his reply makes certain statements accusing us of "painful ignorance," "of a strong smell of bombast," of our desire "to impress the uninformed readers of *The Autocar*," and "that we have never made any tests that are worth the paper they are written on." We are sure that he is too clever an engineer and too good a sportsman to make use meaningfully of expressions of this kind to any opponent, and we do not take them seriously, but think that in all probability Mr. Lanchester replied hastily and without the thought that he usually displays towards a technical, and, we hope, serious discussion of this kind.

Mr. Lanchester mentions artificial cooling as being necessary for a test of worm gear, so as to obtain actual road conditions. May we point out that he appears to have overlooked the fact that when a worm gear is doing its hardest work, namely, climbing hills on low gear, the cooling effect he refers to is reduced to a minimum.

When one meets adverse conditions such as obtain in the North and West of England, where severe gradients of great length and awkward corners are encountered, a comparatively low speed is imperative, and thus "rapid and violent air currents" are non-existent. On the other hand, the maximum cooling effect only takes place when it is least required, namely, on the level or down hill, under circumstances when the majority of motor cars require very little engine assistance.

We consider that worm gear should be tested, not under normal conditions, but under the most adverse road conditions obtainable; unfortunately, it is just such a thorough test to which the Daimler Co. appear to take such a great exception, and seem so anxious to avoid.

Mr. Lanchester certainly insinuates that an air blast was actually used on the Daimler tests; this being so, it is remarkable that no mention of it has been made in any of the various articles which have appeared in the technical press, neither does this apparatus appear in any of the illustrations which have been published. It would be interesting to know exactly how this air blast was operated, the quantity utilised, and its velocity. Without this information it is impossible to judge correctly any of the temperature curves which have been published. We have repeatedly searched the official report of the N.P.L. tests to find some mention of this air blast, but we have been unsuccessful. There does not appear to be even a hint or suggestion of artificial cooling in the whole of their published reports, whilst other matters, such as the position of the thermometer, etc., are given in detail. Why was artificial cooling not mentioned in the N.P.L. report? This omission is most misleading.

We repeat, it will give us great pleasure to meet the Daimler Co. on even ground, but we have no intentions of accepting a one-sided challenge and carrying out a series of tests against some past figures which are more or less shrouded in obscurity.

DAVID BROWN AND SONS (HUDDERSFIELD), LTD.

LONG V. SHORT STROKE.

[19529.]—I think your correspondent (19502), when comparing the performances of cars with different sized engines, especially the performance of a car with an engine 65x98 as against a car with a bigger engine, must have entirely neglected the gear ratios of the cars and also their weights.

That a large number of car owners pay no attention to the gear ratios is evident when I say that I have met motor car agents who could not tell me the top gear ratio of the cars they wished to sell me.

I do not know what car with engine 65x98 your correspondent refers to, but amongst "The Autocars for 1913" there is one listed in *The Autocar*, November 2nd, 1912, of this size, the chassis weight of which is only 9½ cwt., and the gear ratio of this car given in *The Autocar* of June 8th, 1912, is 4.75, with a wheel diameter of 700 mm., which would correspond to a gear ratio of 5.49 on a wheel of 810 mm.—a very low gear ratio. Now if your correspondent will compare the weights of the cars, the gear ratios, the diameter of road wheels, as well as the size of engine, he will be able to understand many of the apparent anomalies which have no connection with bore and stroke ratio. If he has not already compared the gear ratio of his present car with that of his last car, he may find the solution. IF 419.

[19530.]—Your correspondent [letter 19502] has touched upon a field of enquiry that I have been hoping for a long time past would be discussed by some of our well-known designers.

I think we all hoped great things from the correspondence and discussion between Messrs. Pomeroy and Coatalen, and that we really should learn something decisive one way or the other of the relative virtues of the long and short stroke engines. Speaking generally, we may be fairly said to have been disappointed at the net results of this discussion, which might be summed up as determining one broad deduction only, viz., given the same cubical capacity, the two types of engine give practically the same results.

Personally, from the very start I should have tackled the problem in quite another fashion, and I am more than surprised, seeing how comparatively little was learnt from the study of various types of engine of the same cubical capacity, that the next step did not suggest itself immediately, viz., the study of engines of a given bore but differing in stroke.

I know that this is a thorny problem, and any attempt to solve it will bring a whole hornet's nest of rival advocates of their own pet bore-stroke ratio buzzing angrily round us. Yet I am convinced herein lies the solution of the problem of determining what relative engine dimensions are best suited for a given class of work. Supposing the 90 mm. bore engine were selected as the size to be exhaustively experimented upon to ascertain power curves under similar conditions, and with stroke varying, say, from 120 to 180 mm., what a wealth of fine engines would be represented in these dimensions.

I suppose we might expect the millennium before we should witness the spectacle of the makers of engines starting from 90 x 120, and all the well-known types represented by adding 10 mm. successively to the stroke step by step, sending simultaneously a sample engine to the R.A.C. to have the merits of each bore-stroke ratio determined by a series of predetermined tests. I cannot see such a thing happening, and yet that is just what is wanted. How is it going to be accomplished? It is really extraordinary how the very virtue claimed conclusively as characteristic of the long stroke will be claimed just as forcibly by the short stroke expert, and *vice versa*, even when engines of similar bore are under discussion. What improved results of road use, for example, would the Vauxhall people, as builders of a standard engine 90x120, admit Messrs. Maudslay got from their standard engine of 90x130? Anything or nothing?

Correspondence.

The greatest living motor engineer, Mr. F. W. Lanchester, has never, to my knowledge, admitted that any useful purpose has been achieved for practical road usage by going beyond a square engine. When experts differ so widely on this question, is it not time for a critical and impartial enquiry to be set on foot?
PERCY KEARNE.

EIGHT CYLINDERS OR SIX?

[19531.]—I began my motoring in 1899 with one cylinder, then I jumped to four and afterwards to six. Each was a decided step in advance, and I want to know now why practically no eights exist. It seems to me this would be even better than a six, and I do not see that one's petrol bill need be any stiffer, and the elasticity or controllability of the engine would be wonderful. Would it not be interesting to ventilate this subject in your columns?
AN OLD MOTORIST.

THE S.M.M.T. AND PRICE MAINTENANCE.

[19532.]—Under this heading "C.S." [19516] quotes a case designed to show that the S.M.M.T. is, in fact, as we contended in our successful action against the *Field*, a combine interested in maintaining prices. The case referred to by "C.S.," however, relates to the Motor Trades' Association. As a matter of strict accuracy these two organisations are legally separate entities. Doubtless this point will be emphasised to prove that "C.S." is not adhering to the facts. In anticipation of some such communication being received, it is, perhaps, desirable to point out that, although legally distinct, the M.T.A. is a child of the S.M.M.T., brought into existence by, closely allied to, and always working in complete harmony with, the parent body; and brought into existence, moreover, specifically to maintain prices as stated (and so forcefully illustrated) by "C.S." I understand the reason for the separate existence of the child is that the legal status of the parent prevents it from doing the work for price maintenance it desired to do. It was not, therefore, lack of desire but lack of legal power. In all essentials the two trade societies are one.
W. YARWORTH JONES,
Managing Director the Victor Tyre Co., Ltd.

ACCELERATOR V. DECELERATOR.

[19533.]—With reference to the correspondence you have recently published on this very interesting subject, will someone who knows kindly explain to me what are the chief objections to the decelerator system? Seeing that practically all makers of cars, except the De Dion Co., adopt the principle of the accelerator, I presume they must have very good grounds for doing so and some strong reasons for declining the adoption of the decelerator. Why I am especially interested is because, having driven several cars of both types, I vastly prefer the decelerator to the accelerator.
A. W. KEEP.

ACTUAL HORSE-POWER.

[19534.]—I quite agree with "La Tour" [letter 19520] that the maximum r.p.m. would be a valuable and interesting addition to next year's "Buyers' Guide"; but why use such a break-neck calculation as he suggests, when the formula usually associated with my name gives practically the same results? He "computes" the Lancia at 2,000 revolutions to give 52.6 h.p., a process which involves finding the cylinder capacity in litres, multiplying by 2,000 and .0064. Here is the working by mine:

$$\frac{nld^2r}{200,000,000} = \frac{4.130 \ 100.100.2000}{200,000,000} = 52.$$

After cancelling out the noughts, you have to multiply 13 by 4!

For readers who may not be familiar with the formula, I also give it for inches, namely, $\frac{nld^2r}{12000}$

C. F. DENDY MARSHALL.

P.S.—Fancy finding the capacity in litres from dimensions in inches!

CAMPHOR IN PETROL.

[19535.]—A few weeks ago I put some camphor in the petrol of my single-cylinder car—one ounce to five gallons. All went well for some days until one very cold morning I had to leave the car standing in the street for some hours. When I went to start it would not fire. After trying every expedient I could think of I had to leave it there and walk home. The next morning was warm and it fired all right. Next night was similar weather and the same thing occurred. After working until I was tired, some one suggested it might

be the camphor, so I emptied the tank and put in a tin of Shell, and it fired at the first pull of the starting handle, so no more camphor for me in cold weather. I must say the difference in the power was most noticeable when I had to give up the camphor.
M.D.

[19536.]—I have tried camphor on my new car with what I consider improved results in starting and running. But it has occurred to me that the addition of camphor vapour to the petrol might have the effect of sooting plugs, valves, and cylinder heads of an engine, after some time.

I wonder if any motorist who has used the mixture has noticed anything of the kind? So far I have run my car some five or six hundred miles on it, but without any signs of misfiring; I have not inspected the inside of the engine as yet.

I saw some time ago that equal portions of petrol and methylated ether passed into the cylinders of an engine through the compression taps will make the most sulky and stubborn engine start in the coldest weather. Would it be safe to use by making an addition of some ether to the petrol in the tank of the car to improve the running and starting of an engine?

Ether, I know, is highly inflammable, but would a small quantity, say half a pint, added to each two gallon tin of petrol materially increase the risk of fire beyond that which exists in all petrol engines, or would it be liable to over-heat the engine? The point is an interesting one if it has not been tried.
C. H. W. HAMMICK.

RUNNING COSTS.

[19537.]—Some of your readers may possibly be interested to hear of the cost of running a 15 h.p. Mass car for five years from April 7th, 1908, to April 7th, 1913. The engine dimensions are 95 x 120 mm.; weight of car, unladen, 1 ton 5 cwt. 2½ qrs.; tyres, 815 x 105 mm.; seats five people comfortably. I have had a boy to wash the car. The tyres average 7,250 miles each. The cost of repairs includes a yearly overhaul. The railway fares saved are for journeys I should have had to pay for if I had been without a car.

	Cost per mile.
Tyres	£153 12 6 ... 1.215d.
Repairs and renewals to chassis	105 3 5832d.
Insurance, licences, and subscriptions	103 11 5819d.
Petrol, 1,656 gallons = 18.3 m.p.g.	100 1 4791d.
Boy's wages and expenses	56 11 2447d.
Repairs to body and accessories	33 17 10268d.
Accessories and tools	23 7 8185d.
Oil and grease, etc.	15 15 8124d.
Tips	7 4 0057d.
Etceteras	5 1 2040d.
Garage	3 16 0030d.
Leathers, sponges, etc.	3 17 11070d.
Accumulators	2 7 7019d.
	£614 7 8 = 4.857d.
Less for railway fares saved	164 18 10
	£449 8 10 = 3.552d.

Distance run, 30,336 miles, at 3.552d. per mile.

Deterioration I am unable to estimate until I part with the car. It is still running as well as when I bought it.
HARRY F. SULLIVAN.

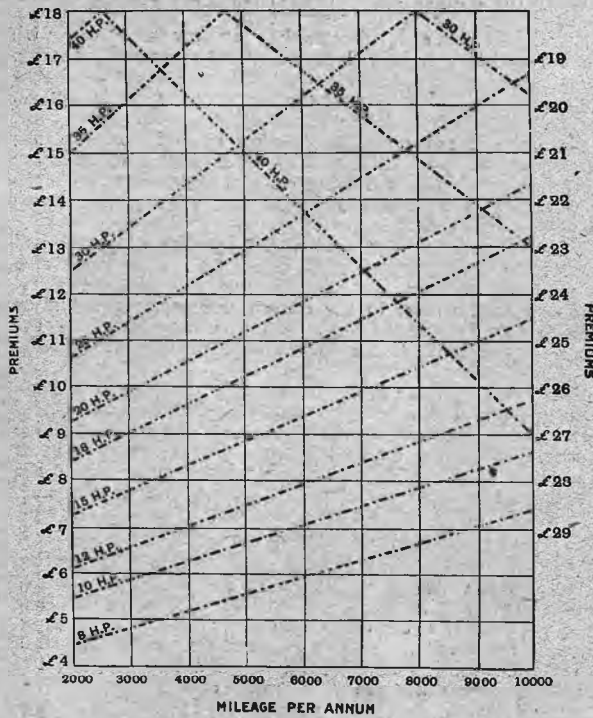
[19538.]—I see from letter 19507 in your issue of May 3rd that a user of a 15.9 h.p. Arrol-Johnston gets 22½ m.p.g. I should be grateful if any user of these cars could give me a hint, for, do what I will, I can get no better average than 18 m.p.g. My car is a 1910 pattern; weight, unladen, 26 cwt. 1 qr.; five-seated body with the usual load of three; hood and side curtains up in winter months; W. and P. carburettor adjusted to give more air than No. 1 adjustment affords, needle has been fitted to seat lower in valve; average speed legal limit, country hilly, and occasionally I drive through London traffic; magneto recently adjusted by Bosch. It was a shade weak, and had been two teeth too far advanced on distributor. I ought to add that the W. and P. accelerator was fitted, but, if anything, the consumption has been worse since. The car has life and power and no signs of over rich mixture. No leak discoverable.
P 5426.

INSURANCE.

[19539.]—In all the letters published lately on the above subject, I have failed to notice a reference to any insurance company which covers cars on a mileage basis. Some

Correspondence.

months ago I received the premium chart herewith, but placed it on one side, having just insured my own car, so that it was not of immediate interest. My average mileage with an 8-10 h.p. car is about 1,800 miles per annum, and I



The chart referred to in the accompanying letter.

The vertical lines represent mileage in 1,000 mile stages.
 The horizontal lines represent premiums in £1 divisions.
 For cars up to 25 h.p. the premiums are read on the left.
 For cars of 30 h.p. and upwards on either side according to mileage.
 This scale is for declared insurance values up to £10 per horse power.
 For higher value make additions as follows: 5% at £20 per horse power; 7½% at £30 per horse power; and 10% at £40 per horse power.

have always objected to the necessity of having to insure at the same cost as one who drives 10,000 to 20,000 miles in the same period. Seeing that an insurance company has actually announced that it is prepared to effect insurances on mileage lines, it is evident that the difficulties of checking the distances covered have not proved insurmountable. Perhaps the chart would prove of interest and evoke the opinion of your readers as to the actual benefit that would accrue to the short mileage motorist by the general adoption of such a system of fixing the premium. T. C. Ives.

THE CHAUFFEUR-GROOM.

[19540.]—Permit me to air my remarks on the "Chauffeur-groom," referred to in an article headed "Leaves from a Sportsman's Notebook," in *The Autocar* of May 3rd, page 811.

It seems difficult to me to gather whether the remarks are in a friendly or an antagonistic spirit. Of late years, through the perfection of the mechanism of cars, it is unnecessary to pay a high wage for a skilled mechanic when an average intelligent minded man as driver can understand the works and working of a car.

It is only natural that a gentleman having a man as groom when he relinquishes horses should prefer the groom as driver of the car. At the present time I emphasise the fact. There are more good drivers of motor vehicles amongst ex-coachmen than amongst the professional mechanic drivers. I also suggest that cars which are looked after by a "stableman" are turned out better than those looked after by the average man who has been "through the shops."

While it sounds sarcastic to suggest that there is a neat appearance about the neck and a resemblance of a mechanic below, be it remembered that a good groom is brought up to cleanliness and neatness.

As a coachman-chauffeur myself, I have been driving seven years with cars as well as horses, and have had charge of five cars, including White steamers. I still hold to the "horsey face" myself, but with experience at the wheel, touring, etc., and owing to having frequently to treat the ailments of cars, I consider myself half a mechanic. By the employment of gentlemen's servants as drivers one not only

infers that they as a body are eligible for the position, but that, being instructed in punctuality, smartness, and, above all, a civil tongue, they are as good and more in evidence than the professional who only understands "cars." I suggest that the employment of the so-called "hybrid" is on the increase, and likely to be. W. H. KEMBER.

REPAIRS.

[19541.]—With reference to Mr. Graves's letter [19499], I have given Mr. Stuart's letter a second thought, and I find that there is a profit on the work done; that is to say, if the price of the new driving bevel was not included. I do not think that the garage proprietors would oblige a complete stranger by repairing his car at a loss. I am a motor mechanic myself of many years' experience, employed by one of the largest motor manufacturing companies as a garage mechanic, and I know from experience that the work required by Mr. Stuart to his car could be done in one good working day of nine and a half hours, with the help of one general labourer. So the wages amount in that case to: One fitter 9½ hours at 8½d., one man 9½ hours at 5½d. = 11s. 1d. There are sundries such as spring washers, bolts, and use of tools, petrol for cleaning, etc., but still there would be a profit.

When a car comes in for repairs to the back axle one does not finish up with washing the car and tuning up the engine. That is out of the question. If Mr. Graves goes into the matter he will find that the job could be done in less than half the time he takes, thus diminishing the price. I should be pleased to see a letter from Mr. Stuart stating the time it took to do his work, also whether the price of new driving bevel was included or not. H.C.

FLEXIBILITY ON TOP SPEED.

[19542.]—We notice considerable publicity has been given recently to a slow speed running test on top gear by the new 12-14 h.p. F.N. car, and we must say that the speed quoted, namely, 3 to 3½ m.p.h., speaks very well for the system of carburation employed. This slow running is undoubtedly due to the variable choke tube employed in the F.N. carburetter.

It might appear from some of the accounts in the press that there was some novelty in the possibility of walking beside a car running on top gear, but certainly four years ago our present demonstration car was able to do this with a gear ratio of 16 into 54, the car weighing 1.5 ton loaded, and at the same time reach a speed of 60 m.p.h. on the track.

One of our demonstrations in connection with the Brewer carburetter is a test of this nature, not only upon the level but up a reasonable incline, the driver walking beside the car. Following this, the engine can be accelerated to top speed without any hesitation on the same car.

THE BREWER CARBURETTOR CO., LTD.

STUDIES IN HUMAN NATURE.

[19543.]—I should like to carve a little space to place before your readers the following facts which have just actually happened to me, and upon which it would be both interesting and instructive to have their opinions. Briefly the facts are as follows:

A gentleman called at the garage at which I am manager informing me that his car had broken down, and would I send a mechanic to his assistance, as he was anxious to complete his journey if the fault was anything that could readily be put right. As my men had all gone out on other jobs I went with him myself; at great inconvenience, taking a lad only. We found his car but two minutes from the garage, and quickly discovered the back axle was seriously damaged, so much so that the wheels were jammed. We took the cardan-shaft off, and towed the car into our yard; during which process the owner consulted his A.A. guide book, and calmly requested me to telephone a certain firm in the city (three miles distant) to ask them to take over his car for repairs, as he preferred someone recognised by the "Association" to deal with it. I pointed out the irregularity of the request, but did as he desired, and the firm in question are now doing the necessary repairs.

Now, sir, in these days of enlightenment, one is surely not asking too much when one expects some little return in good manners for services rendered. It is not a question of £ s. d. but of principle. Would it not have been better to have consulted the guide book first, and got the assistance of the official repairers at the outset?

The gentleman stayed most of the afternoon in my office waiting for the "repairers," and after seeing them departed, having given me his card.

If I am a judge of character I have not the slightest doubt that my account, necessarily very small, will be promptly paid, but I can honestly say that a little courtesy would have meant more to me, and been a more fitting recompense on this occasion than the veiled insult and the few shillings to follow in its train.

The firm who are doing the repairs are not aware of the circumstances of the case. They were merely requested to do certain things, and they are duly carrying them out. I wish to make it quite plain that I entertain very great respect for them and their work, and at the present moment I have just arranged with them, to save moving the car again unnecessarily, to carry out the repairs here, but with their own men.

If any of your readers are sufficiently interested in "studies of human nature in real life" and care to offer their opinions, either privately to me or through your excellent paper, I shall feel personally grateful.

M. A. BRIGGS.

COMPLAINT AGAINST MOTOR CYCLISTS.

[19544.]—I desire to make a protest against a certain type of motor cyclist met with on the road. I wish to be reasonable; as a car driver I regret the increase in the number of motor cyclists, but I recognise they have as much right on the road as I have. I do think, however, that often their riding is inconsiderate and even unfair. They are so prone to make for narrow openings—in cases, e.g., when one car is passing another or is otherwise placed where there is very little space to spare. Many times I have got dangerously near the ditch to make room for a cyclist who persisted in coming on, when there was not enough room, instead of slackening down a moment. They are now the fastest traffic on the road, and for this very reason they can afford more than they otherwise could to have a little extra consideration for the traffic which is so much less handy and as a rule slower. Instead of extra consideration, there is often none at all, and they ride as if "speed is right." I do not write in a hostile spirit, but I consider that their increasing numbers, when riding in the way described, constitute a menace and a danger to other road users. The speed they go and the noise they make (in spite of the L.G. Board Order as to silencers) are amazing. Up to now they have been more or less the chartered libertines of the road. Trapping for them has hardly existed. I trust the influence of public opinion will be strong enough to effect a change, and that it will be unnecessary to invoke the authorities.

FAIR PLAY.

CARNARVONSHIRE ROADS.

[19545.]—I motored down here (Pwllheli district) on April 3rd in my car from Holyhead, and am writing to ask you to warn other motorists not to come the route I did (until it is repaired), as I struck almost one of the worst and most disgraceful roads one could possibly find. At any rate it is the worst in North Wales, with the exception of the Holyhead Road near Corwen. I think something should be done at once. I may say the roads for a mile on both sides of Carnarvon are in a first-class condition, but I discovered this road a mile out of Carnarvon on the Carnarvon and Pwllheli main road. I simply had to crawl for quite eight or nine miles, and even then I thought the springs of my car must go. Also, I beg to call attention to the three main roads within the boundary of the Pwllheli borough. They are the worst surface in any borough in North Wales. In their present state they are quite unsuitable for pleasure motor traffic. The Ala Road, which is the principal main road leading to the town from Aberdaron, Nevin, Abersoch, etc., is kept in such a state that it is dangerous to keep off the centre. It has several inches camber; also it is bumpy and indifferent and full of pot-holes. The manholes are left inches above the level of the streets in several parts of the town.

G.T.

GUARANTEES.

[19546.]—As originators of the 10,000 mile minimum service guarantee for resilient wheels, we have read with interest the letter appearing over the signature "Disgusted" [19408]. To avoid misapprehension, we beg to state that the wheels in question were not supplied by Messrs. Vico, Ltd.; that, to the best of our knowledge, no wheels manufactured by us ever wore out in 3,000 miles, and that if they had done so, we should certainly have stood up to our guarantee.

VICO, LTD.

[19547.]—I was interested to note, on reading letter No. 19514, on the subject of makers' guarantees, that your correspondent, "S.C.," chooses for specific mention, among

Correspondence.

English makers, the Austin and Wolseley Companies as firms who interpret their guarantees in a really liberal manner. Your correspondent's reference to those two firms has additional interest when one remembers that both of them owe their existence to the brain and energies of one man, of whom it is said, "He puts his conscience in his cars." I refer to that pioneer designer, Mr. Herbert Austin.

A.G.M.

UNOFFICIAL TRIALS.

[19548.]—In the circumstances, I am sure "Ignotus" [19522] will pardon a little suspicion of the motive of his letter in your last issue.

When he writes anonymously to protest about something he need not read, one wonders why, and it is only with great difficulty that one represses the obtruding thought that here is either a very peevish and a very illogical gentleman, or somebody interested in the opposition.

Here also is a very presumptuous gentleman, who, writing for himself, affirms that he speaks for other motorists. Does he speak for other motorists? How many? When did these anonymous gentlemen authorise him to speak for them anonymously?

Obviously, says "Ignotus," Dr. Cole's letter was a leader designed to pave the way for further correspondence from me. Obviously "Ignotus" is without perspicacity or knowledge. Before Dr. Cole's letter appeared I had written the story of the second betrayal by the R.A.C. to *The Autocar*. That letter was amended not in fact but in form to appear as an answer to Dr. Cole, who was a member of the committee, and as such had a legitimate grievance until an explanation was made. "Ignotus" seems to have read what has appeared in the daily and some technical papers upon the matter, and knew, therefore, that Dr. Cole's letter would bring out the facts. Why should "Ignotus" object to the facts being brought out? Is "Ignotus" interested in the facts being suppressed? We should know if "Ignotus" gave his name. Is that the reason he does not give his name?

W. YARWORTH JONES,

Managing Director the Victor Tyre Co., Ltd.

MOTORS AND FOX HUNTING.

[19549.]—After reading Mr. Blakeborough's article in *The Autocar* of the 29th of March, giving an incident which happened with Lord Fitzharding's hounds, chronicled by a *Field* correspondent, I should like to point out that there are hundreds of motor owners in this country who cultivate from ten to 150 acres of land for pleasure, who are not followers of hounds in the strict sense of the word, neither do they claim compensation from the hunt funds. They rent or possess large or small shootings, losing annually scores of partridges, pheasants, and poultry by preserving foxes for the different hunts they live in, put up with damage by hounds and a large following crossing their land, disturbing their game when drawing or running through their coverts. They often offer hospitality to one and all if a fixture is in their vicinity or a fox is killed on their ground. Many even walk puppies, or suffer from those who do, which are sold in the draft for fabulous prices at the hound sales, besides which many give subscriptions or donations, and yet the Duke of Beaufort and the Warwickshire Hunt Committee have issued an official notice that these very people, whose only recompense is to see a little sport from their cars, are in future to be forbidden to come anywhere near hounds. I sincerely hope that other masters and committees will show a more considerate spirit to this long-suffering class, who are seldom mentioned without a sneer, but who, directly or indirectly, do so much for fox hunting in this country.

FUR COAT.

GARAGE AND MOTOR SCHOOL TRAINING.

[19550.]—Feeling that my case is a rather hard one, I write to you in the hope that, if you will be good enough to publish my letter, I may discover whether any others are in a similar predicament; also, that by publicity I may perhaps obtain what I seek.

It is a little more than eleven years ago now since I made my entrance into the motor world by going into the London depot of a well-known firm of car builders and factors, to be instructed in the mysteries of car construction and driving. I put in about two months with this firm, getting a very fair idea of construction, and I could drive their cars of that day with a reasonable amount of confidence. I left them to drive and attend to a customer's car, but this job lasted only a few weeks, so I was then again stranded.

Correspondence.

Not to make too long a story of it, I may tell you that not only once, but three times in the intervening years have I gone into London motor schools (garages) paying their somewhat heavy fees, for the purpose of increasing my knowledge and keeping as far as possible up to date. And then I have advertised for a position, but always without success. Having no "influence" behind me, no friend well-known in the trade, to push me on, I have failed to find what I most desire.

I decided to start on my own account a few years ago, getting some capital together as best I could, and secured suitable premises in a western district of London, being pursued by County Council and Borough Council for fat fees for the privilege of being my own master. In spite of this, I was doing pretty well, when the affair came to an untimely end, as the owner sold the premises over my head, and I had to clear out. Later on I again essayed another start on my own, only to fail once more owing to the ever-changing population of the London suburbs, heavy expenses, competition, etc. This was more serious for me, as I lost nearly all I had, not having been able to save anything while in business, for the above reasons. However, I again took my courage in both hands, and, feeling that time and the motor were both rapidly advancing, and that my knowledge of the latter was perhaps a bit dull and needed polishing up in the light of present day practice, I again put myself in the care of a garage, where I learned something certainly. Still, I felt I had been just rolled over and turned out.

I am the proud possessor of a beautiful certificate, which, however, does not seem to do for me what I really need, viz., get me a position, in spite of what the garage promised me. I do not ask or expect a high position at the start. I only want to get in a London garage as assistant to obtain the necessary experience to fit me for a better position—by doing some repairs, some driving, and other necessary work.

WOULD-BE MOTORIST.

[19551.]—I am delighted to see that at last the subject of motor training "schools" is being taken up. Some few months ago I visited the secretary of a much advertised school with a view of being trained as a salesman demonstrator or for some other suitable situation. He informed me (in his palatial London office) that for seven guineas they would train me, and then there would be absolutely no difficulty in getting me a job worth £200 a year.

Naturally I took all this in *cum grano salis*; but I paid my seven guineas, and was then told to report myself at the garage (five miles away) for orders.

At the garage I found three men labelled "Instructor" and a class of about twenty students, mostly doing nothing. The reason of this being that only one instructor was available for the students, the other two being occupied in repairing and refitting the instructional car which had broken down.

During the five weeks which I attended the garage, this car only went out twice; the rest of the time it was in the hands of the above named men, who did nothing else.

There was one other car which was in fair order, and, in this, three students were taken out for one hour at a time. I was given three such lessons and then told that I was proficient.

The third instructor in the garage was doing his level best to help the students, but frequently I left the place for lunch without ever having been able to get a job from him to do. I learned absolutely nothing from this school, and although I hold their certificate for exceptional proficiency, they have not found me any job nor do they ever answer my letters.

Incidentally, I may mention that in their offices I saw a large photograph of their fleet of instructional cars, in which there were six or seven fine-looking vehicles. They actually only had the two named above.

I subsequently paid a visit to Motor Schools, Ltd., in Heddon Street, where I was much struck by the business-like manner in which that school was run. There the student got what he paid for, and was not humbugged by promises of gaudy certificates.

I hold no brief for this school, but if any friends were to ask my advice on the subject, I should undoubtedly recommend them to go to Heddon Street.

I think this is a subject that "Owen John" might tackle with great advantage, and I would look forward eagerly for his views.

JEMADAR.

ESSEX TO MIDDLESEX.

[19552.]—Having frequently to journey from Woodford and district across the River Lea to Barnet and district, I

B36

am struck with the unsatisfactory routes open to motorists.

As far as I can discover, there are five crossings, most of which are bad, and it seems to me a pity that the responsible authorities cannot be induced to improve those already existing.

The Lea Bridge Road and Waltham Abbey-Waltham Cross routes are quite satisfactory, but they both necessitate quite a wide *detour*, whilst the three remaining routes are little short of despair to all motorists.

The Ferry Lane to Tottenham High Cross route is bad enough, but not to be compared with the other two, namely, that from the foot of Chingford Hill to Cook's Ferry *via* Angel Road (which is positively dangerous to traffic), and that from Chingford Police Station Hill to Enfield Wharf and across Ponders End Railway Station.

Both of the last-mentioned routes could, with very little expenditure, be made quite respectable crossings, as, in the latter case, the new road by the reservoir is quite good, and only the last part across the river and level railway crossing is bad.

I may further remark that all the last three crossings mentioned are single roads, the approaches to which are very twisty, and particularly dangerous at night.

I trust that this letter may meet the eye of some of the authorities responsible for the present state of affairs, and cause them to approach the Road Board for a grant to enable them to remedy the defects.

H. GREENWOOD BROWN.

CANADIAN CRITICISMS.

[19553.]—It is evident that R. B. Hardie [18902] is one of the anti-British persons who delight in depreciating British goods as compared with those of other nations. It may be assumed that the motorists of Australia and South Africa know their own minds, but who ever heard of them going in for American cars? I, at least, have not. I have only heard of their predilection for Talbot and Colonial Napier cars, to mention only two of the best ones. I have yet to hear of any American cars which have equalled the feat of the 15 h.p. Talbot, in crossing Australia without any roads, or the ways of the Colonial Napier with the spruits and veldt, where only Cape carts with twelve span of oxen had been before. If there are any such, I should be glad to hear of them. I am one of those many who believe in the strength and reliability of British cars above all others.

E. H. YOUNG.

TO SEVERAL CORRESPONDENTS.—Owing to the intervention of the holidays several letters which came to hand after the correspondence pages had been made up are unavoidably held over till next week.

:: BOOKS and MAPS ::
:: FOR MOTORISTS ::

	Net.	By post.
"Complete Hints and Tips for Automobilists"	2/6	2/10
"Faults and How to Find Them," J. S. Bickford, B.A., 3rd edition	2/6	2/10
"The Maintenance of Motor Cars," Eric W. Walford	2/6	2/9
"Encyclopedia of Motoring," R. J. Mecredy	7/6	7/10
"The Autocar" Log Book	1/6	1/8
"Motors and Motoring," Prof. Spooner	2/-	2/4
"The Highways and Byways of England," Their History and Romance, T. W. Wilkinson	4/6	4/9
"The Autocar" Sectional Map of England and Wales, Consisting of 24 loose sections on strong card. Scale 8 miles to the inch		
In stout waterproof envelope	4/6	4/10
In cloth case	6/-	6/4
In solid hide case, celluloid front	12/6	12/10
"The Autocar" Map of England and Wales, Scale 8 miles to the inch		
Dissected and folded, in neat case cloth	8/6	8/10
Also on rollers (a good wall map)	8/6	8/10
"The Autocar" Map of Scotland.		
"The Autocar" Map of Ireland, Scale 7 miles to the inch.		
Same styles and prices as above.		
"The Autocar" Map of London and Environs.		
In stout waterproof envelope	3/6	3/10
In-cloth case	4/6	4/10
Solid hide case, celluloid front	12/6	12/10

Obtainable by post (remittance with order) from
ILIFFE & SONS Ltd., 20, Tudor St., London, E.C.
or of leading Booksellers and Railway Bookstalls.

Flashes.

An Argyll car chassis has been converted by the Peterborough Fire Brigade into a most serviceable tender, carrying eight men, with stand pipes, branch pipes, hose, ladders, and all accessories. The new vehicle relieves the horse-drawn steamer and covers the ground in a third of the time.

* * *

It is claimed that congestion of traffic at difficult curves is avoided and collisions between cars are eliminated by a peculiar plan adopted at Redlands, California. It consists of a broad stripe of bright aluminium paint on the road surface with a guiding arrow at each end, which plainly indicates, "Keep to the right" (the correct side to drive in America). This guiding line runs down the centre of dangerously curved streets. In approaching a compound curve the driver of a swiftly moving vehicle has a tendency to take a straight course from kerb to kerb, instead of remaining on his own side of the road, and as this is likely to result in confusion where there is other traffic, the plan of painted guide lines was hit upon as a remedy.

* * *

The work of the Motor Car Engineering Department of the Faculty of Engineering, which is provided in the Merchant Venturers' Technical College, University of Bristol, has been extended to include not merely engineering problems connected with motor cars, but also those connected with flying machines, motor boats, etc. It has, therefore, been decided that the department shall henceforth be known as the "Department of Automobile Engineering"; a corresponding alteration will be made in the title of the Chair occupied by Professor W. Morgan, B.Sc.

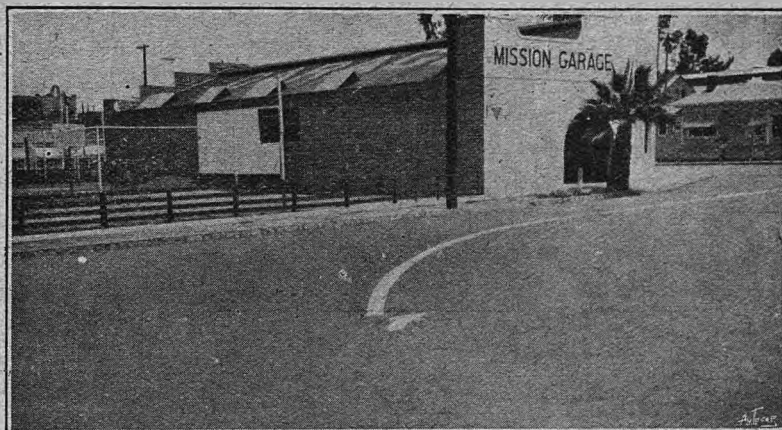
* * *

The employees of the Argyll Co. are now reaping the benefit of the foresight of the management displayed last autumn. The building programme at the Argyll works was then extended and the winter pro-

duction accelerated by a considerable addition of men and an extensive system of overtime. A bargain with the employees was made that overtime would cease when weather and light would permit of outdoor exercise. Now the workers are enjoying the fruits of a winter of hard work, and the management are in a position to give reasonably quick delivery, which is so desirable at this time of the year.

* * *

The Continental Tyre Co. have just published a very interesting addition to their many guide books and

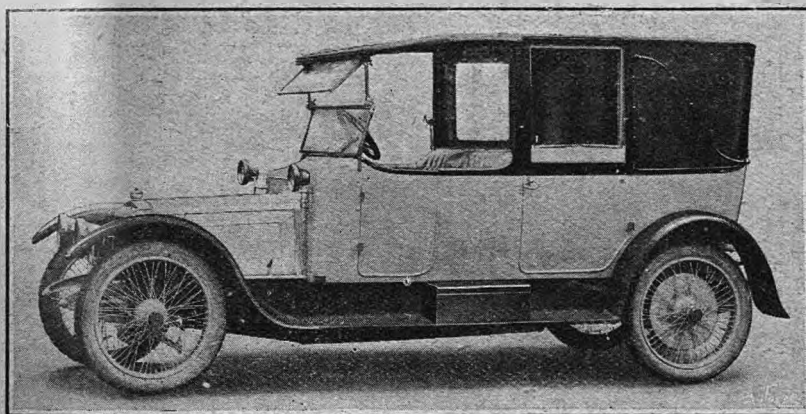


A PLAN TO PREVENT CORNER CUTTING. The centre line drawn on the road referred to in the accompanying paragraph. The arrow shows drivers the side of the line to keep to. As this example is in America the arrow directs to the right-hand side of the road.

atlases of Continental countries; before the appearance of this publication, no atlases or hand books of equal value to motorists were in existence for Holland. Existing works of Holland, to our knowledge, were always associated with other countries, and it naturally follows that such issues could not exhaustively and satisfactorily deal with a country which possesses so many romantic and picturesque, as well as historic, attractions. All motorists intending to travel in Holland should find this new guide of a very helpful nature. It is sold at 2s. 6d. post free.

* * *

As the ratepayers' associations and other local interests still persisted in their opposition, the Roads



A 25 h.p. Knight-Panhard limousine cabriolet which was recently supplied to Mr. W. Beit by Messrs. W. and G. Du Cros, Acton Vale, W. The body is by Messrs. J. A. Lawton & Co., and is upholstered in aluminium coloured leather with interior fittings to match. The equipment includes a C.A.V. dynamo lighting set and Dunlop detachable wheels.

Improvement Association briefed counsel to support the Croydon Corporation at the Local Government Board Inquiry on the 14th ult. into the Corporation's application for power to raise the £19,743 required to carry through the scheme for a new relief road from Thornton Heath to Purley. This scheme shows the necessity of maintaining a strong and well organised body, such as the R.I.A. to represent the general road users' interests. Unless the R.I.A. had handled this matter there is no doubt that the scheme would have fallen through or have been held up indefinitely in spite of the fact that it had the support of the Corporation's Executive Departments and a number of influential members of the council.

Flashes.

Arrangements are in hand for organising an automobile section in connection with the Industrial Exhibition which is to be held in Auckland, New Zealand, from December to February next.

Motorists are asked to drive slowly in the Ayr district, especially on the Racecourse Road and on the Prestwick Road. A complaint has also been received from the Chief Constable of Lanarkshire regarding the driving of cars on the Glasgow-Carlisle Road near Elvinfoot. Care is necessary, as the road is unfenced and there are a large number of sheep about.



The meet of the motoring members of the Royal North of Ireland Yacht Club at Belfast on Saturday last. A paper chase was held subsequently.

Included in the list of new Chevaliers de la Legion d'Honneur just issued by the French Government is the name of M. Pierre Delaunay-Belleville, of the well-known French motor car company of that name.

* * *

A company has just been formed in New York, with a capital of £80,000, under the title of the Dunlop Wire Wheel Corporation of America, to manufacture the Dunlop detachable wire wheel for the American market.

* * *

An interesting incident in the meeting of the Boy Scouts' Association, at which the Duke of Connaught occupied the chair for the first time since his recent appointment as president by H.M. the King, was the presentation to the Chief Scout—Lieut.-General Sir R. Baden-Powell—of the wedding present subscribed for by members, a 20 h.p. Standard single landaulet.

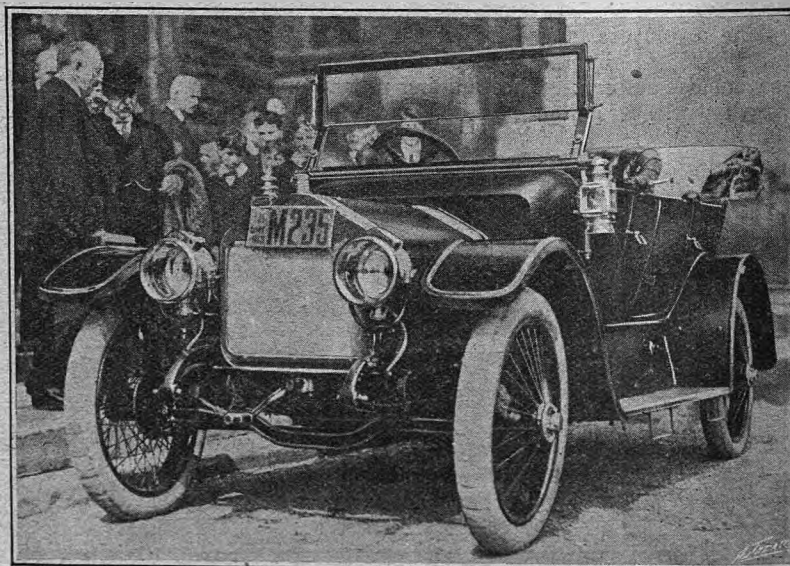
* * *

In connection with the endeavours of the National Society of Chauffeurs to bring out an automatic cancellation of endorsements recorded upon motor driving licences in this country, it is interesting to note that in France the Chamber of Deputies has just adopted a Bill in favour of an amnesty to all chauffeurs and motor drivers who have been fined for infringing the motor regulations. The amnesty will not extend to those who have been repeatedly found guilty or who have been convicted of causing a serious accident. The Bill has yet to be passed by the French Senate, but it is not expected to be opposed in that House.

other hand, the shipments to the United Kingdom were not equal to those recorded in February a year ago.

* * *

Another good tale from Ireland is about an honest motor expert who was asked to "vet" a second-hand car in a garage. He went to the place, walked round the car, and then took hold of the body and shook it. The result of this practical treatment was a most appalling rattle. Whereupon the motor vet. turned to the proprietor of the garage with some alarm on his countenance and said, "Come here and hold this old car; I am sure it will fall down if I let it go."



The Hon. Sir James Whitney, Premier of Ontario (in bowler hat), on the steps of Ontario Parliament Buildings admiring a Wolseley car which had just been presented to him by his associates in Parliament. Hitherto Sir James has been in the habit of cycling to and from the Parliament Buildings.

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.

Querists 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. 2665.—7 h.p. Swift.

I drove a 7 h.p. Swift car for some thousands of miles, and found that it went very much better after I had fitted a smaller jet, which was supplied to me by the company, and also a Powden wire extra air valve. Mileage was increased, and I was able to keep the engine much cleaner. I never had an involuntary stop for other than very minor repairs.—CROW.

No. 2615.—18-20 h.p. R.M.C. Car.

I have driven one of these cars over 20,000 miles and was only hung up for a few minutes on one occasion with magneto trouble, due to the distributor case cover unscrewing. I always looked well after the car and kept it in first-class order. I averaged twenty-four miles to the gallon of petrol, and 400 miles to a gallon of oil. The car is very light on tyres. One front tyre did 11,000 miles; one back tyre did 5,000 miles, and the other 7,000 odd. The other front tyre did about 7,000. There is no tendency on the part of the car to skid if driven reasonably. The concessionaries are all right to deal with, but one must satisfy them that renewals are required through faulty material or workmanship. A broken crankshaft is an impossibility. The carburetter is easily adjustable at several points of the throttle movement and is perfectly simple. The car is a fine hill-climber, practically top gear. I have had good results with the Claudel-Hobson and Zenith carburetter, but prefer the one fitted, the Schebler. I have never tried benzole. Any of the good brands of oil are satisfactory. I have run the car about 9,000 miles all up and down the country without the pistons being cleaned.—W.I.R.

2616.—Carburetter for 14-16 h.p. Belsize.

I have a 1912 car of this make; it is a five-seater and weighs just over 27 cwt. It is fitted with a Zenith carburetter, and I have tried all sorts of combinations of jets and choke tubes, but cannot get a reasonable consumption. The best is choke tube 19, main jet 85, subsidiary jet 100. I can get 16 m.p.g. on a run of fifty miles, but only thirteen to fourteen on short runs. Extra air inlets do not improve it at all. Moreover, the cars will not do above 36 m.p.h. on level with any combination. Would be interested to hear opinions of other users.—H.D.W.

No. 2631.—Warland Dual Rims.

I had Warland Dual rims fitted to my 20 h.p. six-cylinder Talbot on May 1st, 1912, and have driven 4,750 miles on them. On July 1st, 1912, I fitted two new Helsby covers on the front wheels, and these two rims have not been removed for nine months and have done 4,008 miles during that time. There is no rust at any part and the water does not get inside the cover. I have used detachable rims since May, 1906, and have had experience of four different makes, and I have no hesitation in placing Warland Dual rims first by a long way.—LEYCESTER BARWELL.

No. 2648.—Adams 1913 Self-starter Car.

I have had experience of a 1911 16 h.p. self-starter Adams, and the general characteristics of the car were extreme steadiness on the road, silence, and steady strong pull of the engine. My car could be driven at four to five miles per hour on top speed, and the acceleration was very good, and speed on the level was equal to almost any other car of similar power on the road. The springing and system of lubrication were quite satisfactory. My carburetter was not a Claudel, but an Adams, and the consumption of petrol was about twenty miles per gallon.—D. S. CAMPBELL.

No. 2629.—11.9 Humber.

I bought a new two-seater in March, 1912, ran it 6,000 miles last summer, and it gave me every satisfaction. Petrol consumption 22 m.p.g. (average), cylinders cleaned out after summer's use, but were not badly carbonised; car quite simple for lady to drive my wife drives often. I have had no breakage or renewals whatever, with exception of two valve springs. Car is most comfortable, and I have not found any weak points.—EE 327.

No. 2659.—Carburetter for 14-20 h.p. Renault.

I have a 14-20 h.p. 1912 Renault. Petrol consumption 17 m.p.g. I use Taxi bus spirit, and can do nearly 50 m.p.h. on a good road with a big landaulet body. I have driven this car 9,000 miles. The car only did 13 m.p.g., and would do no more than 35 m.p.h., and would only climb hills at 16 m.p.h. on third speed. It will now go up at 25 m.p.h. on third. I lowered the petrol consumption by loosening the locknut on the needle valve and screwing the needle valve two complete turns to the right, which lowered the petrol level; adjusted the valve tappets so that, with the piston at the top of the stroke, the exhaust valve just shuts and the inlet just starts opening. The magneto was set so that the spark occurred 9 mm. from top of the compression stroke. I retarded it a bit by setting it 6 mm. from the top of the stroke. The engine ran much smoother at low speeds. I always use the hot air in winter and cold in summer. When it is very cold I have to run with the air closed. These adjustments have made the engine harder to start, but it is all right when it gets warm. I generally inject a little petrol through the compression taps and flood the carburetter, and the engine starts at the first pull on the coldest of mornings. "S.J.S." should adjust his needle valve till he gets a satisfactory result, as, from what he says about the air, I am quite sure his petrol level is too high.—L.B.

No. 2672.—Noisy Universal Joints.

In reply to "G.H.H.," I suggest that he make sure that the pins are properly lubricated. On a car I once had I had the same trouble. On taking out the pins I found them quite dry; the one next the gear box was rusty, although the joints were packed round with grease and covered up with leather bags. I found by

The AUTOMOBILE EXCHANGE, Ltd.

91, Gt. Portland St., LONDON, W.

Telephone: Mayfair 3946.

Telegrams: "Fluentness, London."

Works—33 and 34, Foley Street, W.

Have the following Cars for Immediate Delivery:

NEW Cars—

16/20 h.p. **ADAMS**, interior driven coupe with dickey seat **£500**
 15.9 h.p. **S.C.A.R.**, torpedo body, hood and screen. **£375 gns.**
 8 h.p. **BAYARD**, 2-seater, completely equipped **£220**
 15.9 h.p. **GERMAIN** Chassis **£350**

SECOND-HAND Cars.

1913 20 h.p. **OVERLAND** Touring Car, completely equipped **£185**
 1912 16/20 h.p. **ADAMS** Touring Car, completely equipped **£300**
 1912 16/20 h.p. **ADAMS** Touring Car, fully equipped **£275**
 Late 1911 12/16 h.p. **WOLSELEY** Touring Car, fully equipped **£265**
 Late 1910 12/14 h.p. **F.I.A.T.**, 4-seater, specially equipped with C.A.V. outfit, 2 wind screens, Frankonia mudguards, detachable rims, etc. **£240**
 1911 17 h.p. **DELAUNAY BELLEVILLE**, interior driven coupe, beautifully fitted up **£425**
 1911 12/16 h.p. **SUNBEAM**, 2-seater, with dickey seat, detachable wheels, etc. **£260**
 1909 20 h.p. **DELAUNAY** Touring Car, live axle, 2 speeds, hood and screen, etc. **£125**
 14/16 h.p. **ADAMS**, 4 cyls., epicyclic gears, 4-seater body **£120**
 1910 15.9 h.p. **S.C.A.T.**, Self-starter, touring body, fully equipped **£235**
 1908 10-12 h.p. **SWIFT**, 4 cylinders, 2-seater, fully equipped **£120**
 1911 25/35 h.p. **AUSTRIAN DAIMLER** Landaulette, beautifully equipped **£520**
 1909 18/24 h.p. **AUSTIN** $\frac{3}{4}$ Landaulette, fully equipped **£375**
 1910 20/30 h.p. **RENAULT** Landaulette, most beautifully equipped **£450**
 1911 22 h.p. **DARRACQ** Cabriolet, fully equipped **£285**
 August 1912 24 h.p. **DENNIS**, fitted with a Salmon "All Weather" body. In perfect order **£500**

Full Specifications on application

Repairs

ANY MAKE OF CAR
REPAIRED AND OVER-
HAULED AT THE

Clement REPAIR WORKS.

All work carried out by skilled
mechanics.

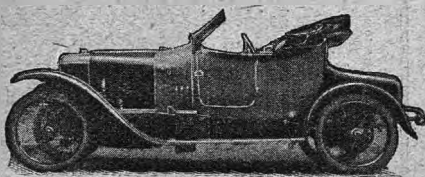
Detailed estimates and definite
date of delivery given.

BODY PAINTING, ETC.

CLEMENT MOTOR CO., Ltd.,
Mercer St., Long Acre, W.C.

Telephones: Gerrard 1917 & 1918.

Europe's Reply to America.



The finest Hill-Climber extant.

HILL

Economy.
Speed.
Reliability.
Simplicity.
Style.

15 h.p. 76x120—750x85 Michelin
200 guineas.

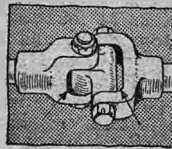
20 h.p. 80x150—760x90 Michelin
230 guineas.

A. GAAL & CO. RENAULT
SPECIALISTS
17 HANOVER SQ. REGENT ST W.

Some Queries and Replies (Continued).

taking out and well greasing the pins once a fortnight the noise was entirely stopped. Of course, proper oil holes or grease cups would have been better.—W.H.T.

A very simple and effective remedy for eliminating chatter in the type of universal joint referred to by "G.H.H.," which I adopted with complete success, is to pack the interstices of the joints (at the points indicated



by the arrows in the accompanying sketch) with a couple of short strips of rubber cut from an old motor tube. This gives the effect of "cushioning" all shocks transmitted, without disturbing the function of the joint. It is best to dismantle the coupling and pack each interstice separately, as it may require two thicknesses of rubber, and tight packing is essential for success.—S.E.S.

No. 2367.—Electric Light.

I have a 14 h.p. 1912 Humber and had it fitted with the C.A.V. electric lighting. With one exception I have found it most satisfactory, but, of course, it is fairly expensive, mine costing fully £40, including battery, dynamo, and fitting. The C.A.V. supply an aluminum wheel for bolting on to the cardan-shaft, but I found it soon slipped. The local agents then fitted a brass pulley, which has given complete satisfaction. I have run the car about 3,500 miles now, and the lighting has never failed me once. It is as well to carry a few spare bulbs, however, in case any of the filaments break.—D.H.W.

QUERIES.

No. 2680.—Fort William to Arisaig.

I SHOULD be much obliged for any information re the road from Fort William to Arisaig, as to the steepness of the gradients, the surface, etc. I half intend going to Arisaig for June, and do not know whether to take my 8 h.p. Renault car with me.—R.B.C.

No. 2681.—20 h.p. New Pick Car

WOULD any of your readers kindly give me their criticism of the behaviour of and value of service to be obtained from a four-seater 20 h.p. 1913 New Pick? I am an owner-driver of ample experience, and afford the kindest of treatment to my cars. Any other information from drivers of the New Pick will be welcomed.—MEDICO.

No. 2682.—Openings in Brazil.

BEING at present in business as an automobile engineer, I have been considering of late going abroad, and having seen at various times in *The Autocar* that there are openings for this business in Brazil, I should esteem it a great favour if any of your readers can give me some information on this point, as to the best time of year to go out? If not knowing foreign languages, would one be seriously handicapped? The best town to go to? How does the cost of living compare with England? Are there many English people living there? Would employment be easy to obtain, and at about what remuneration? I should

prefer to get employment for a time to get accustomed to the ways of the country before starting in business for myself.—E.A.R.

QUERY AND REPLY.

No. 2683.—Knocking Noises.

CAN any user of a 15 h.p. S.C.A.T. car fitted with self-starter enlighten me as to the cause of bad clanking, hammering, or knocking noises in the engine, under certain conditions, which are in some way caused by the presence of the eccentric, connecting rod, and piston of the air compressor, collectively or individually. Several careful examinations by qualified men have resulted in reports that everything appears to be in perfect order about the crankshaft, big and little ends, timing wheels, and the aforesaid eccentric, connecting rod, and piston, and, in fact, they have one and all been unable to state the actual cause of this hammering or knocking noise? In the case in point the piston of the air compressor and the piston of the engine cylinder nearest the radiator rise and fall together. There is no sign at all of this knocking except with throttle full or nearly full open, together with a speed, on top gear (or the equivalent engine speed on a lower gear), of 15 m.p.h. and upwards. For instance, suppose one is going at 10 m.p.h. on top gear, throttle full open or otherwise, there is no knocking, but if the throttle be kept full or nearly full open, then as soon as the speed reaches 15 m.p.h. it commences, and, I believe, continues up to the maximum speed which can be obtained, but the instant the accelerator be let up, irrespective of speed, all signs of the knocking disappear. If the eccentric, connecting rod, and piston of the air compressor be removed the knocking cannot be produced. This knocking is almost entirely confined to the front cylinder of the engine, as may be proved by short-circuiting, in rotation, three of the plugs, and running on one cylinder at a time, with the gears in neutral. There may be just a little of it in the second cylinder, and possibly a symptom of it in the third, but no sign whatever in the fourth. I have spent so much in attempts to trace and remedy this matter without the slightest success that unless some reader can enlighten me I shall, reluctantly, abandon any further attempts to rectify a very objectionable, even if possibly harmless, feature in a car which in almost all other respects I have a very high opinion of.—GROSVEN.

A proof of the above was sent to Messrs. Newton and Bennett, Ltd., the British agents for the S.C.A.T. car, and the following is their reply: "We are extremely sorry to note that after your correspondent's efforts to discover the knocking he has not met with better results. We can only gather from his letter that he has not tested the crankshaft or the crankshaft bearings, and we think it is quite possible there is some slight play in the bearings that might be responsible for the knocking complained of. We shall be very pleased to place our services at your correspondent's disposal, when we have little doubt that we shall be successful in eliminating the trouble."

Week-end and Touring Notes.

Motoring in Russia.—Warsaw to Moscow.

An Account of a Motorist's Experiences after Crossing the Frontier from Germany to Russia.

(Continued from page 875.)

Except for some thirty or forty miles in the neighbourhood of Slutsk the road from Warsaw to Moscow is an excellent one. That is not to say that one can let the car rip; if one does, one breaks springs and things—as I did. Whenever there are three or four posts close together on both sides of the road the man of experience knows there is a stream passing underneath, and that the road for a yard or two will probably be a foot above or below the normal level, the doubt depending on whether the supporting piles have had time to sink or whether provision has recently been made for their eventual sinking. The larger bridges also are frequently wanting in one or two of their most useful planks. So this Moscow road, in spite of its generally good surface, is not one on which an intelligent driver often exceeds 20 m.p.h., and driving at night is really dangerous.

The road passes through a most interesting country, chiefly inhabited by Russian peasants, who are a kindly, childlike people. The scenery is usually

One cannot miss the road. There is no other. Hotel information might have been conveyed by a hint to take a sleeping bag, canned food, and some cooking apparatus, and to live in the fields in fine weather and sleep in the first barn one finds when the weather is wet. I went to some trouble to get maps, but found that the Army maps had been made for only half the distance. I bought a German map which reproduced these in more convenient form, but this was an unnecessary expense, as I never referred to anything but a map I had previously torn out of a railway guide.

The road out of Warsaw is made of the usual cobbles, but it soon improves, and one has an excellent run to Siedlce, where quite a fair lunch can be obtained either in the public garden or in a restaurant just outside it, and where the Hotel Angielski has accommodation for car and driver less primitive than will be met with later.

In Siedlce I passed a detachment of infantry going at a great pace. It was preceded by its singers. The chief



An unfinished house, totally without furniture, in which the writer of the accompanying article found his most comfortable accommodation in 800 miles. Although he had to sleep on bare boards he was consoled by these at least being clean.

beautiful, reminding one often of the prettiest parts of rural England, but with the fields and forests on a larger scale. There are no walls or hedges, and one misses the pretty English cottages.

The reverse of the medal is the lack of decent sleeping accommodation and nicely prepared food. I also disliked the terrible straightness of the roads, but I should not have felt this so much if I had travelled shorter hours. I was nervous about petrol supplies; also after two or three days I longed for a clean soft bed and a good meal.

I worried my good friends of the Automobile Club of Poland at Warsaw quite unnecessarily for information as to roads and hotels. They could tell me very little, but there was little to tell. The road directions might have been accurately summarised, "Cross the ugly crowded iron bridge over the Vistula, keep right of the Brest and Kovelski railway stations; then left to the main road, and straight ahead for 800 miles."

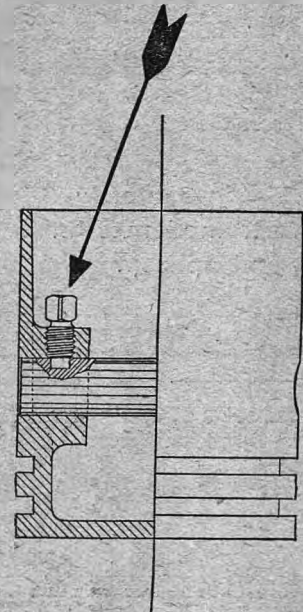
singers gave the verse with excellent voices, then the soldiers took up the chorus with a roar. It was a splendid marching tune; it simply swung the men along. I tried, unsuccessfully, to catch the words, and when later I made enquiry I was told the song was not a very proper one.

After Siedlce there was another sixty or seventy miles of good road, but five miles before Brest going became bad, with worse to follow. I was pulled up by a soldier, who told me the bridge had been burnt and there was only a temporary pontoon—too light for my car. I should have to cross by another bridge ten miles away, with nothing but field tracks to reach it by. I had a look at the pontoon, which seemed to me strong enough, so I told the sentry that my intimate friend M. Jacobliev, the engineer of roads and communications, had passed the pontoon in his car last week, and would greatly dislike my being forbidden unless it were absolutely necessary. The mention of this name made the sentry



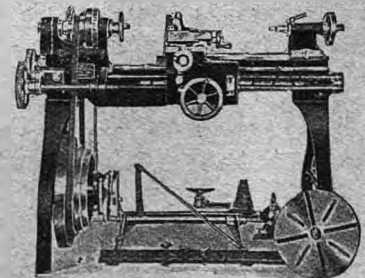
En Panne! And badly so; the motorist knows well what has happened, and is blaming himself roundly for not having prevented the trouble when prevention was not only possible, but easy.

This is what has happened. The set-screw that holds the gudgeon pin in place on one of his pistons (see drawing below) was lost during an overhaul of the engine. Not having another set-screw that would fit, it being a metric pitch, the motorist assembled his engine without it. Result, the gudgeon pin became loose and badly scored the cylinder, putting the car in dock for an expensive repair.



Now, supposing our motorist had had a lathe in his garage during the assembling of his engine, the making of a set-screw would have been an obvious and an easy thing to do. There would have been no need to trust to luck, and the consequences we have pictured could not have resulted.

The installation of a lathe in the garage is a paying proposition. There are hundreds of jobs similar to the above that can be readily done; running repair bills can be halved by such an installation.



Let us send you full particulars of our lathes for garage use. We shall be pleased to, and to give any information as to methods of installation, etc.

DRUMMOND BROS., LTD.,
AUTO TOOL WORKS, GUILDFORD SURREY.

HESSE & SAVORY



STRAKER
SQUIRE

The Motor Car of luxurious comfort, moderate in first cost, and upkeep.



STRAKER
SQUIRE

Early deliveries from

HESSE & SAVORY

TEDDINGTON.

SECOND-HAND CAR ?

We are the market.

F 16

Week-end and Touring Notes (Continued).

doubtful, and eventually he gave me leave to try at my own risk. I got over all right, but the pontoon was certainly not so solid as I had expected. I may say that I have not the honour of M. Jacobliev's friendship, but I had heard he had been into Brest by motor. A little bluff comes off better in this country than in some others. The other day the postman brought me a registered letter, which he refused to deliver without proof of my identity. It was not convenient to produce my passport, and I needed the letter at once. I took the envelope out of the postman's hands and said to him, "Do you see that seal? That is the seal of one of the greatest banks of the world. Do you think the National Provincial Bank of England would write letters to me unless I were a person of the highest position and of absolute honesty?" I opened the envelope and placed the contents in my pocket, the postman meantime standing awestruck. Then I said to him, "I shall give you this envelope, with the seal, and you will produce it as evidence if any question arises." The postman took the envelope, with the seal, and went away perfectly satisfied.

At Brest one is out of Poland and in true Russia. This was the first Russian fortified town I had seen. It seems strange to a non-military mind that, whereas the German strategic railways and fortified towns run within sight of the Russian border, the Russian line of defensive works should be 300 miles inside their political frontier. Perhaps the Russians count on the Polish dislike for Germany being almost as great as their hatred of Russia. Possibly they think it would do the Poles good to experience the treatment meted out to the French frontier people in 1870.

I found a clean bedroom in the Hotel d'Europe, where I first became acquainted with a custom prevailing in most Russian country hotels, namely, that travellers bring their own bedding and towels or go without. This hotel was, however, able to provide me with these luxuries at an extra charge, which I was most willing to pay, as I got them clean. Later on I had to sleep wrapped in my motor coat. I had dinner in the public garden. It took a long time to prepare, but was not bad when I got it. I filled the car with petrol here, and bought and fitted an extra tank. There is plenty of excellent and cheap petrol to be obtained at Sloutsk, but the natives knew nothing of this. Perhaps it is not to be wondered at, seeing that the journey to Sloutsk, less than 200 miles distant, occupies two whole days by train and post waggon.

I left Brest before four o'clock the next morning with a vague idea that I might succeed in covering before night the 260 miles to Bobruisk. This early start was worth the trouble. The road entered a country of wild moorland with a very distinct horizon of forest. The sun was just rising and the mists stood over the numerous swampy places. Great herds of horses and cattle were dotted over the huge plain, with here and there great flocks of geese feeding in company with many storks. The people watching the animals and geese, mostly children, who were near the road, all raced at full speed to see the car. I was equally interested in them. They were dressed only in sheepskins, with sheepskin caps.

My recollection of the "Decline and Fall" is not so distinct as it should be, but I fancy this is the country in which the Goths first manifested their desire to enter polite society. Whether these people are their direct descendants or not, there are thousands of models at hand to-day who could sit at any moment for a painter desirous of portraying the strenuous travellers who fifteen centuries ago toured the Eastern and Western Empires without thought of paying hotel bills. The children had complexions like a well-conditioned brown boot, with light blue eyes and hair almost white in its yellowness. They looked strong and healthy, and I imagine they had all passed the night in the open air, as some were still sleeping near the geese, and I saw no village near. It seemed a hard life for boys and girls of from about six to twelve years of age.

They were very inquisitive when I stopped, but would not come near, whether from good manners or fear of the car I cannot say, but their shyness was a most pleasant change from the manners of the Poles and Jews.

After this plain came a forest country, and then somewhat higher better cultivated ground, on which were great crops of rye and smaller patches of flax and huge fields of clover. Villages became more numerous, but were all well away from the road. These villages of log cabins are most inconspicuous. Their walls and old thatched roofs seem to sink into their background of field and forest. The road was excellent, but going was very slow, as I had to stop whenever I saw a horse. When overtaking, I usually waited until the peasant unharnessed and led the horse from his waggon into the fields. But, in spite of all my care there were five bad smashes on this and the previous day. I was sorry for one woman, whose horse bolted into the forest and smashed the waggon against the trees throwing the woman out very violently. She did all she could, but had not strength enough to control the horse. The other victims were men, who seemed as scared as their horses, and acted like fools. One drove straight into a deep pond, where his waggon upset with its full load of timber. His horse was nearly drowned before I got it loose. The peasants seemed used to their waggons being upset and broken, as is only natural in a country with such roads. But the loss of a horse would have been a serious matter.

Nearing Sloutsk the horses became tamer, which surprised me as I was always going further away from civilisation. Suddenly I saw on the skyline something which looked like a double-decked motor omnibus. It was a motor 'bus. It ran from Sloutsk to the local railway station, some fifty miles away. How often it ran I do not know—perhaps once a week. Built to carry about thirty, there were at least fifty people on it, hanging on everywhere, and much luggage. It was an old machine and very slow, but one could see how much such things were needed. I wondered how this 'bus would pass a road diversion I had just had great difficulty in passing with my car. I expect it toppled over. But these people would not mind. The road, as I have already stated, became very bad near Sloutsk, and this and my troubles with the horses so delayed me that I stayed there for the night.

Week-end and Touring Notes (Continued).

I dined fairly well at the local club. The members are always glad when any more or less presentable stranger enters their country club without introduction and treats the place as though it were a restaurant. To do otherwise is to assert a social superiority over the local officials (there are few other educated people) who belong to it. I stayed at the Hotel Bristol, which was not bad, except in the one department which suffers most from scarcity of water. The want of water is a great trouble in this country. Every drop between Warsaw and Moscow has to be drawn from rivers or wells, and often carried great distances. The Russians do not take unnecessary trouble, and they have invented all sorts of devices, not for supplying water, but for economising it. The result is filth, stinks, and discomfort. What water there is is usually dirty and highly dangerous to drink except after boiling.

My third day's run was a short one, as I expected to have a very long run on the fourth. The road leaving Sloutsk was very bad; I had to crawl the first ten miles on second speed. Then it became better and ran through a poor forest country, alternating between swamps and a sandy soil, on which thin crops of rye and flax were growing here and there. I came to a village on the road (they are mostly far away in the fields), and, this being a day on which time mattered little, I stopped to study the peasant in his home. The women all wore the national costume, with lots of red in it, with red kerchiefs on their heads and no shoes or stockings. There were very few young men; I imagine these were mostly with the army. The women have to do the hardest field work, and I have seen them doing

heavy navy-work on the railway under male overlookers. I took a photograph of the Mayor which pleased him immensely; he was a simple peasant in linen blouse and drawers and bark shoes like the other men. I asked his name and address, so that I might send him a print. He could not write, but he looked an intelligent old boy. They seemed a happy community and more prosperous than in the districts where Jews are numerous. The Russian peasant cannot meet the Jew on level terms. The Jew does not waste his time in dancing and singing, and the Jew is not troubled by the Russian peasant's terrible passion for Vodka; but I believe the sympathies of strangers are all with the amiable, generous, and ignorant Russian.

This day only one timber waggon was capsized, but there were many narrow escapes. I also had a narrow escape, as one horse pulling a load of very long fir-logs suddenly turned completely round, and did it so quickly that the ends of the logs just missed the front of my car before I could reverse far enough. I drove into Bobruisk through very pretty country, much of it like an English park, and then parts with splendid wide horizons of moor, cultivated land, and forest. At Bobruisk, I found another very large Jewish community, and in towns where the Jews are very numerous, or are backed by their allies the Poles, politeness to strangers, who may, for all they know, be German or Austrian, or Russian, is the last thing to be expected. Also such places are usually most unclean. I stayed at a Jewish hotel, the Hotel Passage, which was not very bad, and I found a better restaurant than I should have anticipated.

(To be concluded.)

Flashes (Continued).

An up-to-date garage has just been opened by Messrs. Loftus L. Salter and Co. at Royston, on the main road from London to Cambridge and Newmarket, which should prove of great convenience to motorists using this road.

For reference to the description of the 22 h.p. Bayard, which appeared in our issue of May 3rd, pages 804-6, it should be noted that these cars are handled in this country by Messrs. Bayard Cars, Ltd., 98, High Street, Marylebone, London, W.

Pirelli Tyres, Ltd., 144, Queen Victoria Street, London, E.C., send us a copy of their pamphlet setting out the conditions of the free car insurance policy issued to users of Pirelli tyres by the London and Lancashire Life and General Assurance Association, Ltd. This scheme appears to be a very good one.

We learn that Messrs. Cooke and Caffyns, Ltd., Station Road, Bexhill, have recently completed a considerable addition to their premises in the shape of an open garage capable of accommodating forty to fifty cars with the existing lock-up garages. A special inspection pit is provided for the use of visitors, and also a large covered wash.

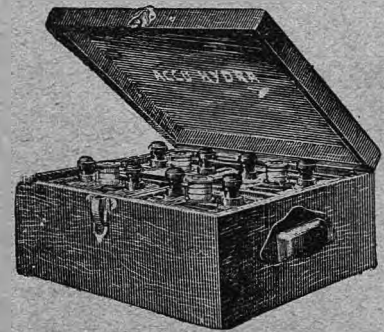
We are informed by Bramco, Ltd., Coventry, that during April they sold between 700 and 800 of their valve cap tyre inflators.

Messrs. Harvey Frost and Co., Great Eastern Street, E.C., and 27, Charing Cross Road, London, W.C., ask us to state that the mandrel referred to in a description of the new H.F. fitting in our issue of the 3rd inst. is illustrated in a pamphlet, No. 79, which can be had on application to Messrs. Harvey Frost and Co., at the above address.

The motor department of Messrs. John Barker and Co., High Street, Kensington, London, W., is offering many attractive motor accessories. The Barker fibre stepmat, which is complete in brass or nickel tray with thumb-screw nuts at 7s. 6d., is one of the neatest things of its kind we have yet come across, while the motor cleaning outfit at 21s., carriage paid, should appeal to the owner-driver who feels compelled, or who prefers, to do his own car washing. This outfit is very complete and good value, and the owner-driver purchasing it will find himself completely equipped to cope with the dirt. Messrs. John Barker also deal in Empire motor fuel, which is 3d. to 4d. cheaper than petrol, and guaranteed to run thirty to thirty-three miles to the gallon on 16-20 h.p. cars.

HYDRA

Lighting
Accumulators.



No Separators used.
Actual Capacity Supplied.
Cheapest in the end.

British Representatives:
G. H. SMITH & Co. (London) Ltd.,
12, Mortimer Street,
Great Portland Street,
LONDON, W. ;
and 171, Spon Street, Coventry.

Write for Hydra List.

**“Faults and How to Find Them.”**

By J. S. V. BICKFORD, B.A.

Motor Car Failures and their remedies fully explained. . . .

Third Edition, Revised and Enlarged.

This useful work has been prepared chiefly with a view to assist the novice to locate the faults usually met with in motor cars. Over 180 faults are mentioned, and a remedy is given for each fault.

Price 2/6 Net. By Post 2/9.

OBTAINABLE FROM
Iliffe & Sons Ltd., 20, Tudor St., London, E.C.
AND ALL BOOKSELLERS.

Hollingdrakes STOCKPORT.

Before definitely deciding to purchase a new car, it would pay you without doubt to try a 1913

Standard Car

Guaranteed for Three Years.

PRICES.

- 9.5 h.p. Two-seater .. £185.
- 15 h.p. Four-seater .. £375.
- 20 h.p. Five-seater .. £487.

SPECIFICATION—Complete with Sankey detachable wheels, spare wheel, tyre, and tube, high-class body, hood, screen, all lamps, horn, full kit of tools and spares.

Write to above address for catalogue and full particulars.

EARLY DELIVERY OF ALL MODELS.

D. J. SMITH & Co., LTD.

ENGINEERS AND MERCHANTS,
Established 1899.
Steam Specialists.

White, 15 h.p., latest type, touring car	£225
Renault, 20-30 h.p. Limousine	£300
18 h.p. White, hood, screen	£120
15 h.p. White car, hood, screen	£150
Side Entrance Car, hood, screen. No engine	£.0
Mercedes, 1-cyl., magneto, two-seater	£40
20 h.p. White, single landaulette	£140
18 h.p. White, landaulette	£100
4-cyl. Darracq, 2-seater, hood, screen	£60
12-15 h.p. Gardner-Serpolllet	£125
10 h.p. Stanley 2-seater, with dickey	£80
20 h.p. White, petrol or paraffin fuel	£130
20 h.p. White, two-seater, hood, electric lamps	£120
11 h.p. Serpollet, 4-seater	£35
12 h.p. Darracq Serpollet	£80
20 h.p. White touring car	£85
Humber 3½ h.p. motor cycle	£7 10
Quadrant 3½ h.p. motor cycle	£7 10

SPECIALITY—Light Railway Locomotives, any gauge, any fuel. Motor Caravans. Special vehicles built, steam or petrol.

REPAIRS! REPAIRS!

Are you satisfied with the Repairs you have had done?

For many years we have been doing repair work for the trade. We are now open to do repairs for private owners, pleasure or commercial vehicles, chassis or body work. We build railway locomotives, so can undertake all classes of motor or engineering work.

White, Stanley, Serpollet, Turner, Locomobile, and other steam car parts in stock.

58 Compton St., Goswell Rd., London, E.C.

Telegrams: "Smitholm, London." Phone: 3047 Central

"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.		This Year.		Last Div.	Div. Payable
				Highest	Lowest	Highest	Lowest		
2,520	1/	Abingdon-Ecco, Ltd.	2/6 3/6	3/-	2/3	3/6	3/-	%	Nov.
45,000	£5	Alldays & Onions (£3 paid)	3½ sellers	4½	3½	3½	3½	5	Ap/Dc
50,000	£5	" " 6% Cum. Pref.	5 5½	5½	5½	5½	5½	6	Ap/Dc
209,802	10/-	Argylls, Ltd.	5/6 6/-	6/-	4/-	6/-	4/9	12	Dec.
150,000	£1	Belsize Motors, Ltd.	25/6 26/-	28/1½	25/-	27/6	26/-	12	My/Nv
100,000	£1	" " Cum. Pref.	19/9 20/4½	20/9	20/-	20/3	20/9	6	Fb/Au
44,772	£1	Bowden Brake, Ltd.	5/- sellers	7/-	3/1½	5/-	3/-	Nil	Dec.
766,982	£1	Birm'gham Sm'l Arms, Ltd.	47/9 48/-	53/3	46/3	50/-	47/9	10	Mr/Sp
203,150	£5	" " Cum. Pref.	5½	5½	5½	5½	5½	5	Mr/Sp
75,000	£5	Braintree Bros. Cum. Pref.	4 sellers	4½	3½	4½	3½	6	Oct.
100,000	£1	Brooks, J. B., & Co., Ltd.	36/6 sellers	37/6	31/-	36/6	35/-	5	My/Nv
100,000	£5	" " Cum. Pref.	5½ 5½xd	5½	5½	5½	5½	5	My/Nv
100,000	£5	Brown Bros. Cum. Pref.	4½	5	5	5	5	6	Ap/Dc
380,000	£1	Charon Par. Pref. Ord. ...	12/6 13/3	11/6	8/-	14/-	7/9	6	Ap/Dc
200,000	£1	Clement-Gladstator	3/6 4/6	3/-	1/6	3/-	2/1½	6	Ap/Dc
100,000	£1	" " 6% Cum. Pref.	14/6 sellers	14/9	10/4½	15/-	12/6	6	Dec.
55,000	£1	Components, Ltd.	6/- 6/9	6/9	4/-	6/9	6/1	Nil	Dec.
25,347	£1	" " 7% Cum. Pref.	12/6 13/6	15/-	11/1½	15/-	12/1	6	Dec.
275,000	£1	Darracq, A. & Co., Ltd. ...	14/- 14/3	16/4½	8/9	15/-	9/9	Nil	Ju/Dc
375,000	£1	" " 7% Cum. Pref. Ord.	15/4½ 15/6	19/1½	11/10½	18/-	15/-	7	Ap/Oc
159,229	£1	De Dion-Bouton, 7% Ord.	8/6 9/3	11/3	8/9	10/3	7/6	6	Dec.
1,000,000	£1	Dunlop Rubber	37/4½ 38/-	56/9	27/6	39/6	35/6	12½	Ap/Oc
200,000	£1	" " Cum. Pref.	19/9 20/3	21/-	17/-	20/-	18/6	6	My/SD
312,785	£1	" " Income Stock	17/9 18/6	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/-	15/9	10	Ju/Dc
994,990	£1	" " 5% Cum. Pref.	12/6 13/3	16/9	10/6	15/1½	12/7½	5	Ju/Dc
499,962	£1	" " Deferred	9/3 10/-	15/-	6/3	10/1½	8/-	Nil	Ju/Dc
99,977	£1	Enfield Cycle	20/9 21/6	19/9	13/9	21/9	18/-	7	Oct.
24,985	£1	" " Cum. Pref.	20/6 21/6	21/3	20/6	23/-	21/-	7	Fb/Oc
292,904	£1	Humber, Ltd. (New)	10/6 11/-	7/6	3/7½	17/9	10/1½	Nil	Nov.
331,495	£1	" " Cum. Pref.	15/- 15/9	11/-	8/9	15/-	6/6	Nil	Nov.
50,000	£1	James Cycle	12/- sellers	6/6	9	9½	9½	5	Ap/Nv
100,000	£5	Lucas, Joseph, Ltd.	1½ 2½	9½	5	9½	5½	6	Mr/Sp
100,000	£5	" " Cum. Pref.	2½ sellers	5½	5½	5½	5½	10	Nov.
73,385	£1	New Hudson Cycle Co.	25/- 25/6	24/6	11/0	28/-	24/6	6	Mr/Nv
18,023	£1	" " Cum. Pref.	18/6 19/6	20/-	18/-	19/6	19/6	15	Sept.
50,000	4/-	Premier Cycle	4/6 4/9	5/-	3/-	5/6	4/4½	7½	Feb.
125,000	10/-	" " Cum. Pref.	7/6 7/9	8/9	6/9	8/6	7/3	Nil	Feb.
31,000	£1	Riley (Coventry), Ltd.	6/3 6/9	8/9	5/3	7/4½	5/3	30	Jan/Feb.
200,000	£1	Rolls-Royce	44/3 sellers	47/3	36/3	48/6	44/6	10	N. v.
138,662	£1	Rover	39/- 39/6	31/3	12/6	40/-	30/9	10	N. v.
100,000	£1	Rudge-Whitworth, Ltd. ...	23/- sellers	24/-	15/-	25/3	22/6	5	Oct.
100,000	£5	" " 6% Cum. Pref.	3½ 4½	5½	3½	4½	3½	12	Oct.
41,621	6/-	Siddeley-Deasy	10/6 11/6	10/6	6/-	11/-	8/10½	8½	Dec.
50,000	£1	Singer & Co., Ltd.	17/6 18/6	19/6	6/6	19/1½	16/-	Nil	Oct.
70,000	£1	Star Engineering, Ltd.	12/- 13/-	18/6	10/6	17/6	12/6	5	Mar.
69,157	£1	" " Cum. Pref.	17/3 sellers	18/-	15/4½	17/6	17/-	7	Mar.
87,550	£1	Stepney Wheel	29/- 30/-	35/-	30/-	32/6	29/6	20	Mr/Oc
120,000	£1	Sunbeam Motor Car	56/6 58/6	59/-	57/6	59/-	55/-	25	Nov.
30,000	£1	" " 6% Cum. Pref.	22/-	23/3	20/4½	22/6	21/6	6	Ap/Nv
80,000	£1	Swift Cycle	20/3	21/-	21/9	13/-	20/6	6	Dec.
100,000	£1	" " 6½% Cum. Pref.	17/- sellers	17/3	14/10½	17/3	16/3	6½	Ju/Dc
80,000	£1	Triumph Cycle	78/6 80/-	71/6	43/9	82/-	68/-	30	Nov.
50,000	£1	" " 5% Cum. Par. Pref.	24/-	23/6	20/7½	24/6	21/6	6½	Nov.

Markets generally have been quiet owing to the holidays. * Including all arrears.

"The Autocar" Diary.

- | | |
|--|---|
| May. | June. |
| 17.—Essex C.A.C. Visit to Faulkbourne Hall, Witham. | 7.—Shelsley Walsh Hill-climb. |
| 18.—Cardiff M.C. Club Meet at Porthcawl. | 19.—Cardiff M.C. and South Wales A.C. Open Hill-climb at Caerphilly. |
| 18.—Opening of the Russian Automobile Exhibition | 21.—Cardiff M.C. and South Wales A.C. Open Speed Trials at Porthcawl. |
| 21 and 28.—Examinations for R.A.C. Driving Certificates. Pall Mall, S.W., 9 a.m. | 22-29.—Austrian Alpine Tour. |
| 24.—Hampshire A.C. Hill-climb at Brook Hill, Bramshaw. | July. |
| 24.—Cardiff M.C. Annual Hill climb. | 5.—Yorkshire A.C. Speed Trials on Saitburn Sands |
| 24.—Essex M.C. Race Meeting at Brooklands. | 12.—Grand Prix Race. Picardie Circuit. |
| 24.—Herts County A.C. Aston Hill-climb. | 19 and 20.—R.A.C. of Belgium Grand Prix Race. |
| 30.—500 Miles Race on Indianapolis track, U.S.A. | 28.—Grand Prix de France and Coupe de la Sarthe. Le Mans. |
| 31.—R.A.C. and Associated Clubs' Gala Day, Brooklands. | August. |
| June. | 10.—Mont Ventoux Hill Climb. |
| 4 and 6.—Tourist Trophy Races, Isle of Man (see <i>The Motor Cycle</i>). | September. |
| | 21.—Coupe de l'Auto, Boulogne Circuit. |
| | 23.—International Stock Car Race, Isle of Man. |

"THE AUTOCAR" COLONIAL AND FOREIGN EDITION.

IN ADDITION TO THE USUAL EDITIONS OF "THE AUTOCAR," A THIN 3D. EDITION IS PUBLISHED EACH WEEK FOR CIRCULATION ABROAD. THE ENGLISH AND FOREIGN RATES WILL BE FOUND BELOW. ORDERS WITH REMITTANCE SHOULD BE ADDRESSED "THE AUTOCAR," HERFORD STREET, COVENTRY. THE FOREIGN EDITION OF "THE AUTOCAR" IS SOLD TO THE TRADE AT A PRICE WHICH ENABLES IT TO BE RETAILED IN ANY PART OF THE WORLD AT 3D.

- The Autocar can be obtained from the following:
- UNITED STATES: The International News Company, New York.
 - PARIS: Smith's English Library, 248, Rue Rivoli.
 - AUSTRALIA: Gordon and Gotch, Ltd., Melbourne (Victoria) Sydney (N.S.W.), Brisbane (Queensland), Adelaide (S.A.), Perth (W.A.), and Launceston (Tasmania).
 - NEW ZEALAND: Gordon and Gotch, Ltd., Wellington, Auckland, Christchurch, and Dunedin.
 - CANADA: Toronto News Co., Ltd., Toronto; Montreal News Co., Ltd., Montreal; Winnipeg News Co., Winnipeg; British Columbia News Co. Vancouver; Gordon and Gotch, Ltd., 132, Bay Street, Toronto.
 - SOUTH AFRICA: Central News Agency, Ltd.

"THE AUTOCAR" SUBSCRIPTION RATES.

British Isles—Threepenny edition, 1s. Penny (thin paper) edition, 6s. 6d. Foreign, 24s. per annum.