

# The Motor

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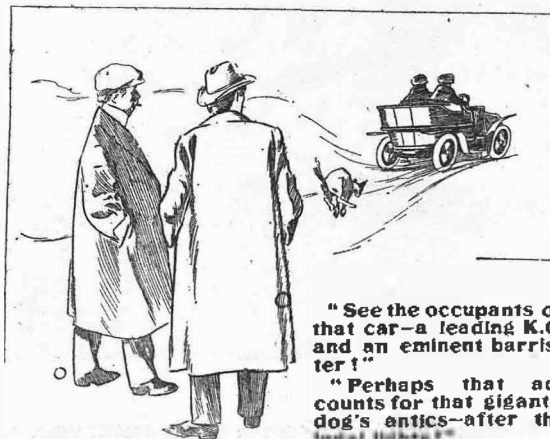
## THE DEVELOPMENT OF THE LIGHT CAR.

By "DEERATCH."

Considering the large number of firms turning out cars in Great Britain, the Continent, and America, it is hard to believe that the commercial production of the motor vehicle only dates back to 1890-1891. Unlike many industries, the pioneers in this are amongst the leading manufacturers of to-day, and are very properly reaping a reward which must well repay them for the trials and disappointments they underwent in endeavouring to introduce their wares to an unbelieving public. The few years which have elapsed since its birth have seen vast changes in every portion of the motorcar; and in reviewing the phases through which it has passed it is interesting to note that those manufacturers who began by building two-seated cars, and have gradually increased their horse-powers and their prices, are now awakening to the tendency of the times, and descending from the position of complacent toleration, for the smaller fry, are hastening to cater for the market which will be the mainstay of the trade. Straws show which way the wind is blowing, and the recent declaration of the Chairman of the Daimler Motor Co., Ltd., that his firm may market a light car for 1905 is instructive indeed, coming from such an authoritative quarter.

Although to Gottlieb Daimler, in conjunction with Messrs. Panhard and Levassor, must be credited the exploitation of the early light car, the efforts of other early workers in this direction should not be overlooked, and among those who were the first to realise the immense possibilities of a standardised vehicle at a moderate price were Messrs. Benz and Co., of Mulheim. Many of the men who now own high-powered cars served their apprenticeship in driving on a Benz, and the number of these cars to be seen in out of the way corners of the country, still doing fair service, bears testimony to the soundness of their construction. As may be remembered, the Benz had a single horizontal cylinder at the rear (the head pointing to the front of the car) and drove by means of belts on to a countershaft, midway along the car's length, which carried the differential, and the transmission was completed by chains to the direct-spoked wire wheels. Two outstanding features of the Benz were the use of solid tyres and the transmission of the whole power from engine to road wheels in the same plane. It was so delightfully simple that a lad could drive and keep it in order; and usually one could rely upon going out on the car—and returning on it—within the limits of a reasonable time schedule—quite a re-

markable feat in the period under consideration. Still earlier in the field was M. Peugeot, who, foreseeing the possibilities of the motor vehicle, had exhibited at the Paris Exhibition of 1889 a car fitted with a Serpollet boiler: this was the first time the Serpollet system had been used for car work. Peugeot soon discarded steam for petrol; and, adapting a Daimler engine to fit in with his own ideas, drove a car in 1891 from Paris to Brest and back. This had the "V" type vertical Daimler 2-cylinder motor fitted to the rear, driving by clutch on to the primary gear shaft, and thence to the secondary shaft, giving three speeds and a reverse; the differential was on the countershaft fitted across the car, and two chains drove the rear wire wheels. Excepting that a double tiller was used for steering, this car would well pass muster amongst many of the most up-to-date vehicles. It had a double phaeton body seating four passengers, with side entrance; two-cylinder engine; side brakes with ratchet lever; and Bollée steering system. The last mentioned item is notable for the fact that Ackerman is usually credited with the system in universal use for steering cars, by placing the two front wheels on independent pivots; the real originator was Amédée Bollée (father of the present-day Leon Bollée), who on April 28th, 1873, obtained a French patent for the independent pivoting of the steering wheels. The connection from the steering column was taken by means of a chain running over a chain wheel at the base of the column to another chain wheel attached to a bolster pin immediately under the front centre of the car, the steering rod being directly connected from the bolster pin to the two wheels. The knuckle-jointed arms were set at the correct angle to point towards the exact centre of the rear axle, exactly as we have them in modern cars. Ackerman improved upon this by abolishing the bolster pin, putting his connecting rod from the base of the steering column to one wheel only, and using a tension rod to connect the two wheels. It is a very moot point as to who is to receive the credit for irreversible worm steering, but one of the Bollée family most certainly originated the fitting of a wheel upon the steering pillar, and also the arrangement of the control levers by the side of the column upon toothed sectors. On the first car which was turned out by the younger Amédée Bollée (son of the before-mentioned Amédée), in 1896, a rack and pinion was fitted at the base of the steering column for controlling the front wheels, and the worm and sector was but a development



"See the occupants of that car—a leading K.C. and an eminent barrister!"

"Perhaps that accounts for that gigantic dog's antics—after the legal lights!"

**Development of the  
Light Car.—Contd.**

of this idea. A single horizontal motor was employed upon the car, but the transmission was very crude. A belt took the power from the engine to two pulleys upon a countershaft which carried four spur wheels; a second shaft carried the differential and four other spur wheels; the ends of the second motion shaft were fitted with bevel wheels, meshing with other bevel wheels carried upon two longitudinal shafts, which had bevels upon their ends, meshing in their turn again with bevel wheels upon the hubs of the driving wheels. Except for the belt drive from the engine at the rear, the whole system was exactly on the lines of the De Dietrich which came upon the market with a flourish of trumpets at a much later period and had to be as promptly discarded as the machine which Bollée had to throw upon the scrap heap. The transmission system killed Bollée's car, but the working out of the engine and general arrangements were as original in their method as is the Leon Bollée car of 1904.

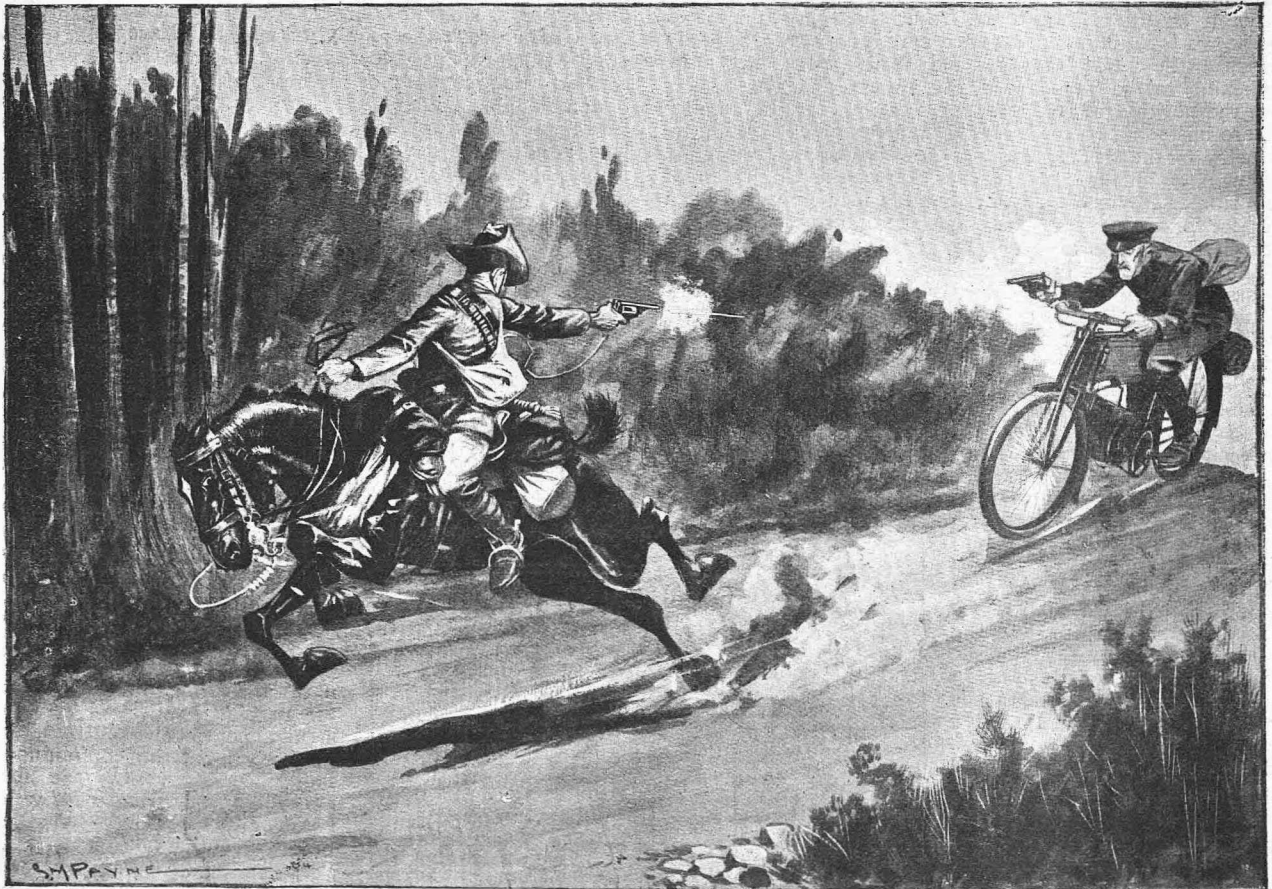
**THE FURTHER DEVELOPMENT OF THE STEERING**

system of canting the front wheels inwards was due to Tenting, of Paris, who early in 1892 (as the result of trouble with an experimental car in 1891) was practically the first to see what an enormous improvement this would make. He so devised his pivots as to have the vertical centre passing exactly through the points of contact of the wheels with the

ground. Duryea, of America, makes a claim for this setting of the steering centres, but most certainly without any claim which can be justified; one of the early cars turned out by Duryea, which took part in a race from Chicago to Waikewan in 1895, was fitted with a tiller steering and had Bollée's independent pivots and knuckles, but the front wheels were quite vertical. By the way, it is amusing in the light of what is being done by the British Duryea Company to learn that the actual h.p. of this very early car was only  $1\frac{1}{2}$ , and that it covered the course at the alarming average rate of a little over  $4\frac{1}{2}$  miles per hour.

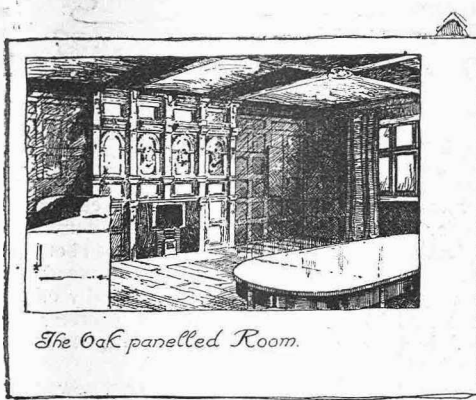
Most designers now consider it desirable to fit a two-cylinder engine to a light car, on account of the elasticity thereby given to the general control of the car; but one of the earliest Gladiator cars had a two-cylinder horizontal engine of 4 h.p. which had two speeds, no reverse and tiller steering; accommodation was provided for three passengers, and yet the total weight was as low as a little under  $4\frac{1}{2}$  cwt., and this included  $6\frac{1}{2}$  gallons of water and  $4\frac{1}{2}$  gallons of petrol; of course this low weight was obtained by the use of tangent-spoked wire wheels and 2 in. pneumatic tyres.

Undoubtedly Comte de Dion is largely responsible for the popularity of the light car; and the efforts also of the brothers Marcel and Louis Renault should not be forgotten; but it would be a task almost impossible of accomplishment to trace its development step by step down to the present day within the short limits of an article: sufficient has been indicated to show that the problems that have arisen have been tackled by numberless minds, and solutions have only been found by the actual survival of the fittest.



**BACK FIRING**

In a case of this sort the advantage undoubtedly lies with the motorcyclist who, owing to the steady running of the machine, can take a quicker and more accurate aim without any fear of his mount tiring.



The Oak panelled Room.

### Carburettor Adjustments.

It is rarely, so far as my experience goes, that the best results can be obtained in the first few trials of a spray carburettor. The jet may be too large or too small, the former indicated by an abnormal consumption of petrol, and the latter by a difficulty in starting and necessitating shutting off most of the air supply. The exact balancing of the float to keep the petrol level close up to the jet is also a matter that has a very important bearing on the running of the machine. I recently determined on trying some experiments with a carburettor which I was convinced was not giving the best results. The engine would fire perfectly up to a speed of about 20 miles per hour, but any further opening of the throttle and advance of the spark simply failed to increase the speed in the least, and as a rule misfiring began. I had noticed on a previous occasion when taking the float out of the carburettor immediately after the machine had been in use that there was only a small quantity of petrol in the chamber, which certainly would not reach halfway up the jet tube. The float was a very buoyant one, being made of cork. It seemed to me far too light to open the needle valve soon enough to keep a good level of petrol when the engine necessitated it. This being so, I determined to weight the float with a small washer of sheet lead slipped over the valve stem and kept in position by a spiral of the wire. By gradually clipping a bit off the edge of the washer I got the float to exactly balance the column of petrol to within  $\frac{1}{16}$ th inch of the jet. I also enlarged the aperture to 1-32nd of an inch, expecting to get a larger supply of gas thereby. The actual results fully justified the alteration. The engine started up much easier, and there was no necessity to depress the float or cut off the air supply. It responded to the throttle splendidly, and whereas formerly 20 miles an hour was the maximum, I could touch 35 miles an hour with ease. It seems to me to be fairly safe to say that every carburettor requires carefully adjusting to suit the engine it is fitted to.

### Brush Contact Troubles.

I also wish to draw attention to the vital importance of noting that the spring or brush of the contact breaker has sufficient pressure to force it well on the disc, and thus make a good connection at the sector. As most of the brush contact discs are made of fibre, a material which absorbs oil, there is a continual scraping or working up of a kind of greasy deposit, which gets under the brush and tends to insulate it more or less. It is thus necessary for the brush to have sufficient pressure or spring to cut through the grease to make a good connection. On several occasions recently I traced persistent misfiring of the engine to this cause. I should be glad to see the fibre disc abolished, as at best it can only be regarded as a makeshift method of construction. A perfect brush contact, in my opinion, should consist of a small brass disc with an insulated piece let in. Of course, the disc would be insulated from the shaft with mica or vulcanite. Such a method of construction would ensure a practically unwearable disc, it would always be true, and the possibility of insulating deposits collecting under the brush would be greatly minimised. It is a very good plan, I find, to thoroughly clean the

surface of the contact disc with paraffin. Formerly I used to lubricate the disc, but past experience has taught me that it is better to run it dry. I don't say this treatment would do for a multiple contact such as fitted to a car engine.

### A Loose Connection Incident.

The following incident shows the importance of noting that all connections are tight in the event of the engine failing to fire. Returning home from a motorcycle run recently I was surprised at the engine suddenly giving a few spasmodic explosions and then stopping. It was dark at the time when the stoppage occurred, and fortunately I did not happen to be more than a mile or two from home. I dismounted, and took the cable off the spark plug to see if the spark was all right. It seemed so, and I also made sure the carburettor was all right and examined the plug. I suspected an exhausted accumulator, and thought that by giving it a short rest I could get along the rest of my journey. I mounted, got a few explosions, and no more. I slipped the belt off and pedalled the short distance I had to go. It was quite by accident that I found out what was the cause of the trouble next day. It was simply the wire connecting to the switch block on handle-bar stem was quite loose, owing to the nut having dropped off. The wire still held on to the stem of the terminal, but the least shake disturbed the connection. Had it been daylight I might have noticed that the nut had dropped off.

### A Motor Paradox.

A correspondent writing in "O.P.V." some little while back described a curious feature possessed by his motorcycle engine. He found that after the engine had been running for some time that, if he raised the exhaust valve slightly, the pace immediately increased by several miles per hour, but if he raised the exhaust valve still more, the pace fell below its original figure. Now the fact that lifting the valve increased the speed is exactly the reverse of what should really occur; because by doing so it diminishes the amount of gas taken into the cylinder, the compression is less, and part of the exploded charge escapes directly into the silencer. I believe it is generally supposed that this curious feature arises from the combustion chamber becoming abnormally hot, and the lifting of the valve slightly produces a cooling effect which more than compensates for the diminished compression, etc. My own view of the matter is that the increase of speed is due more to the effect of a small amount of air coming through the exhaust valve on the suction stroke, and improving the proportions of the mixture, which previously had an excess of gas due to the high speed effect on the carburettor jet which draws an excess of petrol through the jet. Whilst dealing with this matter of motor puzzles I might draw attention to the fact that the reason why some machines do not show any noticeable improvement in the power given out when the exhaust cut-out is opened is due to the fact that the cut-out is not fitted in the right position. There is not much advantage in fitting it at the end of the silencer, or at top for that matter, if the exhaust has to pass through a long narrow pipe. This in itself has a considerable throttling effect. The place for the cut-out to be fitted is as close up to the exhaust valve chamber as possible.

## MOTORCYCLES AND SIDE-SLIP.

By B. H. DAVIES.

The two most uncomfortable sensations known to man are (i.) when you are skating and your heels attempt to overtake your toes, (ii.) when you are motor-bicycling on grease, and your machine suddenly remembers an important engagement down a side street you have just passed. Many a score of riders regard side-slip as they do death or a puncture—as a necessary evil which will come to us all sooner or later; and so in November they buy a pot of vaseline, rummage some long strips out of the family rag-bag, and lay up their machine for the winter. On the other hand, there is an ever-increasing band (called the "non-slipping band") for whom rivers of mud and battered tram-lines have no terrors. The stay-at-home brigade shudder as they see these more daring drivers go down the road; they look on them as gamblers, who are content to take their chance; yet if skidding cannot be wholly avoided, there is no real necessity for anyone to fall. A good many years ago I rode a push-bicycle as a means of locomotion, not as a hobby. I did not study the cycling Press, but I saw big headlines in it about side-slip. I regarded it as a necessary evil, and, living in the country, I plugged merrily away on wet limestone till I came over. Then soiled trousers were the only damage, and I picked myself up and went on. Suddenly

### THE MOTOR ERA DAWNED,

and I rode my motorcycle with the same innocence. Several bad falls resulted in bad shakings to myself, broken cranks, and bashed contact breakers to the machine. I acquired a morbid fear of grease, and if the roads were wet out came the discarded push-bike.

On a lucky day for me a local estate agent bought a  $1\frac{1}{2}$  h.p. Werner with smooth Michelin tyres: he rode it regardless of the weather, and I marvelled. Then I was caught in a heavy storm, and perforce had to cover 25 miles of "dangerous" slime which, by dint of extreme caution, I accomplished without a fall. A second time I was weather-bound in the company of a boy of 14; we braved the elements, and he left me far behind, so it dawned on me at last that, though a man must skid, he need never fall—an opinion which has ripened into a conviction since I have watched the London newspaper motorcyclists sprinting through the traffic over villainous roads.

A man should never ride over grease in traffic until he has acquired confidence, because the proximity of a bus or a tram may make the least mistake fatal. But the country rider, possessed of average nerve, should tackle the question, and he will be surprised to find that in a very brief period

### HE CAN RIDE IN WINTER AS COMFORTABLY AS IN SUMMER,

but at a reduced speed. In acquiring this proficiency there are three factors: the machine, the tyres, the driver.

*Machine.*—Design affects side-slip in two respects—centre of gravity and length of wheel base. A machine should not be top-heavy. My worst side-slippers have been a front-driven Werner, a French machine with the engine inside the diamond frame, and a standard Humber. The old pat-

tern Ormonde was not a steady mount, perhaps because the weight was too far back—a fact to which poor Adams probably owed his death. But I can detect no variation between modern pattern mounts with the engine well forward and low down. As regards wheel base, I think a really expert driver is not affected by it, while personally I prefer the shorter types. A long base seems to exercise a great leverage when one wheel skids.

*Tyres.*—The best "greasy driver" I ever knew used smooth Michelin tyres. An "Evening News" rider I was talking to the other day said it did not much matter what tread you used, so long as the tyres were ribbed or grooved somehow. He favoured a Bates' band. I like the Palmer pattern best of all. The Parsons chains are almost certainly the best preventive on the market, but I dare not use them on a two-wheeler, as the consequences of anything coming adrift would be so serious. I am actually using See bands, with which

### A HIGH PACE OVER GREASE IS TOLERABLY SAFE,

and they have the very considerable advantage of being puncture-proof. They are, of course, very heavy, and a low-powered machine would not carry them. As I use big engines, I always have a reserve of power, and they do not slow me on the level: in a timed hill climb their effect would be noticeable. The wear is very slight, and I expect my bands to last between five and six thousand miles if the covers are interchanged after the third thousand. They have, however, one very unpleasant feature. I believe the Thames mud and soft soap compound in the A.C.C. trials opened the drivers' eyes, but for a real lightning side-slip commend me to steel studs on smooth stone or asphalt. I became the laughter of all beholders on a beautiful dry pavement the other day. I had to turn sharply. My front tread had two rows of steel studs, nearly new, as in Fig. 1. Owing to the acuteness of my turn, only one row was in contact with the road surface, and my machine was flat on the ground

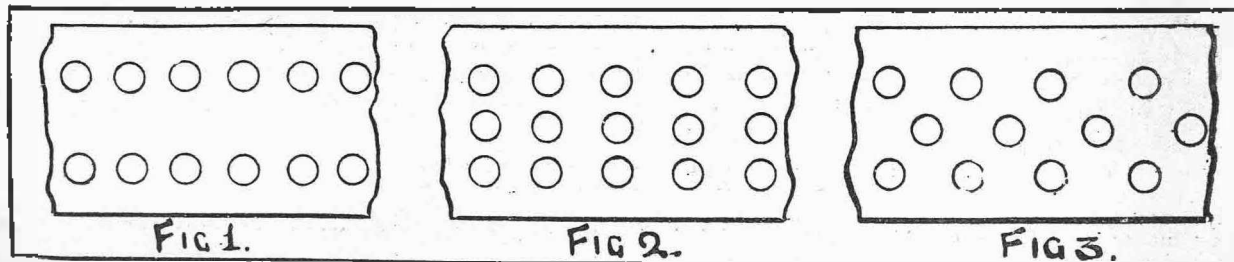
### IN LESS THAN A MILLIONTH OF A SECOND.

This tendency could be easily remedied if the studs were arranged as in Fig. 2 or Fig. 3. A tip in choosing such a tread is to ascertain that there is an adequate protecting pad of leather or felt between the inner butts of the studs and the rubber of the tyres. A lot of nonsensical rumours are flying about to the effect that the See and similar treads slip so badly on a dry surface that the driver cannot start a high compression engine. I have never known them slip in the direction of motion, and they only slip laterally on a dry surface when but one row is in contact with the ground.

Thus I should vote for a really good steel and leather tread as puncture-proof and steady on grease, provided you have a powerful engine; and,

### SHOULD THE EXPENSE BE A DETERRENT,

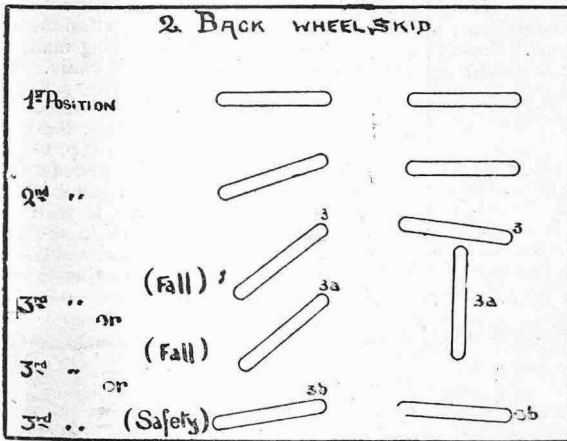
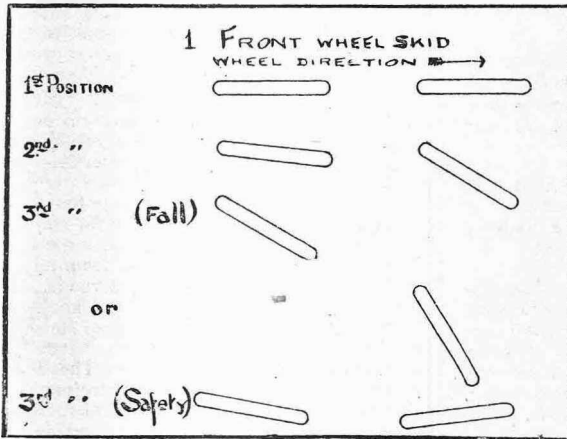
a Palmer tyre on the front wheel is a very satisfactory expedient.



**Motorcycles and Side-Slip.—Contd.**

An examination of the following diagrams and reasonings will show why I lay emphasis on the front wheel. I am no scientist, and what follows may be egregiously mistaken. They are given as the explanation I attach to my actual experiences. I think there are three kinds of side-slip: (1) front wheel, (2) back wheel, (3) both wheels together. The two former can be corrected and a fall avoided, provided that

- The driver is prompt.
- The tyres hard.
- The tread roughened.
- The pace reasonable, i.e., dead slow round an acute turn, and not too fast on the level. A safe pace on the level is determined in every case by (a), (b), and (c).



Other things being equal, the first kind of side-slip is alike the most common and the most dangerous.

**I.—FRONT WHEEL SKID.**

Previous to the skid both wheels are probably moving in the same straight line—forward. (If the front wheel is being already deflected, the side-pull is emphasised, and the skid is more difficult to remedy.) The skid occurs, and one might think the front wheel is then travelling in the same direction as the rear, but in a line parallel to it; in reality the skid pulls the rear wheel out of its straight-ahead line, but it is not deflected to the same extent as the front wheel. Now is the critical moment. If the skid is allowed to continue the front wheel will get so much “across” that balancing becomes impossible, and a fall results. (In the case of a car you mount the footpath.) On the other hand, if you correct the skid too sharply or too late either the front wheel gets too much “across” the other way; or the jerk sets the

back wheel skidding in the same direction as the front wheel originally slipped. A fall again results. To avoid the fall, therefore,

- Both tyres must bite.
- The side inclination must never exceed the balancing line.
- The correction must not be so sudden as to make the back wheel skid. In 99 cases out of 100 the fall is caused by a back wheel skid consequent on front wheel skid.

**II.—BACK WHEEL SKID.**

This can be induced, as stated, by a front wheel skid, but in my experience otherwise only occurs under either of two conditions:

- When the bite of the back tyre is inferior (e.g., through extra wear) to the bite of the front tyre, and so it slips on a surface which the front wheel has just passed steadily over.
- When it crosses a slimy surface at a less safe angle than the front wheel, e.g., tram-lines. The driver takes his front wheel over a rail at a wide angle, instantly corrects his steering, so that the back wheel lies along the tram-line, and so does not bite for a whole revolution or more.

This skid is rarely dangerous: the original skid pure and simple only extends for a few inches. The corrective, in this case, is applied to the other wheel, and a slight mistake either way does not induce the same leverage.

**III.—BOTH WHEELS SIMULTANEOUSLY.**

This skid is peculiarly dangerous; it is, therefore, concluding that it probably never occurs when the machine is vertical, and few riders “lie over” round a corner on grease. I suffered from it once, when riding a fast machine on a wet track insufficiently banked. Nothing can counteract it—merely pray that your knee-cap may not be pinned under the engine. Probably this skid does not occur once a season to road riders, and then only to an exceptionally foolhardy man, who is best off the roads till he learns wisdom.

It is scarcely necessary to conclude with the rudimentary maxims: (a) Never accelerate or slow down with a jerk. (b) Never ride on the road edge, if the crown is clear. (c) Never brake the front wheel singly, or with more force than is applied to the back.



**NAUTICAL.**

“My dear, I shall be away some days on a cruise. I expect to make some 1,000 knots.”  
 “Oh, Fred, what an awful muddle; and however will you unravel them again?”

## THE STANLEY SHOW.

The following is a continuation of the Stanley Show forecast, in respect to novelties, which we commenced in last week's issue.

### Shaw Detachable Tyre Bands.

Detachable bands for motorcars will be shown by the Shaw Motor Tyre Tread Co. at this exhibition. These bands are readily attached and detached. Further, a large selection of motorcar and cycle tyre non-skidding and puncture-proof bands, burst cover gaiters, continuous flow oilcans, etc., will be shown by this company. The tyre bands, it should be mentioned, are made of chrome leather, studded with steel studs, and are vulcanized to the ordinary rubber tyre.

### Micro. "Two-speed and Reverse."

The Micrometer Engineering Co., Ltd., in addition to their free-wheel clutches and other well-known specialties, will exhibit a two-speed gear and reverse, specially adapted for tri-cars, and operated by one lever. This was illustrated and described in our issue dated November 1st, and should attract the attention of the owners of all tri-cars who visit the Show. The Micro. free engine clutch, with metal to metal surfaces, to fit most of the leading engines, will also be shown.

### Marsh Motorcycles.

P. Brough, of Kettering, will be showing the  $3\frac{1}{2}$  h.p. Marsh motorcycle. He is the British sole agent for the engine fitted to this machine, which is built up and finished in this country. Special features of the engine are a large crank case, containing gin. fly-wheels, and a long connecting rod. The handles are long, and the triple forks are practically unbreakable. The ignition is low tension "make and break," with current from dry batteries. On this stand will also be shown the  $3\frac{1}{2}$  h.p. Marsh tri-car, with side lever steering and two-speed gear, with free engine. A Marsh motor-bicycle, dismantled to show all the working parts, and a patent lock washer to supersede lock nuts or split pins will also be staged.

### Halliday Hoods.

Owners of light cars will find a most interesting display of these light folding hoods on the stand of the British-American Company, of Coventry. These hoods are the same as those universally used in America on buggies, and are made in a great variety of materials at prices ranging from £4 to £24 retail. A new top for use on four-seated cars will be shown for the first time. It is hoped that the Cape Cart hood will largely be superseded by this new top. On the same stand will also be shown the Economic carburetter, made in all sizes for cars and cycles. It is claimed that it shows 30 per cent. more efficiency than other types. A 3lb. folding jack, and a new preparation for cleaning the panels and upholstery of cars from grease or dirt, complete an attractive list of novelties which will appear on this stand.

### SHOW FEATURES.

*We continue our description of some of the new machines and novelties which will be found at the Stanley Show which opens at noon on Friday next, and will remain open till Saturday, November 26th.*

*Naturally in this brief survey we have not been able to include all the new things, but we shall make good this unavoidable omission in our Show report.*

*Motorcycles will be numerous and representative. Many exhibits of motor-bicycles will show a tendency to reduction of weight.*

*Tri-cars will be an outstanding feature of the Show. The improvements in these will be plentiful and will consist in the almost general adoption of car features, such as wheel steering, free engine clutches, water-cooling, variable gears, etc., etc.*

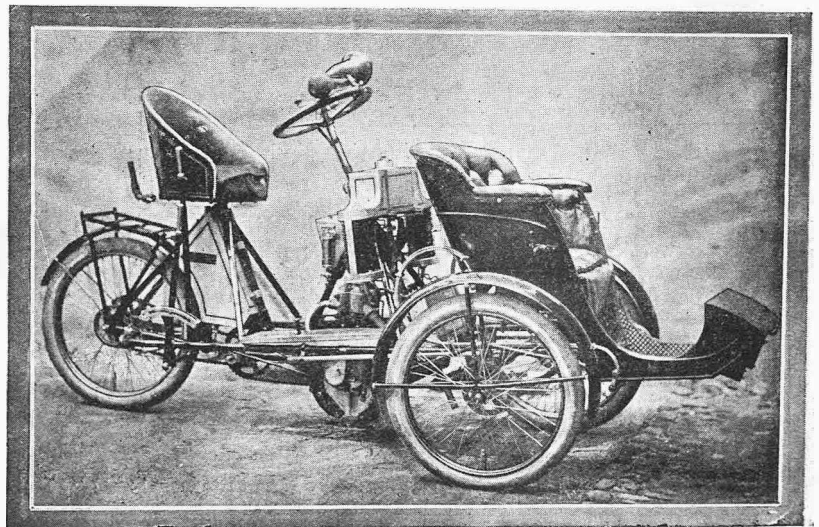
*There will be a slightly larger number of light cars, though the Stanley Show is still restricted in this respect. Several well-known makers will exhibit their 1905 models for the first time.*

Rich's patent detachable air tubes will be shown on one of the stands. The inventor is F. Rich, of Crawley, Sussex. The inner tube, instead of being made endless, has two ends with metal flanges. One of these ends fits into a socket in the other end, thus providing an air-tight joint.

W. H. M. Burgess, of Sutton, Surrey, in addition to displaying a wide range of engines, will also exhibit the patent pneumatic suspension wheel (Preston Weir's patent), which will be shown for the first time at an exhibition, and which device was used by Mr. Eli Clark in the 1,000-mile trial of the Auto-Cycle Club with such success. It is claimed that this invention increases speed, stops side-slip, kills vibration, and saves the wear of tyres.

### The King Car.

The most prominent feature on the stand of King and Co., Cambridge, will be the new 6 h.p. twin-cylinder King car. The motor is cooled both by a water jacket and by radiators. It has large fly-wheels, and is started up by a handle similarly to a car. The frame is built on springs, which insulates both riders from any excessive vibration due to bad roads. The top bar of the frame has been abolished, and the accessories which were stowed in the diamond centre space have been moved to other positions. The driver, who steers by wheel, can therefore make use of a rug. The new general footboard and two-speed gear is retained in this year's model. Chain transmission is used from engine shaft to driving wheel through a countershaft, provision being made for taking up the slack in each chain. The car is fitted with three brakes, a pair of front band brakes and a back band brake, the former operated by pedals, the latter by a hand lever. A King  $3\frac{1}{2}$  h.p. bicycle and a 4 h.p. tri-car, with air-cooled motor, will also be shown on this stand. King bicycles have demonstrated their reliability and efficiency both in the 1903 and 1904 thousand mile trials, obtaining in each case a first-class certificate from the Automobile Club.



The New King Car.

**Stanley Show.**  
—Contd.

**Brown & Barlow's Carburetters.**

These carburetters are built up from solid drawn brass tubes, screwed and sweated into a bottom plate. A much lighter, better finished and truer article can thus be obtained. A throttle and air valve are fitted, with either horizontal or vertical outlet to the motor, to these carburetters, which are fitted to Cycle Components, Triumph, Royal Enfield, Swift, and other well-known makes of cycles. The nozzle in the new pattern is arranged so that it may be withdrawn for inspection from either the top or bottom of the carburetter. This article is made in various sizes for cars and cycles. A perfectly water and dust tight two-way switch and handle-bar switch will also be shown here for the first time, as will several other interesting novelties.

**Bluemel Bros.**

Messrs. Bluemel Bros., who are now thoroughly installed in their commodious factory at Wolston, near Coventry, will exhibit several specialities of interest to motor visitors. These will include tool-bags, plugs, petrol gauges, mudguard flaps, switch handles, "sight feed" oilers, four-volt test lamps, and new acid tight accumulators for cars and motorcycles. In these a rubber washer is used at the terminals, over which is placed a celluloid collar, which acts as an effective seal. A new pump for car tyres is also worthy of the closest inspection. This is fitted with a pressure gauge. The footrests or stirrups are hinged, and close up close to the barrel when not in use, and another feature of this excellent pump is the very durable connections, which are guaranteed to stand a 1,200lb. pressure. The range of motor specialities to be found on Messrs. Bluemel's stand will be so wide that we can confidently recommend visitors to pay it a visit.

**The New Singer Models.**

Messrs. Singer and Co., Coventry, inform us that their exhibit will comprise several novelties, which are sure to attract considerable attention. Among these are a new 6 h.p. water-cooled tri-car, a powerful machine on up-to-date lines, and of the highest-class workmanship in all details. It is fitted with bucket seat for driver, free engine clutch, and two-speed gear, circulating pump, and high-tension magneto ignition. Chain-transmission is adopted, and the engine can be started from the seat. Tiller steering will be shown, but wheel steering can be had if preferred. A 5 h.p. double cylinder, fan-cooled tri-car will also be exhibited. This also has chain-transmission and two-speed gear, with free engine clutch. The twin-cylinders, which are bolted to one crankcase, can either be used together or alternately, and the throttle is controlled from the handle-bar. A belt-driven Singer tri-car, 3 h.p., will be staged, fitted with two-speed gear and fan-cooling. The 3 h.p. belt-driven Singer motor-bicycle, which has made an excellent name during this year, will be exhibited, as will a new 3 h.p. pattern motor-bicycle, the Special Singer B.D. (belt driven). This is a lighter type and the frame is of new design. All the motors on Singer and Co.'s stand are fitted with high-tension magnetos. It is a source of satisfaction to the

firm to find that magneto ignition, which they have exclusively employed since 1900, and of which they were so largely the pioneers, is increasing rapidly in popularity.

**The Milford Specialities.**

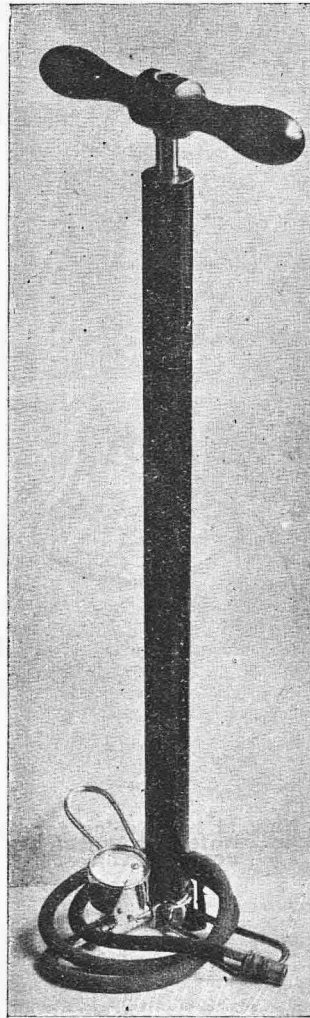
Mills and Fulford's stand at the annual Cycle Shows has always been one possessing more than ordinary interest to every visitor, as it has usually contained designs of attachments for motorcycles of a more or less distinct and original character. This year, we are informed, is to be no exception, as they are showing for the first time an original form of car for

engine be high enough to take the tri-plate load. The other exhibits will comprise new pattern fore-cars with suspended spring fronts, with various shaped bodies; also a number of side-cars and trailers.

**Wearwell Wares: A New 6 h.p. Wolf Carrette.**

The Wearwell Co., Wolverhampton, besides showing bicycles and a 3½ h.p. water-cooled motette, will place before the public their latest Wolf three-wheeled car, which embodies many new and original features. It is fitted with a 6 h.p. water-cooled Fafnir engine, 80mm. by 60mm., placed longitudinally in the frame, which is very long, the wheel base being 5ft. 2in., and the track 3ft. 7in. The frame is built of 1½in. weldless steel tubing, well stayed and trussed, and is carried on the front wheels by two elliptical springs. The steering is by inclined wheel, and all controlling levers are brought well within reach of the driver. The two side wheels have ball-bearings to their steering heads, while the cross-connecting rod is adjustable. In the machine we recently saw there was an entire absence of back lash in the steering gear. The power is transmitted from the engine to a coned leather to metal clutch and thence to a gear-box which gives two speeds, 5 to 1 and 3½ to 1. The gear is worked with two dog clutches, the wheels being always in mesh. From the gear-box the power is transmitted by a longitudinal shaft and bevel gear to the back wheel. Cooling is effected by radiators placed underneath the engine, and the circulation is maintained by a pump driven off the 2 to 1 shaft. The water tank has a capacity of three gallons and is placed underneath the front seat. The whole of the gear runs in oil and is encased, while a large shield is placed underneath the engine to afford protection from mud.

The engine is encased in a torpedo-shaped bonnet, with side doors. Lubricating oil is stored in a tank fixed at the back of the front seat, and is supplied to the engine by a force pump. The whole of the body is coach-built, with aluminium panelling, while the bucket seat for the driver is provided with internal springs. Floor-boards, easily removable, are placed around the sides and back of engine. Brake power is well provided for by a band-brake on the gear shaft, actuated by a pedal which disengages the clutch at the same time, while another pedal applies the back band-brake, which is of V section. One thing which particularly struck us as being rather uncommon was the placing of the change-speed gear on the left-hand side. This necessitates the driver walking all round the car to get inside, and this is not always convenient in traffic or wet weather. Protection from the mud is well provided. Large spray guards of the Mercedes pattern are fitted to the front wheels, and an extra wide guard, with wings, is fitted to the rear wheels. A novel feature of this car will be the new back tyre, which is being manufactured specially by the North British Rubber Co., and is of 3in. section, but will fit the ordinary 2½in. motorcycle rim. This vehicle cannot fail to interest all fore-car owners who visit the Show. The speed is calculated to be about 33 m.p.h. on the flat, while for hills the gear ought to enable the machine to climb anything short of a miniature mountain.



**Bluemel's gauge pump for car tyres.**

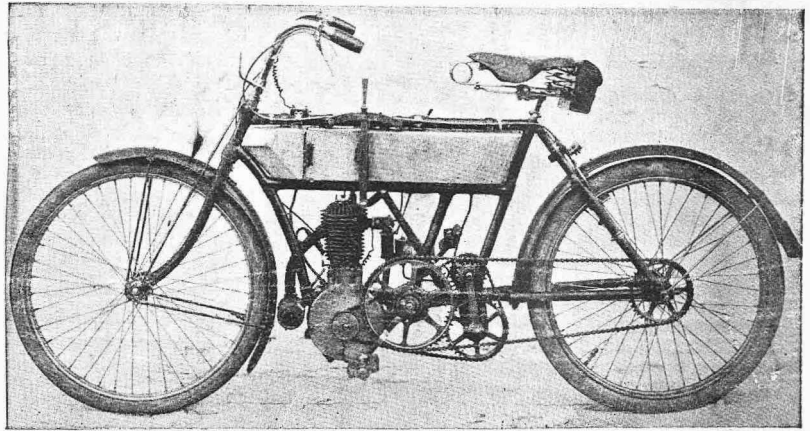
fitting to motorcycles of a fairly high horse-power, enabling the passengers to sit side by side. This is done by the removal of the saddle and fixing of two neat bucket-shaped seats to the frame. The frame is much on the same lines as the fore-carriage, but has no chair in the front, and is nicely sprung on the same lines as the light motorcar. This model car, which is termed the Social, can be fitted with auxiliary pedals, enabling each passenger to use them when necessary. Further, the frame is so constructed as to allow of a fore-carriage chair being fitted to the front, providing the h.p. of the

**Stanley Show.  
—Contd.**

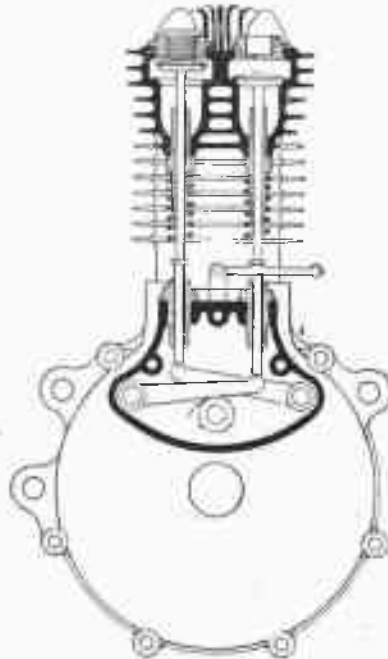
Casswell, Ltd., of Great Eastern Street, London, will be exhibiting several motor-cycles, tri-cars, side-cars, and a very large assortment of useful and interesting accessories.

**The New Jackson Dogcart.**

The illustration which we produce on this page of the new Jackson dogcart shows the general appearance of the car. It can easily be converted into a chassis, exposing the engine and all the gear. Another alteration can be made by taking off the rear seats and converting it into a light touring car with two seats and a luggage platform. The motor is a 6½ h.p. single-cylinder De Dion-Bouton, with high tension electric ignition, from dry batteries and De Dion-Bouton induction coil. The power from the engine is transmitted to the rear wheels through a gear-box, giving two speeds, one reverse, and a direct drive on top speed, by a cardan shaft, and a differential on the rear axle. A double-acting brake is coupled to the clutch on the gear shaft, and two double-acting brakes act on drums on the driving road-wheels. The clutch and clutch brake are pedal operated. The frame is built of tubular steel, and this main frame is strengthened by superposed auxiliary armoured wooden frame. The engine is governed, and can be independently controlled by a throttle, worked from a hand-lever on the steering column. All the bearings of the shafts in the gear-box are automatically lubricated by means of oil rings, and this same system of lubrication is used throughout. The centrifugal water-circulating pump is friction driven by a leather-faced wheel in contact with fly-wheel. A fin radiator is carried in front and under the Mercedes type bonnet, which is hinged to the dashboard. Double-tube pneumatic or De Nevers grooved solid tyres are fitted to the artillery wheels, running on ball-bearings. Side lamps, tail-lamps, horn, inflater, and tool outfit are included free with this car, the cost of which is 135 guineas. It is supplied by Messrs. Reynold Jackson and Co., 11 and 13, High Street, Notting Hill Gate, London. As the illustration shows, the car is of a taking design.



**The Light Royal Enfield Chain-driven Motor-bicycle.**

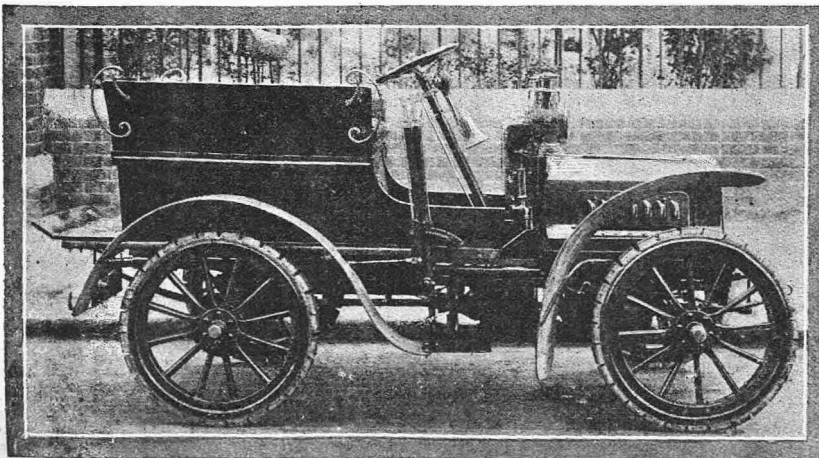


**The New 2½ h.p. Engine for Motor-bicycles. Note the rocking levers actuating valves.**

**Two Royal Enfield Light-weights.**

As we were able to announce last week, the Enfield Autocar Co.—the motor department of the Enfield Cycle Co., Ltd., of Redditch—have just turned out two new light motor-bicycles—chain and belt, and from an inspection of them, and also as a witness to some splendid performances along the flat and up stiff gradients, we have no hesitation in stating that these machines will speedily leap into wide public favour. Both will be staged on the company's stand. The chain-driven machine is of very light type, weighing 111 lb., with 26in. wheels, the front wheel being fitted with 1½in. and the back 2in. tyres. It is built low, and therefore, as the centre of gravity is very low, a most safe and handy machine has been evolved for general use. It is fitted with a Royal Enfield engine, which will develop 1½ h.p. at 1,800 r.p.m., though the engine can be readily accelerated to a speed of 2,500 r.p.m. The bore of the cylinder is 2½in., and the stroke 2½in., and a feature of the motor is the method of actuating the mechanically-operated valves by means of rocking levers working on cams. This will be clearly understood by reference to the line drawing which we give. The machine is fitted with two-speed gear, obtained by having two chains and a slide carrying four sprocket wheels, which engage the top or bottom portion of the chain as required to obtain the high and low speeds. This is operated by a lever attached to the top tube of the frame, and, it is claimed, enables the machine to climb almost any hill that can be found on main roads, and yet, when on the level, it will travel very fast without causing the engine to race. In fact, the actual tests made by the makers show that this bicycle will, on the average, perform, during a run of 50 miles in fairly hilly country, as well as many higher powered machines.

The foregoing description also applies to the belt-driven bicycle, eliminating, of course, that portion which refers to the change-speed and double chains, there being only one chain which is used for starting or pedalling the bicycle, and the drive being by belt from pulley on engine to pulley on back wheel. The engine is identical on both machines. It is, however, lighter than the chain-driven, weighing only 90 lb. It will be seen that the engine is most compact and neat and that it is carried in the frame.



**The New 6½ h.p. Jackson Dogcart.**



**Stanley Show  
—Contd.**

We understand that Humber, Ltd., will exhibit an improved type of Olympia tandem. It will have a 5 h.p. water-cooled engine, car frame, two speeds, and wheel-steering.

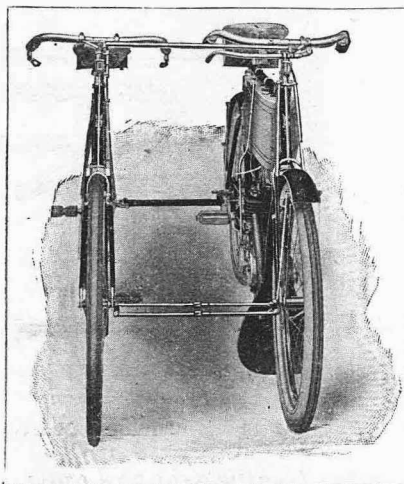
**The New Rex Motor-bicycle.**

In addition to the exhibits referred to in last week's issue, the Rex Motor Manufacturing Co., Coventry, will be showing an entirely new model of machine for 1905. In this new design the engine is bolted into the cradle as hitherto, and does not form part of the frame. The bore and stroke are 82mm.; the great features of next year's engine are M.O.V., an entirely new pattern of silencer, double air draught to both valves, and spray carburetter. The valves are placed on the left side of the engine, the exhaust in front and inlet at the back, both being separated from the engine and each other by air passages. By this means the engine is kept cool on the steepest hills. The new Beehive silencer is a great improvement on last year's baffle plates. The exhaust is discharged in front into a box, shaped like a beehive, which contains a number of pipes drilled with small holes. It passes from the beehive into another chamber, situated underneath the valve seatings, and finally is discharged downwards into the air. It is claimed that there is an absence of back pressure, and that the noise is reduced to a minimum. The old surface carburetter will be superseded by a Longuemare jet into the bottom of the tank to prevent grit, etc., entering. It is easily accessible, the side of the tank coming away on removal of a pin. The frame has been lowered 4in. in the new machine, and in the model we saw it was quite easy to place both feet on the ground while sitting in the saddle. This is rendered possible by fitting 26in. wheels and a new design of top tube, which allows the saddle to be got well down, the handles at the same time retaining the usual position. The fittings of the machine will be practically the same as before; the enamelling for this year being aluminium with a blue lining. Clincher tyres, 2in., will be the standard, unless otherwise ordered.

Two brakes are fitted, the front one being a new design, taking its fulcrum from a bridge between the extension and the forks. The rear brake is actuated in the same manner as last season's model, i.e., by the left foot. On the whole, the Rex Co. are to be congratulated on this production for 1905.

**A New Two-speed Gear.**

The Stevens Motor Manufacturing Co., Ltd., Wolverhampton, besides showing examples of their single-cylinder air and water cooled engines, will exhibit a new model 6 h.p. double-cylinder water-cooled engine, 3in. bore by 3½in. stroke. This has automatic valves of large diameter, the timing gear is enclosed for protection, but easily accessible for inspection; a large outside fly-wheel is fitted, and the crank case is an aluminium casting. This engine is designed for fore-car work in



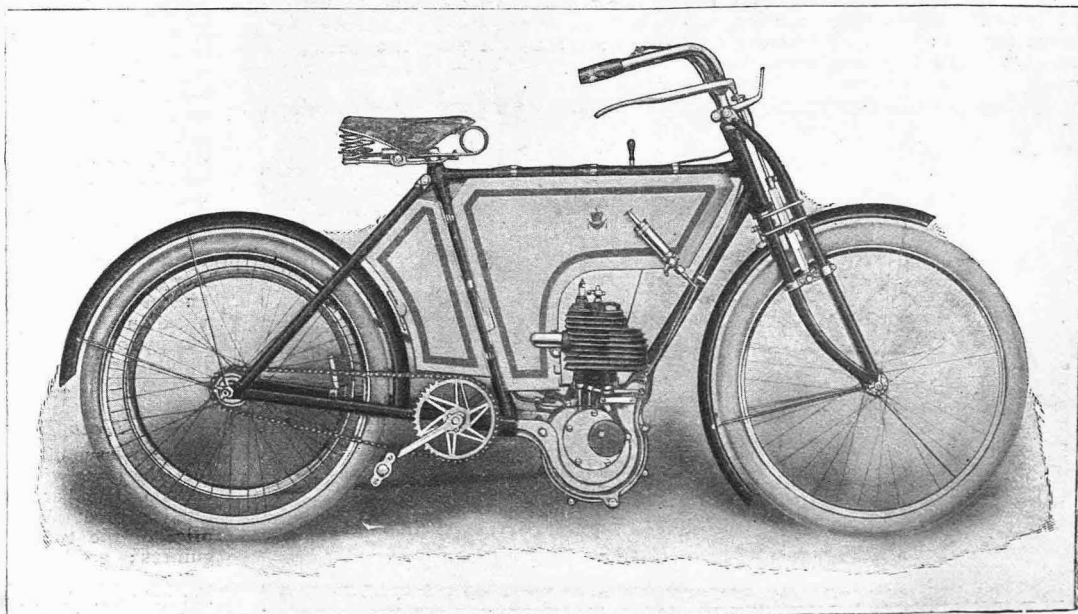
The above illustrates a motor-bicycle and an ordinary cycle coupled together by a Liberty attachment, which will form one of the leading features of Ariel Cycle Co.'s exhibit.

conjunction with the company's two-speed gear and internal clutch, leather to metal, which obviates any end thrust on the bearing. The two-speed gear is very simple, and strongly made, and is worked on the sliding pinton principle. It consists of two countershafts, one of the shafts being hollow and containing another smaller shaft inside.

**White and Poppe's Latest.**

Messrs. White and Poppe, Ltd., Coventry, whilst showing their 3½ h.p. air-cooled and 4 h.p. water-cooled, will also exhibit newly designed engines of one, two, three, or four cylinders, developing 4 h.p. for single, 7 h.p. for double cylinder, 9 h.p. for the three, and 12 h.p. for the four cylinder. We saw one of the two-cylinder models, 80 by 90, and were very much struck with the design, the workmanship being (as usual with this firm) excellent. The model we saw had mechanical valves, operated by cams contained in the crank case, and although this may appear an awkward place to get at in case of need, the design is such that on removal of a small plate the whole of the cam shaft can be withdrawn for inspection. The crank case is so designed that the same patterns are used in the one, two, three, and four cylinders. It consists of two ends, like the sides of a cycle engine, and a middle section that can be adapted to two, three, or four cylinders without adding any extra complication. The crank shaft, which is of 1½in. diameter, is of the built-up variety, with disc-balanced cranks, and is so designed that the single-cylinder shaft is strong enough to withstand the strain that it is put to when used in conjunction with the extra cylinders. The bearings are phosphor-bronze, and of extra large dimensions; while a special manner of fixing the gudgeon-pin makes it impossible for any scoring of the cylinder walls to take place. The valve seats in this pattern are part of the cylinder and not detachable, as is the case in the 82mm. by 85mm. (this year's engine); and we must say that this is an improvement, as there was a lot of trouble in making a tight joint of both seatings, as, if pulled up too hard, the valves started "blowing by." The firm will also show their folding screwdriver—a most useful tool.

Particulars of any other Show novelties which may arrive after this section of the paper has gone to press will appear in our news columns.



The New 31 h.p. Rex Motor-bicycle.

**Stanley Show.**  
—Contd.

### A New Chater-Lea Fore-car Frame.

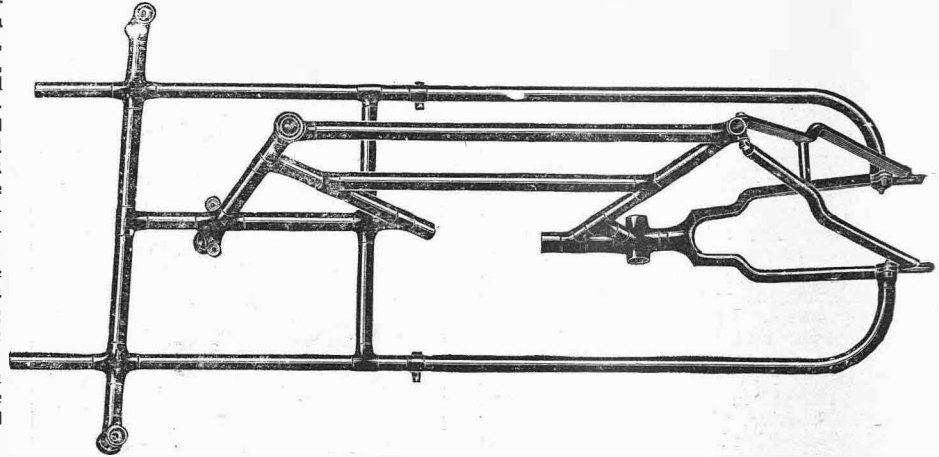
We illustrate a frame built from Chater-Lea fittings—one of the many patterns that can be obtained from the Chater-Lea Manufacturing Co. It will be seen that practically any engine suitable for a fore-car could be used in this frame, while a number of modifications can be made, according to requirements. For instance, the bracket can be done away with and a lug used instead if pedals are not required; the back struts and stays will take any size bolt rim or chain-wheel, and can be varied to suit hubs of different widths. The length of the tubes can be varied according to tank space, etc., required, and the outside tubes are available for carrying clutch and brake pedals. The Chater-Lea Manufacturing Co. are making a good display of new patterns at 114-120, Golden Lane, E.C., during Show week, and members of the trade would do well to pay them a visit. At the Hall all the leading factors—Brown Bros., Casswell, etc.—will show a fine selection of Chater-Lea motor, safety, and tandem fittings.

### The Barnes Three-wheeler.

A most interesting exhibit at the Show will be that displayed by G. A. Barnes, the one hour motorcycle record holder, who has lately devoted his attention to designing and constructing motorcycles and cars. Mr. Barnes will show several novelties, including a Barnes registered design runabout (a photograph of which we reproduce); this is fitted with a 4 h.p. engine, 89 mm. x 95 mm., Barnes patent free engine, double exhaust, and wheel steering; the weight of the vehicle is equally distributed between the three wheels, and the weight of the rider is kept very low down, the maker claiming that it is possible to turn in any average road without throwing out the clutch.

In addition to this there will be a 9 h.p. two-cylinder racing runabout with two speeds and wheel steering; a 4 h.p. air-cooled fore-car; a 5 h.p. water-cooled fore-car; a 2½ h.p. motor-bicycle; and a

4 h.p. motor-bicycle. The Barnes patent free engine embodies a very simple action: a split ring is placed between the outside ring, on which is built up the back pulley and the hub, the split ring expanding and gripping the outside ring by mounting a small roller. The exhibitor's patent variable speed gear and free engine (no countershaft) is employed, the gear being all enclosed in the engine jockey.



The new Chater-Lea fore-car frame.

### Riley Light-weight and other Specialities.

Amongst those stands which will attract the visitor's attention, not only for their appearance but also for the interest of the exhibits, that of the Riley Cycle Co., Ltd., Coventry, will be prominent. The exhibit will comprise one Tri-car de Luxe, one Tri-car de Luxe with helical guards, wheel steering, one new pattern twin-cylinder tri-car, and three motor-bicycles.

The 6 h.p. twin-cylinder tri-car will make its first appearance at this Show. The frame is well sprung, and, being flat and unencumbered by raised or projecting tubes, permits the use of an apron. The engine, 80 by 80 mm., is balanced, and has proved itself remarkably good at hill-climbing. A Riley two-speed gear is fitted, and with the springs carefully ar-

ranged, the long wheel base, the comfortable upholstery, and the balanced engine, this machine is notably free from vibration. The back brake is operated by a ratchet hand lever, which allows any degree of resistance to be left applied at the brakes. Wheel steering and bucket seats are provided after the general fashion in the 1905 models.

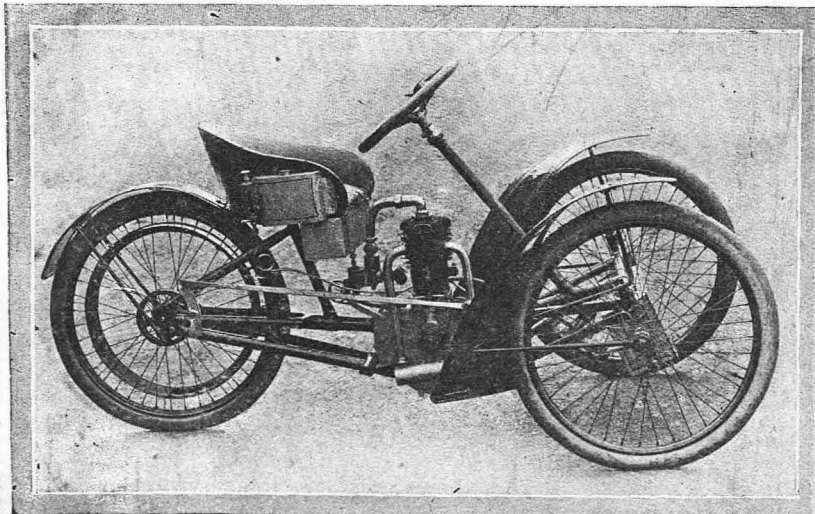
The 4½ h.p. tri-car has a water-cooled engine of bore and stroke 86 by 89 mm.,

and here again the Riley two-speed gear is fitted. This speed gear has sliding clutches, and gives a direct drive on the top speed. A combined tank and radiator provide a very efficient cooling to the water-jacket. The exhaust is practically noiseless owing to the large silencer used. A large wooden box for tools is placed in a convenient position in front of the driver, and a hinged front-seat footboard provides a luggage box when closed. The ratchet lever double-acting back brake is fitted also to this tri-car. Both models have pedal-operated band brakes on the front wheels, and are fitted with a novel type of centrifugal pump. Five gallons of water can be passed at 1,000 revs., and should the pump stop running, the water is free to circulate on the thermo-syphon system, and so keep the engine cool.

A new 2½ h.p. motor-bicycle turns the scale at 105 lb. The cylinder has a bore 80 mm. and stroke 70 mm. It is claimed to be capable of 40 miles an hour. The 3 h.p. type weighs 151 lb.; another of 3½ h.p. scales 160 lb. These bicycles have the coil, two accumulators, and a two-way switch all placed in a double compartment in the front of the tank, the switch being operated by a Bowden twisting handle. Longemare carburettors, two rim brakes, and petrol capacity for 100 miles is provided on all these cycles. The light-weight has petrol capacity for 150 miles. These lighter models will doubtless come in for a large share of attention.

### The New Humber Light Car.

In our issue of November 9th we stated that the price of the new 8-10 h.p. four-cylinder Humber car had not been definitely settled. We now learn that the price of the two-seated car will be 215 guineas; and of the three-seated car (tonneau back, driver's seat only in front) 225 guineas. The car will have mechanically operated valves, and the standard tyres will be 30 in. by 3 in. Dunlops.



The Barnes wheel-steered tricycle.

**TOURING IN CORNWALL.**

The "Wild West" is often referred to as a place where precipices abound and flat roads are unknown.

The hills are still in places; but I have yet to learn what it means to find a hill there on a main road which my 3 h.p. engine cannot tackle successfully.

The variety of scene is almost unique in such a small area. On the north coast around Boscastle are some of the finest cliffs in England. A few miles inland, over splendid roads, are the "Cornish mountains" and moors. Further west the Fal is one of the most charming of rivers. And the sea and scenery at the Lizard and Land's End are superb.

The surface of the roads is famous for smooth running; but the motorcyclist should be well supplied with "spares," as it is a long way to get things from London or Birmingham, and local agents do not keep large stocks of sundries. It is well to use

**A SMALLER PULLEY WHEEL**

than would be found suitable in, say, the Midlands.

Spare valves, plug, accumulator, belt fasteners, and such usuals are a sine qua non; and be sure to get a good belt fastener. I got one at Penzance which wore completely through in 60 miles. Besides the ordinary tool bag implements it is most desirable to have a spanner, fixed or adjustable, which will remove the largest nuts, especially in view of modern gudgeon-pin difficulties. I pedalled to miles once through neglecting this handy tool. The valve will hold an enormous amount if properly packed. It is a great comfort to carry a pair of trousers for evening wear; and the fastidious will find in the "Nugget" boot polisher a handy article for leggings and boots. Boracic acid powder is most useful, though seldom carried. It is very easy to scratch one's hand or run something into it, and a little boracic powder will heal it almost at once; it is also useful for tyres after repairing a puncture, and it relieves any foot soreness, etc., immediately.

In regard to riding overalls, it is an excellent plan to have a half-diamond slip of macintosh sewn to the bottom of the coat on the buttons' side: this increases the circumference of the coat at the bottom and keeps the knees dry; for ordinary use it can be folded inside and buttoned up. A good lamp is well worth the money. An indifferent oil specimen once landed me into a hedge and on another occasion showed me a cow's face just in front of my wheel. I am using two lamps now! Thus provided, Cornwall is well worth a visit; and it includes some of the keenest of motorists who are most hospitable and kind. I have ridden over nearly every road in the country which is worthy of the name, and my friends call my 3 h.p. Quadrant my wife, for we are inseparable. We have been together up precipices, down mountain paths, over ice, under rain, through fog, around cows, for business and pleasure, with trailer, without worry, into hedges, out again—and so on ad lib. My "wife" always lets me have my own way; but her rebuke, though tacit, is very eloquent when the iron enters the tyre and there is no solution in the repair outfit.

A. F.

**Touring in Cornwall: the Author and his companion.**



**MAGNETO IGNITION FOR MOTORCYCLES.**

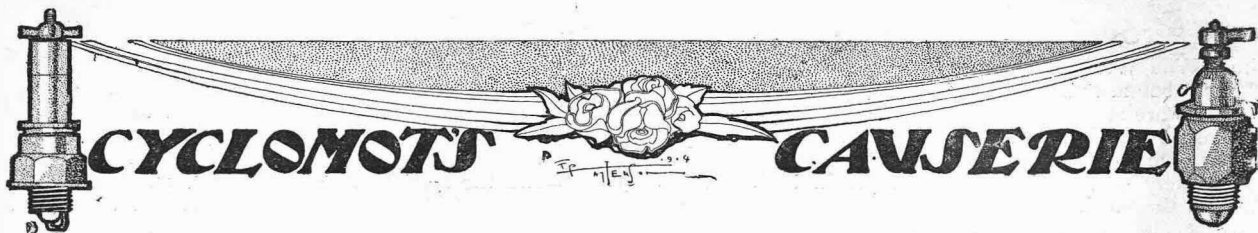
I have often been surprised by the reluctance displayed by many manufacturers of motorcycles to fit magneto ignition to their machines. It has always seemed to me to be an ideal form of ignition for the motorcycle, where compactness and reliability are so much to be desired. One could understand the manufacturer fighting shy of this mode of ignition as first introduced in its low-tension form, where a formidable array of rods and springs met the eye of the prospective customer to whom the magneto looked the height of complication. Moreover, there were other objections to this system of a more tangible nature. Perhaps the worst feature to a novice would be the click-click of the trip rod actuating the sparking device. The experienced rider would hardly consider this a real drawback compared with the loss of compression which arose when a certain amount of wear had taken place at the make and break. But the high-tension system known as "Sinus Arc Light" is a vast improvement on the earlier models. The magneto itself is very similar to the low-tension type, but

**THE ROD, SPRINGS, AND COMPLICATED SPARKING DEVICE ARE ENTIRELY ELIMINATED.**

The charge in the cylinder is exploded by means of an ordinary sparking plug, to which the electric current is transmitted by a short length of insulated wire. The make and break takes place inside the magneto itself; there is a small protecting cover to the mechanism which, when removed, gives easy access to the make and break, which can be adjusted by an amateur, as it is very similar to those fitted to motorcycles for use with accumulators. I have had a machine fitted with this type of ignition in use for seven months now, during which time I have covered 5,000 miles in all weathers. Once only have I heard the machine misfire (during a very heavy thunderstorm, when the road was under water in many places). I instantly dismantled and removed the cover of the make and break; some water had got inside the cover, thus causing a short circuit. This was quickly dried, and I continued my journey without further

trouble. Sceptics said, when I bought the machine, that the magneto would soon wear out and require expensive repairs. The reverse has been my experience; this I attribute to the rotary motion of the armature, which has been substituted for the backward and forward motion of the low-tension type. In conclusion, I may say that it is my opinion that the question of accumulators v. magneto will come to the front again, and be more hotly contested than ever. In my hands the magneto ignition has been a striking success, and I am naturally anxious to draw the attention of other motorcyclists to the advantage of this system in its high-tension form over the old method of ignition with accumulators, feeling confident that if they once give it a fair trial they will never revert to the older idea. The trade also, with true British conservatism, are loth to adopt the magneto there being only two English firms of motorcycle manufacturers, as far as I am aware, who fit it as a standard. However, several firms are fitting it optionally to the accumulator system to their 1905 model—a step in the right direction.

MAURICE C. L. FREER



### The Danger of the Unlighted Vehicle.

Owing, to some extent, to our system of Party Government reforms are exceedingly difficult to obtain in this country. Ever since I became converted from cricket to cycling the cause of "Universal Lights" has, to my knowledge, been pegged away at and steadily urged, but Parliament has rendered not the least help in the matter. Everybody has admitted that the presence of unlighted vehicles on the public highway was a menace to all road-users, but, despite this fact, neither Liberal nor Conservative Premier has ever been induced to adopt as a Government measure the draft Bill put forward by the cycling associations, and thus it has had to undergo the lottery of the ballot for private Bills. Even when it has successfully overcome numerous and heartbreaking obstacles, and has finally come before the House, some ignorant or prejudiced M.P. has thought it his duty to object and so cause the Bill to be blocked. The only good that has been effected during all these years has been the enactment of County Council by-laws on the subject in a number of counties. This entailed an immense amount of work, and I recall the fact of having been one of a deputation of two that attended a meeting of the Council of an agricultural county in order to urge the claims of cyclists to more consideration by other road-users, the agricultural vehicle being the worst offender. The arguments put forward by the farmers and their representatives were astonishingly narrow-minded and selfish, but the way had been most carefully prepared, and we had the ineffable joy of witnessing the carrying of the measure. The road conditions in that particular county are totally different now, and for that state of things cyclists have to be thanked, for no other section of road-users favoured the proposed by-laws at the time.

Almost every cyclist and motorist has had more than one close shave when driving at night time, whilst some of us have met with exceedingly awkward contretemps. One of my narrowest escapes occurred when I was steering a tandem down a hill—a wide open road on an easy gradient. It was a pitch-black night, and suddenly there loomed only three or four yards in front a great black mass. By instinct, and nothing else, we swung to the right and passed by the tailboard of a great heavily-loaded farm wagon drawn across the road, with no warning light. I thought the act on the carter's part an absolutely criminal one, and one that was typical of the lack of consideration shown by those engaged in the agricultural industry towards every other road-user. The defect in regard to county by-laws is that they are neither uniform nor universal. In some counties the by-laws compel all vehicles to show white head-lights and red tail-lights at night time all the year round. In other counties the tail-light is not regarded as necessary, whilst there are some benighted districts which permit vehicles to go unlighted during the periods of full moon (as set out in the calendar and whether the moon be visible and effective or not). These defects can only be removed by the passing of a Bill compelling all vehicles in any part of the country to show the necessary warning lights during all the hours of darkness, and now that, by a great misfortune, a Royal Duke has been injured there may be some chance of success for the new agitation that is now being organised. It used to be said that the only way to prevent railway accidents and to instil the need for carefulness into the minds of responsible officials would be to carry a railway director on the front of each engine. The Duke of Connaught's accident has at least done this good, that it has pointed out that the roads are used by high and low

alike, and that if obscured obstructions are allowed to be on the highway, some fearful national calamity is just as likely to occur as not.

### Cycles and Motorcycles and the Rear-light.

It so happens that our course of action is likely to be greatly simplified by the mishap to his Royal Highness, because it will have paved the way for a deputation representing motorcar-users, motorcyclists, and cyclists which will wait on the Home Secretary and urge the advisability of Government action in the forthcoming Session. And instead of the doubtful and risky course of introducing a private Bill, it is not at all unlikely that the necessary clauses will be introduced into the first Local Government Bill that is laid before the House. As this will be introduced by the Government, its final passing into law is almost a matter of certainty. Let us hope and trust that we may be able to secure all that we want in this direction. With regard to one matter, I must confess to feeling myself on the horns of a dilemma. If we are going to ask that all vehicles shall show a white light forward and a red light aft, why should we lay quiet and say nothing about cycles—pedal and power driven? What is sauce for the goose is sauce for the gander, and we must not, because we use cycles ourselves, resent the universal application of the law because it will touch our own convenience. Of course, neither cycles nor motor vehicles will necessarily come up for consideration in any projected Bill, because they are already legislated for in the Motor Cars Acts and in the Local Government Act. But I do feel that there must be give and take in this matter, and that with the presence of every other vehicle on the road indicated, the cyclist and, in a less degree, the motorcyclist, when approached from behind, becomes an even greater danger because of the general feeling of security created by the enactments. Only the other night I had the nearest possible shave of running into a cyclist from the rear. It was on a particularly dark stretch of road on a particularly dark night, and my attention was momentarily distracted from the view ahead by a big car overtaking me, and I was watching sideways to see that I gave ample room. My acetylene lamp just picked the cyclist out of the gloom, and it was the warning of my companion that enabled me to do a double swerve round him. It was a matter of fortune that the driver of the other car was passing very wide, otherwise there might have been some damage. I may say that I was so close to the man that brake application would not have been of any use. At any rate, that curious instinct that prompts one to act on the instant made me keep my speed up and steer through the danger instead of jangling on all brake power, as I should have done had there been a greater space between me and the cyclist. The incident could not have occupied more than a second or two, but it is the sort of thing that lives in the memory and helps to make one careful in the future. Now, had the cyclist shown a light rearwards, he would not have run the risk that he undoubtedly did run; in fact, I contend that the safety of the unindicated cyclist depends entirely upon the watchfulness of the car driver who is overtaking him. The question, therefore, is, shall we urge cyclists and motorcyclists to adopt the red tail-light? I say yes, and I think that this will be almost as good a course and one that would not be so unpopular as would be the drawing of the attention of the Home Secretary to these exceptions to any general law that may be contemplated.

**The Motor**  
INCORPORATING **Motor Cycling** and **Motoring**

*The sale of "The Motor" exceeds that of any FOUR motor papers combined.*

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**OPINION.**

### **An Officially Recognised Trial.**

It will be remembered that we have been severe in our criticisms of unauthorised and unofficial trials. We have pointed out that some action on the part of the Automobile Club was necessary to safeguard the public interests, and we have not hesitated to say that the duties of observers on trials should only be undertaken by those who are in every way disinterested, and who are so regarded by some recognised authority. In another column we announce the fact that Captain Deasy has started on a 4,000 miles trial on a 16 h.p. Martini car. The conditions of this trial have the approval of the Automobile Club, who will appoint observers and generally control the test. The car is to be run a total distance of 4,000 miles, the average distance per day being 200 miles, and it is stipulated that the speed is never to exceed the legal limit of 20 miles per hour. The runs will start and finish at the Automobile Club daily. It seems to us that the conditions proposed for this run are entirely satisfactory, and the fact that the car will be under the official notice of the club throughout, should render the data obtainable of an interesting and useful character, especially as the trials will be run under ordinary touring conditions. There will, moreover, be no absurd and exacting demands upon the driver, mechanic, or observers, as the conditions allow of a change at will both in the case of driver and mechanic. We welcome this trial as a variant to the haphazard and unsatisfactory tests which have been the subject of criticism in these columns, and shall follow its progress with interest.

### **Careful Driving Necessary.**

Quite an abnormal number of accidents have occurred during the past few weeks in which motorcars have been concerned, and from the evidence at the enquiries (as reported in the daily Press) it would appear as if some of these mishaps have been largely due to carelessness or recklessness on the part of those in charge of the petrol vehicles. Accidents are likely to happen with all forms of vehicles; but, while this is so, it behoves every automobilist to exercise the greatest caution when driving, firstly, because any collision in which he may form a party tends to increase the prejudice which exists in the minds of a large section of the public against all sorts and conditions of motors; and, secondly, because, if he is not to blame, he is almost certain to be adjudged as being so. With those comparatively few car owners who have a ruthless disregard to other users of

the highways, and who dash along at dangerous speeds, we have no sympathy, and leave them to work out their own punishment. It is the sane average participant in the pastime to whom we would appeal, and ask him to remember that the roads were not constructed for his entire monopoly, and that it is little short of a criminal act to indulge in high speeds in public thoroughfares such as are to be found in cities, towns, and villages. If every automobilist would exercise a tolerant spirit towards all other forms of traffic we should not only hear of fewer smashes, but there would be less fear and trembling on the part of the public, and a better feeling all round.

### **The Comparative Growth of Roads and Vehicles.**

The road and the vehicle are so intimately connected that a comparison of their respective developments from the earliest recorded times down to our own day cannot fail to be of interest to the readers of a journal devoted to the cause of the automobile, the vehicle of all vehicles which insists upon efficiency in road-making. The ingenuity, the labour, and the money spent in devising and developing a carriage which shall compare favourably with any other of the works of this enlightened age will be wasted if when we have brought it into a state of comparative perfection we are unable to make the best use of it because we have no sufficiently advanced system of road-making. That there is a section of the community which condemns the automobile on the very ground that it is unsuited to our present roads we have plenty of evidence in the columns of the daily Press: to such our answer is that to adapt it to the highways is a retrogression, and that only in the policy of adapting our roads to our vehicles, according as the brain of the engineer and the wrist of the mechanic develops them, is true progress to be found. A careful study of the respective histories of roads and carriages cannot fail to convince the student that although the science of road-making has been by no means devoid of progress it has progressed in a curiously uneven—in almost a jerky fashion; and that of recent years its movement has not been characterised by any marked development—in striking contrast to the vehicular industry which has leaped at a bound from what we may call mediæval mediocrity into twentieth-century perfection; or at least, if not into perfection, into a state of evolution which gives abundant promise of ultimate perfection. To pick a modern motorcar or cycle to pieces, to condemn it *seriatim*—frame, motor, wheels, tyres and all—is an easy matter; but he is a bold man who dares to assert that in these lusty beginnings we have not the seed of a splendid and abiding means of transit. As we have intimated, the utility of a vehicle is necessarily limited by the efficiency of the road over which it has to travel, and it behoves those who have the true interests of the automobile at heart to arouse the responsible authorities—whether by means of their pens, their brains, or their votes—to a sense of their responsibility. The question of road efficiency is one which might profitably engage the attention of the Automobile Club more seriously than it has done in the past, and we hope that it will not allow other matters to keep it in the background.

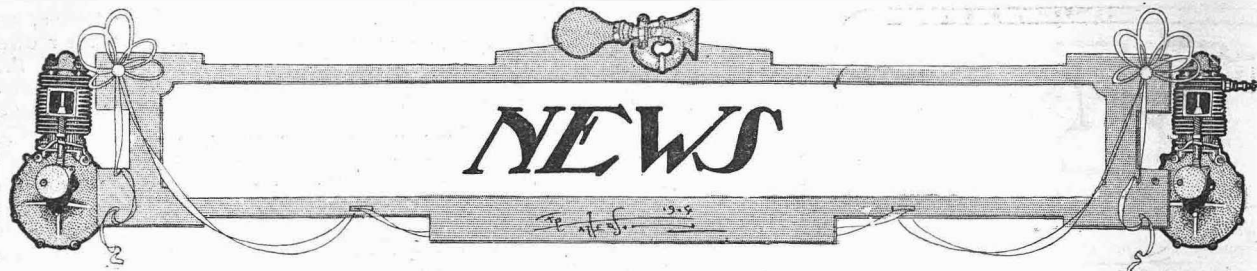
## **NEXT TUESDAY!**

(November 22nd.)

The next issue of "THE MOTOR" will constitute the third and largest of the Show Specials. In addition to a mass of interesting articles and illustrations, it will contain a complete review of the motor exhibits at the Stanley Show written by experts from inspection at the Show and illustrated by drawings and photographs.

The next issue of "THE MOTOR" will therefore be a double number at the usual price—

**One Penny!**



# NEWS

Next week!

"THE MOTOR" Show Number!

It will contain the best fully-illustrated report of the motor exhibits.

Over 70 motorcars were used in connection with the Horsham election.

The King of Greece and Prince Nicholas, his son, have each ordered a motorcar from a German firm at a cost of £750 and £500 respectively.

Ranjitsinhji, the great cricketer, sailed for India last week on board the "Marmora" with a 12 h.p. car which he will run in the Baroda Cup race next January.

Captain Deasy started on Monday from the Automobile Club's motor house, Down Street, W., on an officially observed trial of 4,000 miles. He is driving a 16-20 h.p. Martini.

A new motor postal and mail van service has commenced running between Sunderland and Newcastle. Messrs. Turvey and Co., Sunderland, contracted for the work. The motor was made by the Enfield Autocar Co., Redditch.

The London Road Car Co. will continue their motor omnibus experiments for one year before deciding whether the system is preferable to the present horse haulage. Three types of motor 'bus are being tried. The latest comer is running on the Hammersmith-Oxford Circus route. It is reported that the new vehicles have so far given great satisfaction.

### Coming Events.

- Nov. 18 to 26. Stanley Cycle and Motor Show (Agricultural Hall, London).
- „ 20. 100 Kilometres Trial (A.C. Algeria.)
- „ 20. Motor Cycling Club meets at Slough, "Royal Hotel," 1.30. Provincial motorists to the Stanley Show will be invited.
- „ 30. Auto-Cycle Club's Annual Dinner.
- Dec. 5 to Jan. 15. Exhibition of Engines for Motor Boats and Airships, and Heavy Automobiles; also special prominence to devices for alcohol consumption (Cours de la Reine Conservatoires).
- „ 9 to 26. French Automobile Salon (Grand Palais, Paris).
- „ 10. Annual dinner of the Motor Cycling Club at Frascati's. Mr. S. F. Edge in the chair.
- „ 26. to Jan. 2. Motor Union of Western India Reliability Trial.
- „ 31. Entries close for 1905 Gordon-Bennett Contest.

Mr. Curtis Bennett recently laid it down in the Marylebone Police Court that any member of the public could demand the name and address of the driver of a motorcar, and the name and address of the owner, after an accident.

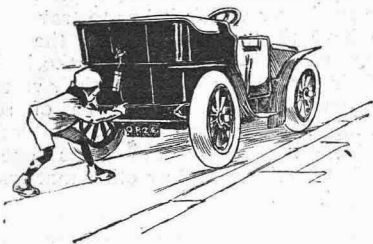
Baron de Zuylen, President of the French A.C.; the Duke of Ratibor, President of the German A.C.; and Mons. Max Richard, President of the Chambre Syndicate de l'Automobile, have been elected honorary members of the A.C.

The Tynemouth Borough Council have applied for powers to impose a by-law compelling all vehicles to carry lights—except such as are proceeding at a walking pace. Which, as Euclid puts it, is absurd; for it is the "walking pace" vehicle which usually contributes to a nocturnal accident.

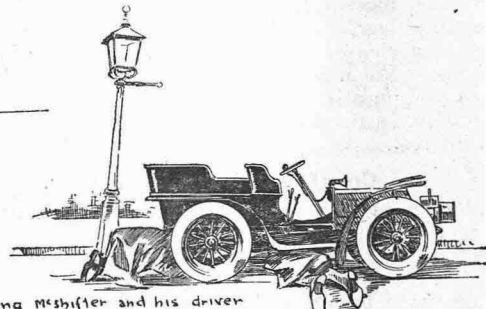
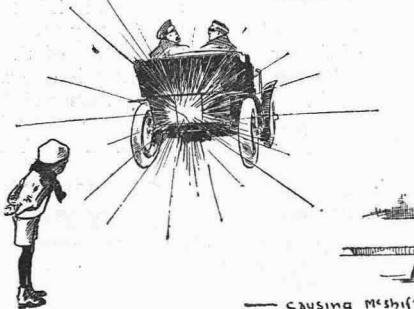
Mr. Nathan Sharpe, who has recently severed his connection with the Imre Engineering Company, wishes it to be known that he is the sole patentee and manufacturer of the Universal silencer, and that it can only be obtained from him. Mr. Sharpe's temporary address is care of Mr. F. Prince, 5, Mitre Court Chambers, Temple, London, E.C.

At the Kingston Police Court a motorist, summoned for furious driving, pleaded that he took no notice of the constable who called him to stop, and who was disguised as a tramp, as it was a common occurrence for mischievous or intoxicated pedestrians to act in this manner. Counsel for the defence pointed out that the L.G.B. Regulations expressly provided that a police constable must be wearing uniform to have authority to stop a car. Superintendent Marks said that there was not a single word in the regulations to that effect; whereupon the following edifying dialogue ensued. Counsel: "What regulations are you proceeding under?" Officer: "1898." Counsel: "Then you are six years behind the times. I am quoting the regulations of 1904." The case was dismissed.

Little Johnny attaches his last Port Arthur cracker to the rear of M'Shifter's car.



A fine threepenny explosion occurs



causing M'Shifter and his driver a terrible half-hour of anxiety and doubt



M'Shifter eventually writes, "THE MOTOR" Dr M's Editor

A most violent, and utterly unaccountable explosion occurred in the rear of my car, recently, a prolonged and thorough examination failing to reveal any cause of trouble, and I am trusting your experience will be able to shed some light on it.

## NEWS.

Friswell, Ltd., have just supplied Messrs. Clark, Nicholls, and Coombs, of confectionery fame, with a motor van, which will be use for conveying confectionery.

The Chater-Lea Manufacturing Co. have just issued their list of reduced prices for 1905. This can be obtained by agents on applying to the company at 114-120 Golden Lane, London, E.C.

Messrs. Bansom, Kent, and Co. will not be exhibiting at the forthcoming Stanley Show, but will be showing all their latest novelties in motorcycle and motor-car accessories, parts, and fittings at their warehouse, 332, Goswell Road, E.C., which is within 10 minutes' walk of the Agricultural Hall.

#### Beltine for Slipping Belts and Clutches.

A preparation named Beltine, sold in collapsible tubes at 1s. and 1s. 6d. by H. S. Hunt and Co., 29, College Street, Cannon Street, London, E.C., is a new dressing for motorcycle and car belts and clutches to prevent slipping and keep the leather in a pliable state. It has also been found useful for increasing the friction of leather-lined band brakes. For slipping clutches it has been found specially successful, and drivers who have experienced this difficulty should give Beltine a trial.

#### The Stanley Dinner: A Great Success.

On Saturday last the Stanley Cycling Club entertained a very large company at their 29th annual dinner at the Hotel Metropole, the motor and its allied trades being well represented. Mr. Robert Todd, president of the club, occupied the chair. Although the forthcoming Show at the Agricultural Hall will include an extensive display of motorcycles and a representative number of cars, speeches were singularly barren of motor talk. In fact, the only reference that we can recall was one made by Sir G. C. T. Bartley, who, in toasting the club, lauded muscular strength and cycling exercise, considering the latter to be preferable to motoring. In a sense, of course, he was right; but no sensible motorist would consider it necessary to drop all forms of exercise because he was in possession of a self-propelled vehicle. Sir George remarked upon the good opinion of sport that is held in this country, and considered that it developed the healthy manliness of the British people. Mr. M. D. Rucker toasted the Show in a very humorous speech, in which he dealt with the split between the club and the cycle trade some years ago and the recent rapprochement. In reply to the toast of the Visitors, the Mayor of Islington, Mr. A. M. Torrance, was induced, by a remark of the proposer, to touch on local matters, and he hinted that when the Borough of Islington gets its service of electric tramways (on the conduit system, he hoped) wood pavement would extend in all directions from the Angel. Mr. C. Vernon Pugh, in toasting the chair and vice-chairs, congratulated the club upon its strength and vigour, and warmly thanked its members for the lavish hospitality which had been displayed. In every sense the Stanley dinner was unique.

We are asked to state that the Hydra plug, which was described and illustrated in our last issue, is made by the Societe Electrique Hydra, of Paris, and is not one of the Dinin electrical specialities.

#### Singers Making Cars.

Singer and Co., Ltd., Coventry, are turning their attention to car making. They will turn out two and four seated vehicles designed on up-to-date lines. Singer cars will make their first public appearance at the Olympia Show in February next.

#### J. A. P. at the Show.

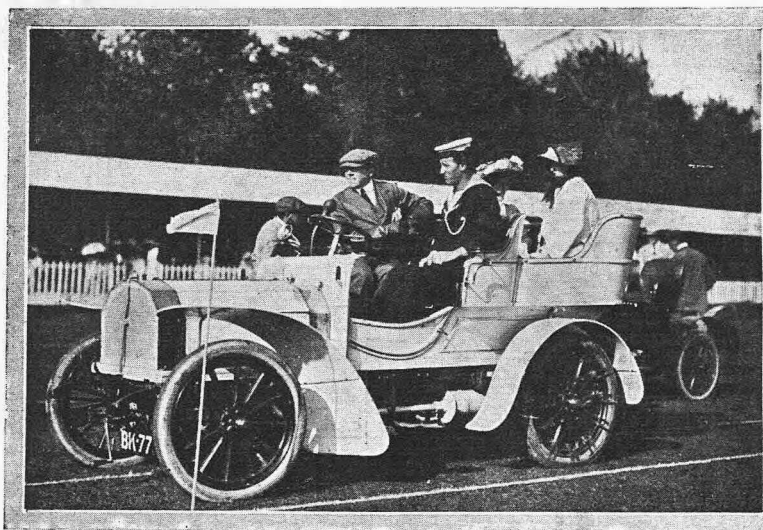
Messrs. J. A. Prestwich and Co.'s exhibit on Stand 177 (ground floor) will consist of 2½ h.p. and 3½ h.p. air-cooled engines, motor sets, and accessories. Also a new tri-car, with two coach-built bodies placed side by side; wheel steering, with control levers on wheel; a 4½ h.p. J.A.P. air-cooled engine, placed in front; and direct transmission to back wheel through pedal clutch and patent roller worm drive. Springs are provided for the front axles, and the steering rods are provided with universal joints throughout, avoiding all backlash.

The German Motor Cycle Association (Vereinigung) now counts some 6,000 members.

A. Rossi, motorcar and bicycle house manufacturer, of Britannia Road, Fulham, has just despatched three large motorcar houses to Bombay and one to Cape Town and Singapore. This is an indication of the spread of automobilism in these parts.

#### Alcohol-driven Motors.

Almost concurrently with our publication of Dr. Ormandy's lecture on the use of alcohol for industrial purposes, the German "Technische Rundschau" was pointing out that, notwithstanding the great encouragement given by the German authorities to the production of denatured spirit and to its employment for driving engines, alcohol had failed to catch on in motor manufacturing circles. Now, as before, almost all automobiles with explosion-motors were driven by benzine, not alcohol. Alcohol's temperature of vaporisation was too high for a practical motor; it would not fire until the engine got warm, and this warmth had to be brought about by the



Captain Blakett, R.N. (Admiralty), with his coxswain as chauffeur. The Misses Fisher, the daughters of Admiral Fisher, are in the tonneau.

#### "Stars" at the Stanley.

The Star Cycle Co., Ltd., Wolverhampton, always have a good and interesting display at the Stanley Show, and this year they will be exhibiting two motorcycles, a 4 h.p. water-cooled English machine and a 2½ h.p. air-cooled German machine. In both of these the cylinder head is cast integrally with the cylinder. Both of them are fitted with Longuemare carbureters and compression taps; but whereas the English machine has a wipe contact breaker, the German machine has a make and break blade. They will also exhibit a 4 h.p. water-cooled tri-car, and quite a large assortment of Star cars. The popular Little Star, with its two-cylinder engine, will attract considerable attention because of the excellent value which it represents. It is a car which is at once easy and simple in its management, and speedy and reliable. The three-seated body should be carefully considered by prospective purchasers because of its exceptional comfort.

initial use of benzine; hence complex apparatus was necessary. Moreover, the susceptibility of alcohol to the moisture in the atmosphere made it difficult to get an explosion in rainy or foggy weather. Then alcohol was not so pure as benzine, and thus liable to choke the spraying tubes. Besides, an engine that had been driven for some time by alcohol and allowed to get cold could not easily be restarted; often not until the plug had been taken out and cleaned of the deposits precipitated by the current. The greatest evil consisted in cylinder, piston, and valves being corroded more by alcohol than benzine power; a circumstance traceable to the transitory production of acids at the combustion of spirit, which ate into the iron parts. And the writer closes by remarking that through the introduction of automobiles and motor boats the German agriculturists would not find a fresh market for denatured spirit. Benzine was just as cheap and far more practical.

## NEWS.

The new Coventry depot of the United Motor Industries, Ltd., is now in full swing. At these commodious premises, which are situate in Gosford Street, will be found a complete stock of Castle coils, magnetos, accumulators, lamps, lubricators, sparking-plugs, etc., etc. Mr. G. F. Roberts, the late secretary of the Motor Cycling Club, is the manager.

A new stand for motorcycles has just been introduced by Messrs. Hearwin, Canny and Co., 158, Sandy Hill Road, Plumstead, London, S.E. It is designed on a new principle, and the makers claim that it possesses the advantages of being instantaneous and automatic in action, a stand and rest combined, light in weight, rigid, and neat, and attachable to the machine in a few minutes. It is priced at 2s. 6d., and is named the Simplex.

#### Of Interest to Light Car Purchasers.

An offer which will be most interesting to prospective buyers is a light car which will be found in Messrs. Brown Brothers' advertisement this week. During the Show time, they intend selling their 8 h.p. gear-driven car at the very low price of £150 instead of £175. There is no doubt that at this price the car is extraordinary value for money, and those contemplating the purchase of a car during Show week should make a point of seeing this at Messrs. Brown Brothers' stand. These cars are identical in every respect with the one which ran in the Hereford Trials recently, when it gained first place for brake power and ease of manipulation.

#### The Hozier Engineering Co.'s Balance-sheet.

The directors of the Hozier Engineering Co., of Glasgow (makers of the Argyll motorcars), have declared a dividend at the rate of 50 per cent. per annum on the ordinary shares for the six months ending September 30th last, which, with the interim dividend at the rate of 20 per cent. per annum paid for the previous six months, makes the total return for the year on these shares 35 per cent. After providing for payment of interest on debentures and dividend on the preference shares at the rate of six per cent. per annum, the directors recommend that the sum of £5,870 be applied as depreciation, £3,000 placed to reserve account, and the balance of £1,973 carried forward.

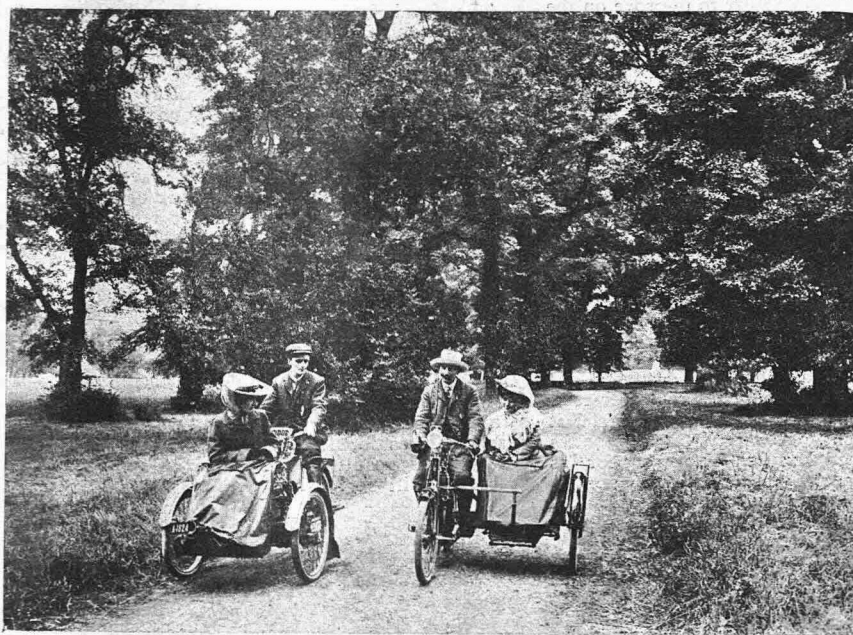
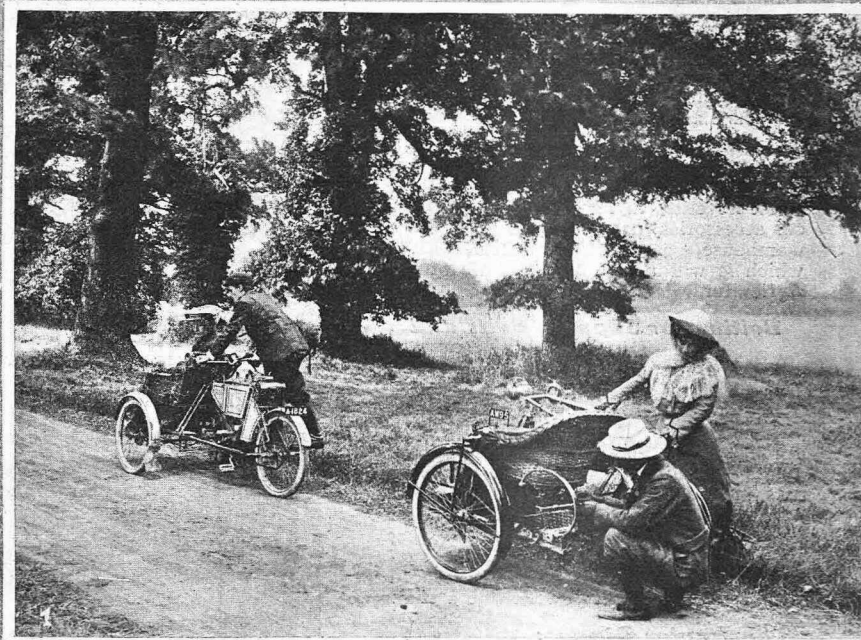
#### The Minervette.

Phoenix Motors, Ltd., inform us that they have placed a large contract for Minervette cars (we gave an illustrated description of this pleasing vehicle in last week's issue), and are now able to give definite dates for delivery commencing with January next. Mr. Hooydonk and Mr. Hsley have tested the Minervette and are so satisfied with its behaviour that they have placed, on behalf of this company, the large contract as referred to. The price of the Minervette is £108, but later on they will market the Phoenix Minervette, the cost of which will be £115. This will contain a number of the firm's own points and specialities. The Phoenix Minervette will particularly appeal to those who want a small car in which is incorporated some extra refinements and additions.

D 8

## ON TOUR.

A reminiscence of brighter days.



At the annual ploughing match of the North Kent Agricultural Association, which took place recently at Dartford, the Ivel agricultural motor was awarded the Gold Medal of the Society, thus adding to its long list of successes. No fewer than 130 ploughs of all kinds, including ploughs drawn by oxen, were at work.

The Rules Committee of the Automobile Club has been dissolved; and a Touring Committee, to consist of not less than 10 or more than 15 members, has been organised. The nucleus of the new committee consists of Messrs. Armstrong, Noble, Ochs, Purchase and Rothschild, with Major Lloyd and Earl Russell.

Messrs. Lintine and Co., of Great Eastern Street, E.C., will not be exhibiting at the forthcoming Stanley Show. This is their first abstention since their establishment, but they hope it will not interfere with their annual meeting with their country customers. During the whole period of the Show their premises

will be converted into a sample showroom, and will display a complete range of motor goods, together with their comprehensive list of side lines, specially arranged and openly priced for the convenience of buyers. Customers visiting Messrs. Lintine's depot are assured of a cordial welcome.

On Tuesday of last week Hemery, on a light Darracq car, beat the light car record for the flying kilometre, completing the distance in 25½ secs. (exactly a second faster than the existing record held by Hanriot). Hemery's speed averaged nearly 143 kilometres (89½ miles) an hour.

#### The Crystal Palace Show.

So many contradictory rumours have been whispered as to what was and was not going to happen at Sydenham two months hence, that a member of our staff paid a visit to headquarters last week and received official notification that the Show will be duly held on the date as originally fixed, viz., from January 27th to February 4th, 1905, both dates inclusive. Several firms have already booked space; amongst others, Clement-Talbot, Ltd., British Automobile Commercial Syndicate, Ltd., Star Motor Co., Horsfall and Bickham, and other prominent members of the industry.

#### The A.C.G.B.I. and the Gordon-Bennett.

The Automobile Club has decided that the following resolution shall be laid before the International Conference of Automobile Clubs which will be held in Paris in December during the progress of the Salon:—That the course for the Gordon-Bennett race shall be extended to 1,000 kilometres, and the race extend over two days. That the principle of altering the race to a team race would destroy the personal sporting character of the event. That competitors shall only be allowed a fixed number of tyres and inner tubes. That the weight limit for 1906 be reduced to 800 kilogrammes.

#### New Departure by the Automobile Club.

Having in view the number of non-official reliability trials of motorcars instituted by manufacturers during the past few months—trials which have not been officially observed and therefore have but little real value—the Automobile Club of Great Britain and Ireland have instituted a new form of tests in the shape of reliability tours for motorists desirous of taking their cars over long distances. These trials will be carried out under the supervision of official observers appointed by the Automobile Club, who will note the nature and duration of all involuntary stops, and the car from start to finish will be under the control of the Club officials. The consumption of petrol will also be carefully noted. Certificates will be granted specifying the behaviour of the car throughout. The first of these trials was started on Monday, when Capt. H. H. P. Deasy availed himself of this latest form of competition with a 16-20 h.p. Martini similar to that with which he made a 3,000 kilometres tour over the Alps last July. The distance to be driven is 4,000 miles, with an average of 200 miles a day, and at no time is the legal speed limit to be exceeded. The object of trials is to officially test more severely than has been possible hitherto in organised competitions the qualities of the modern motorcar under reasonable and exceptionally hard conditions of use. Though there will be no pretence of making non-stop runs, the car will have to travel a given distance with mechanical regularity, and attention will be directed to thoroughly ascertaining the efficiency of the motor and of every mechanical part of the car, as well as of the tyres.

D 9



# NEWS.

Through a printer's error in last week's issue, it was stated that the head office of the Swain Tyre and Rubber Co. was at "Boston," instead of Bolton. We trust this correction will prevent the company from suffering any inconvenience.

The success of the recent "lady-passenger" trials held by the Birmingham Motor Cycle Club was more than a little due to the energetic sub-committee, of which Mr. E. H. Humphries, the popular captain of the club, was a prominent member.

### Motor Cycling Club.

A paper on "Competitions" was read by Mr. J. van Hooydonk before a good attendance of club members at the Restaurant Frascati, London, on Tuesday, November 8th. The paper, which was well received, dealt with the organising of future competitions, and suggestions for obtaining more decisive results in the direction of finding a winner in reliability trials. In several of the events carried out by the club during the past season it happened that the element of luck in tyres largely proved the deciding feature, that is to say, the man who got through the series of tests without tyre troubles proved the winner. Mr. van Hooydonk thought that this element of luck might be eliminated in some way, such as by giving the man who had a puncture a second chance. Some test of skill might be introduced as the deciding factor in the probable event of a tie resulting as far as the reliability of the machine went. Thus a rider might be asked by the judges to remove a certain part of his machine and replace it in the minimum of time, or he might be asked to locate a "fault." A fuel consumption test might be made. He thought that the present gathering was a good opportunity to hear some further suggestions. The discussion failed to elicit any markedly original suggestions on the matter. It was generally conceded that it was a matter of no little difficulty to improve on the tests carried out. Mr. Hart thought that a consumption test should decide the matter; but Mr. C. W. Brown pointed out that even this introduced difficulties in the way of allowing for weight of rider and machine. Mr. Chandler, who was the originator of the London-Edinburgh run held in May last, disclosed another sensational event he had thought out. It was nothing less than an end-to-end ride, to be accomplished in 45 hours net time of riding. He strongly discountenanced the idea of a continuous straight away ride without rest. His idea was to allow for two periods of six hours rest. This would render the scheme popular amongst club members; otherwise very few would enter. Mr. Jackson did not approve of having intervals for rest. He thought the public would consider it a tame event. A hearty vote of thanks was accorded Mr. van Hooydonk for his paper. Mr. Arnott was chairman.

Twelve motorists were summoned last Thursday for exceeding the limit in Hyde Park. The fines varied from 10s. to £2.

The committee of the Auto-Cycle Club awarded a silver medal and certificate (highest award) to the Avon tri-mobile, competing in the club's recently-held tri-car trials, for "excellence of fuel economy, hill-climbing, ease of starting and control, and brake efficiency." The sole agency for Avon tri-mobiles is held by the Otto-Bennett Motor Company, of 8, Snow Hill, London, E.C.

### "Honi Soit Qui Mal y Pense!"

Dorsetshire motorists are agitating for an alteration of their present registration letters. It is stated that the county funds suffer a considerable loss owing to the objection of Dorsetshire owners to register their cars in the county. Many resort to the neighbouring counties of Somerset and Hants, and even to London, rather than adopt the present Dorsetshire lettering—which, by the way, is BF.

### Motor Racing on Ice.

A novel motor race will be included in the programme for the Northern Games to be held at Stockholm on February 4th to 12th next. This event will be followed with interest in motor circles. The race will take place on a straight course on the ice of the Vartans Bay, near Djurs-holm, a suburb about ten miles distant from Stockholm, on Sunday, February 5th. Count Clarence von Rosen is the chairman of the committee for motor racing, and consul-general C. E. Gjest-vang, 10, St. Vatrugatan, Stockholm, is the secretary.

### The Earl of Craven Appeals.

The Lord Chief Justice and Justices Kennedy and Ridley have directed that a writ of certiorari be issued against the Wokingham (Berks) magistrates to show cause why judgment in the Earl of Craven's case should not be quashed. The facts of the case are alleged to have been as follow:—A police-inspector endeavoured to ascertain from Lord Craven the name and address of the driver of a car of which his lordship was the registered owner. Lord Craven referred the official to his solicitor, Mr. Staplee Firth, who asked for what alleged offence the information was required. The inspector refused to satisfy this request, and a summons was issued. An adjournment was applied for on the ground that sufficient time had not been given to the defence to prepare their case; but this, apparently, was refused; and, in the absence of the earl, he was fined £10 and £1 4s. 6d. costs. The result of the certiorari proceedings will be awaited with interest.

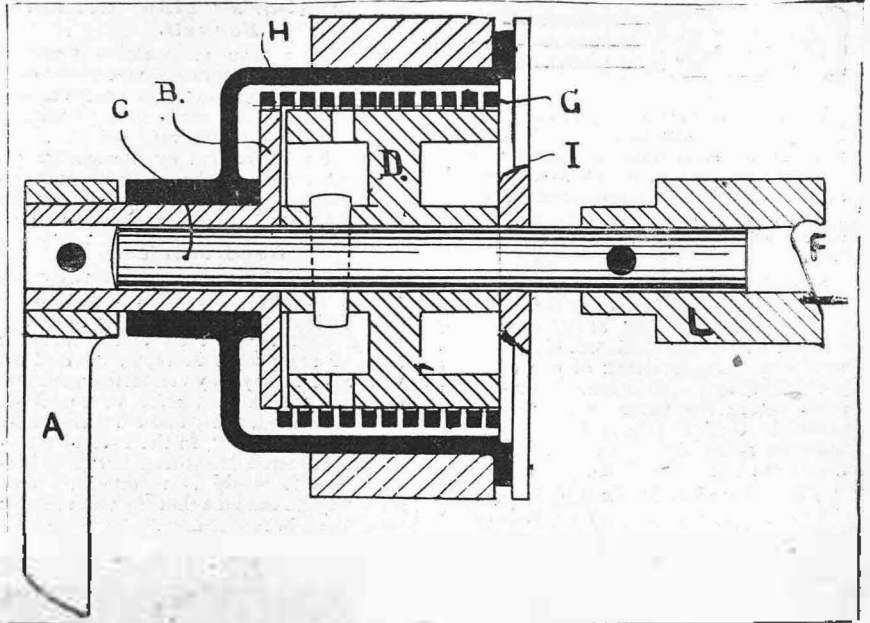


**NEWS.**

**A New Starting Handle: Immediate Disengagement with a Back-fire.**

This starting handle, which disengages in both directions, has been produced to meet the demand for a device by which all accidents, due to back-fire, may be overcome. A back-fire more often than not leaves its mark upon the person operating the starting handle, no matter how much care he may have exercised. Referring to the figure, it will be seen that the starting handle or crank A is loose on the spindle C, but fixed to a disc B, on the rim of which is attached a spring G, which just clears the drum D. The spring G is of a square section. The drum D is fastened to the spindle C, which can engage with the crank shaft of the engine by the ordinary claws F fixed on a collar L. When the handle A is rotated, the friction of the spring G against the plate I causes the spring to contract, and in this manner the drum D is gripped and rotated with the disc B, and, therefore, with the starting handle. In this case, of course, owing to the claws F, the crank shaft is rotated, and the engine starts up. When the engine has speeded up the crank shaft overruns the race at F as usual. If it happened that a back-fire did occur during the cranking, what would take place is this: the drum D would run in the reverse direction and so loosen the grip which the spring has on it; this disengages the starting handle from the crank shaft. The reason why the grip of the spring on the said drum would be loosened is that the friction of the spring against the plate I causes the spring to expand.

The arrangement is attached to the frame in front by means of a bracket. It may so happen that the starting handle acts through gearing. In this case one of the gear wheels must be fixed on the spindle C. The other gear wheel will be mounted on the engine shaft, which, how-



**A new starting handle which neutralizes shock arising from back-fire.**

ever, must be broken between the gear wheel and engine, and have the usual claw coupling.

The whole arrangement is enclosed in a cover H, through which oil can be run on to the spring and drum to prevent them seizing the disc I, which forms part of the cover. This article is patented in nearly all foreign countries, but is not yet on the market in England, but further particulars concerning it may be obtained by applying to Gautreau Freres, Constructeurs a Dourdan (Seine-et-Oise).

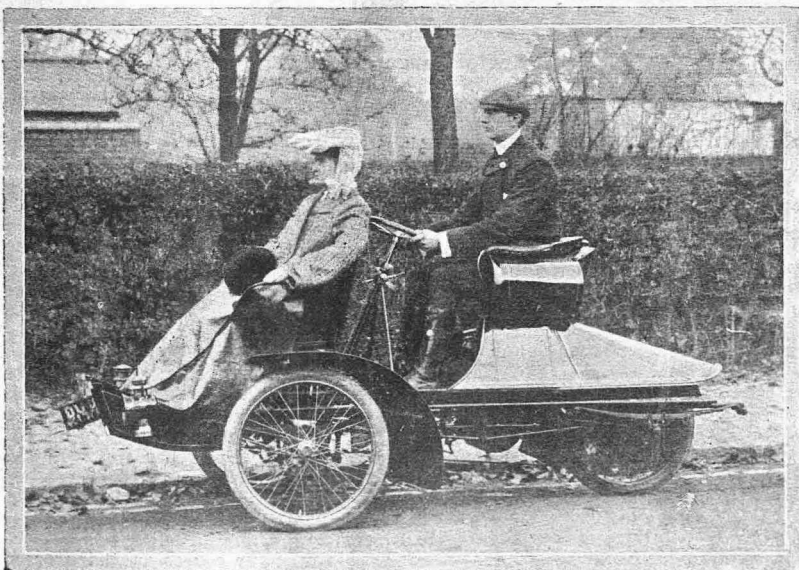
The number of entries for the Paris Automobile Show, which opens on December 9th, already beats all records. Up to the present only three British firms have taken space—the Wolseley, Napier, and Hozier Companies.

**The Delhi Motorcar Run.**

The Delhi motor trials are arousing great interest in India—especially among the natives. Several prizes have been offered by various rajabs and maharajahs who are enthusiastic on motoring. It is probable that the light cars will do best, as the condition of the roads will not favour heavy high-powered vehicles. The course, which is a thousand miles long, comprises all sorts of roads and scenery: several rivers have to be crossed, and one section of the route traverses high mountains. The object of the trials is to discover the most suitable type of car for Indian roads and conditions.

**The N.S.U. Productions.**

The N.S.U. Cycle and Motor Co., of Neckarsulm (Germany), are now comfortably installed in their new English depot, at 4 and 6, Hatton Wall, where an excellent display of their various models may be inspected. The company have taken space at the Stanley Show, and we have no doubt that their machines will excite the attention they deserve. A very taking model is their 3 h.p. motor-bicycle, one of which we are putting through some hard riding tests, and on whose performances we shall have something to say in an early issue. These machines have a tremendous popularity on the Continent, and the makers claim to have turned out no less than 3,000 of them during last year alone, and since then the output has gradually increased. The machines stand out on account of their neat design and excellent workmanship and finish—the engines particularly being neat productions. The valves are mechanically operated, and a small and effective spray carburetter supplies the petrol vapour, which is ignited by an electric magnet. The machine, which is both powerful and speedy, is controlled almost entirely by means of a throttle and petrol regulator combination, and runs remarkably smoothly and quietly. We shall illustrate and describe it further in our Show report.



**The new model Rexette with spring frame, fitted with a new form of sloping back mudguards.**

## NEWS.

The R.L. Engineering Co., 15, Verulam Street, Gray's Inn Road, London, E.C., ask us to state that the double-faced clutch gear described in first page of article on gears last issue is patented No. 2136/04, and thus the idea cannot be copied without infringement of this patent.

The denizens and habitués of Piccadilly were startled out of their usual languor last week by the sight of a motorcar in flames. Two cars collided, with the result that the petrol tank of one of them got alight, and considerable damage was done before the flames could be extinguished. One of the drivers was splashed with the spirit and also took fire, receiving burns about the face and hands.

### The Blackpool Speed Trials.

The Duryea Co. wish to point out again, with reference to the recent Blackpool speed trials, that their phaeton which competed was a genuine standard phaetonette (listed at £200), with a fourth wheel added at a cost of £25; and that, as such, it was justly entitled to compete in the £250 Class—the ordinary phaeton (which would not have been qualified for that class) having double ignition, double circulation, and best quality Halfiday top, with leather apron and ornamental leather dash. The Duryea Co. also quote figures to show that their car did fastest time in the standing start mile.

### The 9-12 h.p. Horbick Car.

An interesting exhibit at the Stanley Show will be the three-cylinder 9-12 h.p. Horbick car, made by Horsfall and Bickham, Manchester. This has an ash frame strengthened with steel flitches; and a comfortable two-seated body is fitted with a large tool-box behind, and arrangement for a detachable tonneau body. The transmission is by a telescopic shaft with universal joints to a live axle. The Panhard gear provides three speeds (up to 30 miles per hour) and reverse, the direct drive being on the top gear. An accumulator and high tension coil are fitted. The steering is by inclined wheel, worm, and segment. Separate mechanically operated valves are provided both for the inlet and the exhaust. Continental, Michelin, or Dunlop tyres can be fitted to customer's choice.

### Human v. Horse Power.

A significant sign of the times is that "strong man" performers which used to call in the aid of the horse to prove their strength now resort to the motorcar. George Lettl, the German strong man who is now giving a turn at the Hippodrome, provides a remarkable indication of the "horse-power" of his muscles by encircling his body with a strap and attaching it to the back of a 16 h.p. car. The car is then set running at top speed (35 miles an hour), and Lettl not only pulls against it and retards its progress, but drags it backwards by pure strength across the arena. He then gets between two 8½ h.p. cars, which are both started off at top speed in the opposite direction, and by sheer strength he holds them both so that they cannot move, it being a strange sight to see the car standing still with its back wheels churning up the ground.

D. I.

### Next Year's "Little Gordon Bennett."

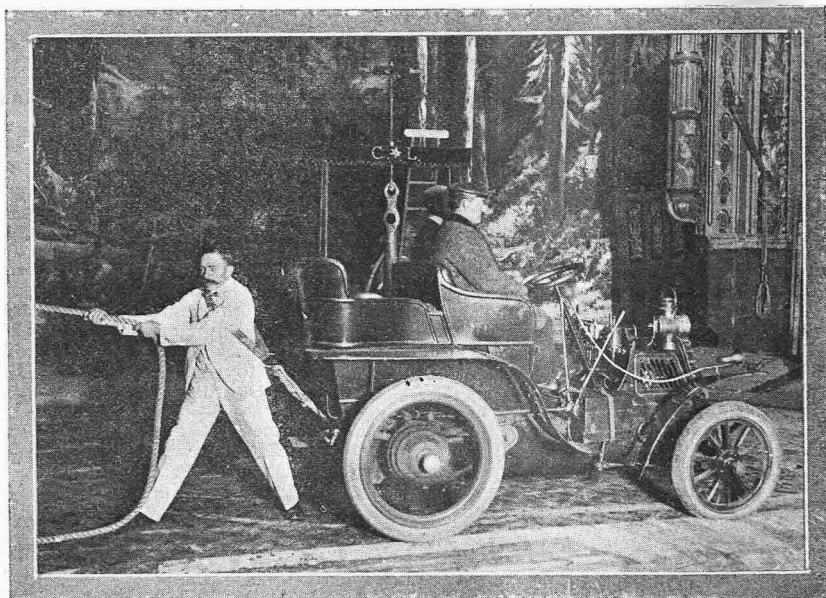
No fewer than 11 Austrian firms of motorcycle manufacturers have been asked by the Austrian Motorcyclisten-Vereinigung whether they are willing to participate next year in the race for the international prize offered by the Motorcycle Club de France. The necessity of holding eliminatory trials will depend on the number of affirmative answers received.

### Good Advice.

Mr. Justice Darling, who frankly admitted in Court the other day that he was prejudiced against motorcars, disliking their noise, their smell, and the look of the people in them, advised all who were in any way connected with law cases in which motorcars or motorists were concerned, to try and rid their minds of this prejudice. "In the case of a collision between a horse-trap and a motorcar," his Lordship is reported to have said, "try to imagine that the two vehicles were both horse-vehicles."

### J. E. Hutton at the Show.

Messrs. J. E. Hutton, Ltd., will exhibit eight Princes motorcycles and two fore-cars. The motorcycles will be a 2½ h.p. air-cooled, belt-driven; a 2½ h.p. air-cooled, chain-driven; a 2½ h.p. water-cooled, belt-driven; a 2½ h.p. water-cooled, chain-driven; a 5 h.p. two-cylinder air-cooled, belt-driven; a 5 h.p. water-cooled, belt-driven; a 5 h.p. two-cylinder air-cooled, chain-driven; and a 5 h.p. two-cylinder water-cooled, chain-driven. Two-speed gears will be fitted to several of these, also hand starting. The fore-cars are fitted with a 5 h.p. two-cylinder air-cooled governed engine, two-speed gear, friction clutch, automatic carburetter, etc. The drive is by chain from the engine to the two-speed gear through the cone friction clutch, and then to the back wheel by another chain. The fore-cars can be had with or without the top bar, and with a saddle or bucket seat for the back rider. One is air-cooled and the other water-cooled, with a special form of radiator.



A Novel Performance at the Hippodrome.

### Fafnir Exhibits at the Stanley Show.

On the stand of Messrs. G. Straus and Co. will be found exhibits of the Fafnir engines, parts, and car components. The Fafnir motor-bicycle engines have earned a splendid reputation on account of the first-rate design and workmanship put in them. The 3 h.p. 1905 air-cooled engine has mechanical valves, and is governed on the inlet. The latest form of high tension magneto electric ignition can be supplied if required. The driving is effected by enclosed gear wheels. The finish on the 1905 engine will even excel the 1904 type, and that is saying a great deal. A light car set, named the Fafnir Omnibus, should prove a most interesting exhibit. The components comprise a two-cylinder 5 to 6 h.p. engine, a three-speed change gear and differential. The total weight of the fittings is less than 175lb. The two-cylinder engine is also expected to prove popular for tri-cars, as it is very compact and light. The set is arranged for chain driving.

### Motor-bicycles and Delhi Bombay Motor Trials.

With reference to the event for motor-cycles, we are officially informed that a sufficient number of entries have now been received to warrant it being carried out. It has been decided to run the trial for motor-bicycles and tricycles in conjunction with that for motorcars, but the smaller machines will only have to traverse between Agra and Mhow, a distance of 389 miles, to be covered in seven days. The motorcycles will arrive in Gwalior the same day as the cars, and will, in consequence be able to take part in the motor gymkhana which is being held by H.H. the Maharaja of Gwalior. This will be on Tuesday, December 27th. Entries for the motorcycle event will be received by Captain Jennings, R.G.A., 32, Colaba, Bombay, and must be sent in before December 1st.

Maps of the course are being prepared, and all information will be afforded to competitors regarding accommodation, etc., in due course.

## THE TRI-CAR TRIALS: JUDGES' FULL REPORT

In our last issue we were able to give but a bare digest of the report issued by the judges on the Sunday night following the trials, and as some of the points may with profit be more fully considered, we do not hesitate to give below the report *in extenso*. It may be prefaced with the remark that the judges had not to consider the whole question of tri-cars, but simply the doings of the 10 machines which competed in the trials, and the points good and bad which they noticed in those particular ones.

1. *General Remarks.*—Fourteen machines entered, 10 started, six finished within the maximum time, and of these a majority approached to the minimum time which corresponds to 20 miles per hour. The weather throughout the day was fine, and the roads generally in good condition. Some of the lanes, however, were a trifle heavy, particularly in one or two places where they were undergoing repair.

2. *Drivers.*—It appeared in this trial, as often before, that drivers had not sufficiently studied the regulations, and many might have gained specific advantages or avoided loss of credit by doing so. The brake test and the stop and start tests showed that the drivers were not as skilful in handling their machines as might have been expected; for instance, one or two men momentarily grasped the wrong handle or threw the lever in too late, unclutched too late, or only used one brake in the emergency stop.

The presence of four private owners was welcomed, and some little regret was felt that no manufacturer availed himself of the right to enter a team.

3. *Observers.*—As compared with any bicycle trial hitherto held, the present trial is severe, owing to the machines being under continuous observation. On the whole the observers' reports were brief and to the point, though all did not equally appreciate what was important, and some did not, as they should, notify *everything* of consequence that happened on the road. The thanks of the judges are rendered to them for their valuable assistance.

4. *Tyres.*—It is worthy of note there were no stoppages on account of tyre troubles, though provision had been made in the regulations whereby a machine would not be thereby disqualified.

5. *Brakes.*—The tests seem to show that the brakes were not always designed to be equally efficient forward and backward. Brakes that are easily thrown into and out of action unquestionably facilitate re-starting on a hill, and the fact had been overlooked in at least one case.

6. *Transmission.*—The manner in which water cooling enables an engine of given cubic capacity, not only somewhat to increase its power, but also to maintain the increased power for long periods, must be borne in mind when designing the transmission. For heavy vehicles such as tri-cars, the use of belts could probably be retained, if their proper proportioning were more carefully studied.

A large and convenient water inlet, so placed that any liquid which splashes over shall not impair the insulation of the sparking-plug or wires, might be more generally provided. Equal attention should be paid to the petrol inlet, providing it with an internal and detachable

filter. Three instances of choked petrol pipes occurred in the trials.

7. *Distribution of Weight.*—In the evolution of the change gear tri-car from the single-gear machine, the proper distribution of weight necessary for the greater road adhesion of the driving wheel when the low gear is in use has in some cases been overlooked. On certain machines the driving wheels skidded considerably when re-starting on an average gradient. This skidding is not only severe on the single tyre, but wastes the engine power as much as belt slip.

8. *Water Systems.*—The adoption of change speed gears has naturally led to the use of water cooling, with the attendant difficulty of combining lightness and strength. The strains to tank and pipe-work on a partially-sprung machine are more severe than in the case of cars, and as the materials give little scope for improvements, attention should be centred on producing a stronger and simpler design. It is to be noted that by far the largest number of troubles arose in connection with the water systems. The possibility of dispensing with the pump by using simple and direct water connections, and placing a more efficient radiator high above the engine, seems to merit further careful trial. Thoroughly efficient radiators, with sufficient surface to prevent boiling on long hills, would obviate the necessity for tanks with their load of water, fragile joints and troublesome attachments.

9. *Electrical Arrangements.*—The experience gained elsewhere in this matter has borne fruit on tri-cars, and the absence of electrical troubles is noteworthy.

10. *Minor Matters.*—More than one machine appears to have had inadequate petrol capacity for 100 miles of average English country.

If it be accepted that flooding the carburetter is necessary for starting, and occasionally during a run, a more accessible and simple means might be provided.

Some machines were fitted with a starting handle conveniently carried in its useful position, and it was noted that where this provision had not been made, the handle was liable to be so packed away that the rider was indisposed to use it, if it were not actually lost, as occurred in one case.

In conclusion, it is by no means universally recognised, either by the public, makers, or agents, that it is not easy to run a number of motor vehicles 100 miles under observation with absolutely no stop, whether from a driver's error or for a small mechanical adjustment. In general, the performance of the six machines which covered the 100 miles within the stipulated maximum time of six hours is not to be looked upon otherwise than as a very creditable performance, although no machine qualified for a non-stop certificate.

The judges recommend the committee of the Auto-Cycle Club to award a silver medal and certificate for excellence in—

1. Fuel economy.
2. Hill climbing.
3. Ease of starting and control.
4. Brakes.

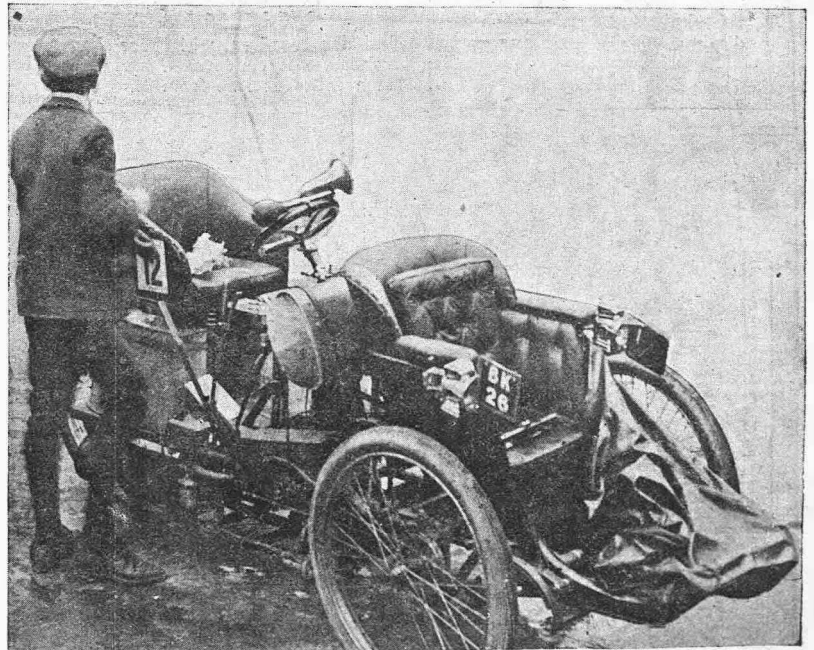
to Vehicle No. 12, 6½ h.p. Pearson, entered by T. Sopwith.

Vehicle No. 10, 4½ h.p. Avon Trimobile, entered by Avon.

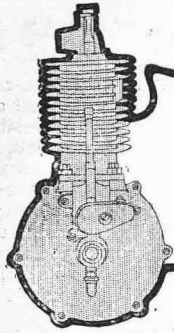
Vehicle No. 8, 3½ h.p. Wallace, entered by Mr. Wallace Batchelor.

Vehicle No. 7, 4½ h.p. King, entered by Messrs. W. King and Co.

EDWARD A. COZENS-HARDY.  
MERVYN O'GORMAN.  
GEORGE F. SHARP.

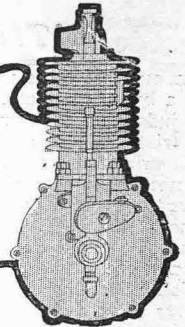


Mr. T. Sopwith and the 6½ h.p. Pearson Tri-car on which he performed so well in the Tri-car Trials as to receive from the Auto-cycle Club both a silver medal and a certificate of merit.



# INVENTIONS

THE "LATEST" IMPROVEMENTS IN MOTORS,  
MOTORCYCLES, MOTORCARS & ACCESSORIES.



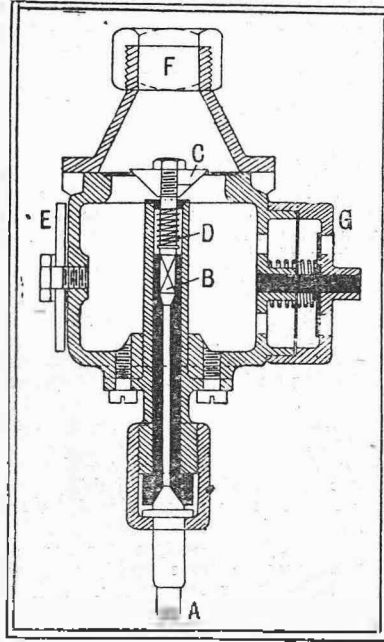
### A Useful Adjunct for Changing Gears on Cars.

The Hamilton Motor Co., Priory Works, Coventry, have just introduced an ingenious mechanism for fitting to cars, which, by its action, facilitates the change of gears, and proves a safeguard against any risk of damaging the gear-wheel teeth when effecting changes. The sectional illustration depicts the mechanism, which, broadly speaking, is a free-wheel chain sprocket. The details are as follow:—

A Bowden wire runs from the change lever to a toggle on a loose shifting sleeve on the boss of the chain-wheel, the upper row of parts being arranged in their proper order: A being one half shaft from the balance gear; C keyed to A; D, slidably connected with C, but pressed outwards by the spring which also keeps its teeth in advance of the teeth of C. It should be observed that though the teeth on C, D, and inside plate E correspond in number and depth, those inside E are narrower, and therefore the gaps in E are wide, but not wide enough to take in a tooth on D, plus its advance on C, caused by the action of spring F. The following actions must be borne in mind:—

- (1) The sliding sleeve D tends (by the pressure of the spring F) to disengage E, and therefore B;
- (2) when H is raised to free the lever from the quadrant it simultaneously forces out G, and therefore frees B, the chain-wheel;
- (3) when B is freed, and when the pin is sliding on the upper part of the quadrant, B must be free;
- (4) when B is free, the resistance of

the road-wheel on the other side of the car, combined with the resistance of the



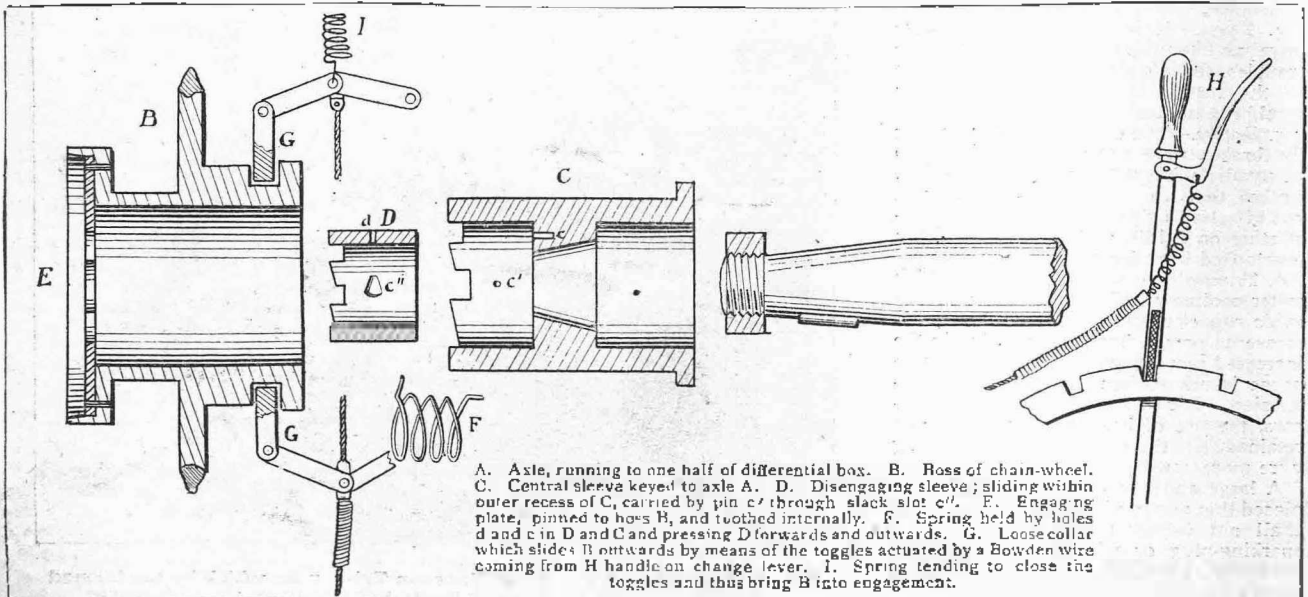
The Force Carburetter.

balance gear-box, will cause shaft A, and, consequently, sleeves C and D, to travel at a different rate from E.

Consequently the teeth on D will be bound to pass, or be passed by those in E, which will be ready to lock itself to C as soon as the pin is dropped into the notch in quadrant; this, however, cannot occur until the gears in the gear-box are fully in mesh; and as they have been slid into mesh while free from both engine and the car, that is to say, when they have lost all impulse and momentum which could do any harm, all possibility of missing or ripping gears is absolutely avoided. The mechanism which we recently inspected at the makers' works in Coventry is exceedingly well made, and is the invention of Mr. C. Hamilton, the works manager, who is open to supply it to the trade.

### The Force Automatic Carburetter.

The Force Motor Syndicate, Round Tower Works, Leicester Street, Coventry, have recently introduced an automatic carburetter, which has several interesting features. It is very simple and thoroughly well made, and, we understand, has been applied with much success to motor-bicycles. The sectional illustration will give a good idea of the principal parts. The petrol enters at A and passes up to the needle valve B. This valve is actuated by the engine suction acting on coned plate C, which acts as a diaphragm. There is an air regulating disc at E, which is adjustable, and is set when the carburetter is fitted to the machine. At G there is an auxiliary air inlet, which acts quite automatically, and as the speed of the engine



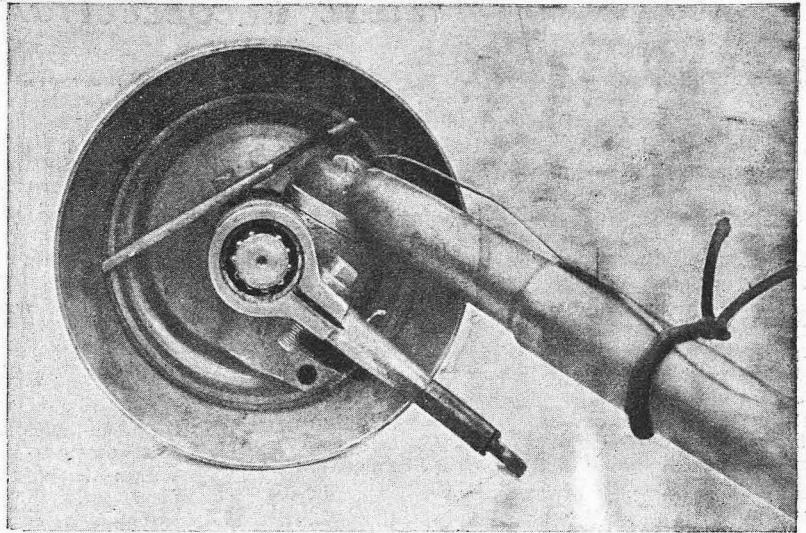
A. Axle, running to one half of differential box. B. Boss of chain-wheel. C. Central sleeve keyed to axle A. D. Disengaging sleeve; sliding within outer recess of C, carried by pin c' through slack slot c''. E. Engaging plate, pinned to boss H, and toothed internally. F. Spring held by holes d and e in D and C and pressing D forwards and outwards. G. Loose collar which slides B outwards by means of the toggles actuated by a Bowden wire coming from H handle on change lever. I. Spring tending to close the toggles and thus bring B into engagement.

**INVENTIONS**  
— contd. —

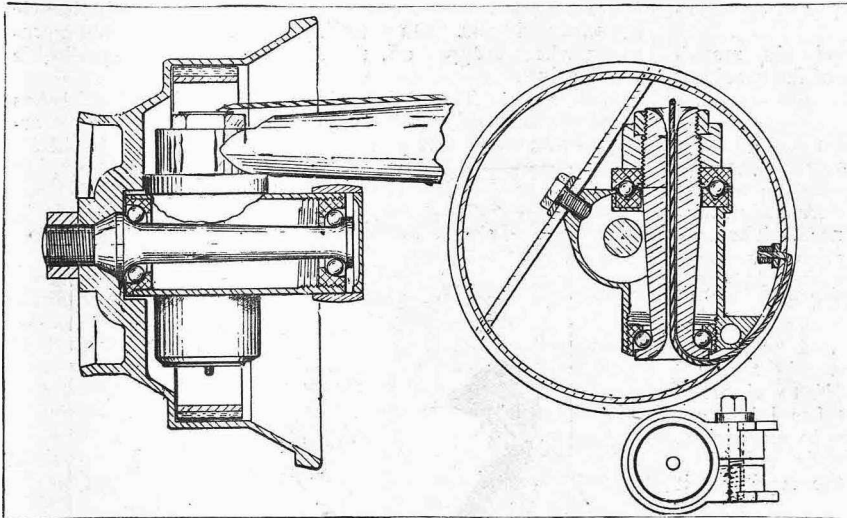
increases this valve admits more air in proportion. There are no levers to operate, and the whole device is very neat and light. It is made in aluminium.

**Centrally-pivoted Steering Hubs with enclosed Brakes.**

It has long been recognised that the defects of the Ackermann steering arrangement, whereby the pivots are by the side of the wheel, are only partially remedied by the addition of a so-called "irreversible" mechanism. The latter, while adding complication, expense, and backlash, does not relieve the pivot, the axles themselves, and the rod connections of the continual strains imposed by the tendency of the wheels to spread outwards; and nothing but brute strength of material will resist the shocks of a sudden increase of resistance occasioned by roughness of the road, stones, etc. While it is acknowledged that the steering pivots should be placed in the central plane of the steering



A view showing internal mechanism of Renouf's steering device.



Sectional elevation and end views of Renouf's system of steering.

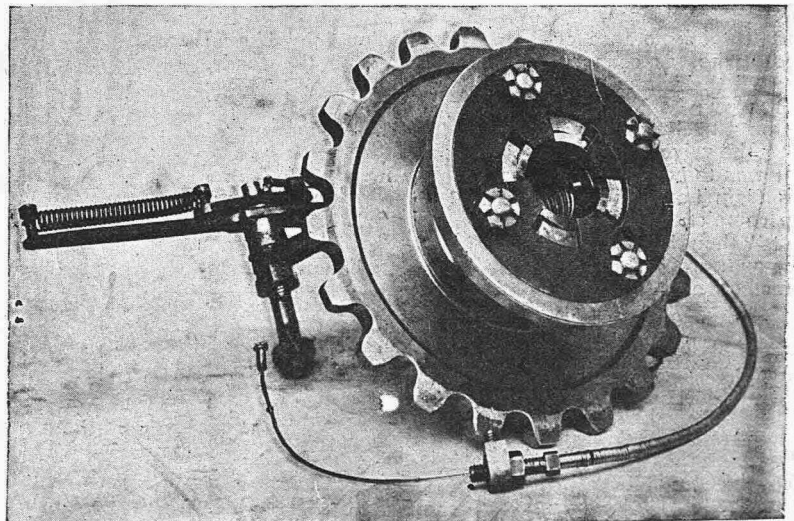
now been made at the Hamilton Motor Co., Ltd., of Coventry; they may almost be described as consisting of a brake drum surrounding the steering pivot and serving as the flanges for the spokes at the same time. A very slight amount of pressure is required to produce very powerful braking, without affecting steering in the least.

As is seen from the annexed illustrations, the bearings are of normal size; all dirt is thrown off them, and the brakes and the wheels can be detached for the purpose of tyre repair, storage, etc., without interfering with the bearings or the brakes, which are left intact on the chassis. Particulars will be given by the Hamilton Motor Co., of Coventry, or by P. L. Renouf, of Chester Road, Erdington. The size manufactured at present is particularly suitable for tri-cars up to 5 h.p.

Readers who desire information regarding Patents may obtain same on sending details addressed as follows — "Patent," care of 'THE MOTOR,' Rosebery Avenue, London, E.C.1'

wheels and numerous designs embodying this feature have been suggested and even tried, the difficulties in dealing with the bearings, and steering clearance have placed most of them outside the sphere of practical manufacture. Mr. P. L. Renouf, of Birmingham, the well-known inventor and patentee, has, during the last couple of years, used a very simple arrangement in which all these difficulties are claimed to be overcome; and ball bearings are applied to both pivot and axles without great expense. To what extent the steering is improved and the strains on the connections relieved may be gathered by the fact that the motor is easily steered by merely grasping the vertical steering stem instead of the wheel or handle-bar; when the rod connecting the two tillers is removed for experimental purposes, so that one wheel only is connected with the handle and the other wheel pin is free from all mechanical control, the latter is found, on a good road at any rate, to follow the deflections of the controlled wheel perfectly and quite automatically.

An improved form of these hubs has



Hamilton's free-wheel chain sprocket to facilitate changing car gears.

## SOME RECOLLECTIONS.

Down what a vista of adventures and events—all more or less amusing and instructive when regarded in the light of to-day's more mature experience—do I look back to the day when I consulted my father on the subject of purchasing a motor-tricycle. Let it be understood that I had quite made up my mind on the subject, and consulted my respected parent more with a view to ascertaining the kind of reception the newcomer would be likely to receive in the paternal coach-house than with any intention of being influenced on the main question. The "powers that were"—considering their strictly conservative views—did not seem so averse to the innovation as I had feared. They merely intimated that (1) I was a most colossal idiot; (2) of course the money was mine; (3) I should be tired of the machine in a month.

Much relieved by the (comparatively) agreeable nature of this interview, I made arrangements with the manufacturers to bring the machine over for a trial. It was a proud moment for me when, seated upon the Whippet trailer,

I WAS SWUNG PERILOUSLY OUT OF THE FRONT GATE and away up the road. That trial run still remains to me the most delightful motor experience of my life. Soon tiring of the trailer, I insisted upon changing places with the driver, having assured him that I could steer a tricycle. Fortunately the ditch at that spot was not deep, and the mud-guard alone suffered serious damage.

On reaching home I had my first lesson in motor-mechanics, being initiated into the mysteries of the sparking plug, and the relative positions of the twin taps on what I was informed was the carburetter.

About this time the powers, who had been out on their bicycle, turned up. Then there was what may vulgarly be described as a "row." Having come to the conclusion that the purchase scheme would be abandoned after their interview with me, the powers were highly incensed. They demanded the instant removal of the offender from the position it had usurped between the brougham and dog-cart, and its immediate removal to the stable yard of a neighbouring hotel. Seeing that it was my only chance, I became as a mere and abject worm before them, and by dint of much pleading obtained a reprieve for "one night only." Somehow the "one night" extended itself to eighteen months—long after the car arrived! What fun I had out of that machine! What an education it was in mechanics, and what knowledge of motors and their moods, gained by bitter, bitter experience during hours by the roadside, it afforded me!

### MY FIRST MISHAP

serves to show how much beginners in those pioneer days trusted in Providence, while it serves as an example of the monumental ignorance of their trade displayed by bicycle makers who, as soon as motors appeared on the roads, decorated their premises with the attractive title of "motor repair works." Three days after my purchase I sallied forth on a twelve mile ride to the makers for the purpose of having the valves ground in. I had no idea what it meant, but it was to be done gratis, so I was quite happy. Three miles from home there was a loud bang in the silencer, and a complete cessation of work on the part of the engine. "Ah!" thought I, "that must be the sparking plug." Three-quarters of an hour later I pushed the machine to a "motor works" half a mile from

### THE SCENE OF THE DISASTER.

I hope that time instead of softening has accentuated the language which I seem to remember using. For three long days did they experiment with that machine. All to no purpose! A frenzied wire finally summoned an "expert" from the makers. For three long hours did the "expert" try his hand with no better success. And it was so simple! I am convinced that it was simply a stroke of luck which led that expert to the discovery that the cotter-pin from the exhaust valve was missing! It seems almost incredible that an entire absence of compression should not have led to an

inspection of the valves in the first instance. But no! It took more than three days.

The expert made a temporary cotter on the spot, by the aid of which I did succeed in reaching the makers' works. On arrival I found the new cotter hanging out in such a manner that another half-mile would have meant a recurrence of the mishap. The makers inserted another of the standard pattern. It was dark when I started for home. At the top of the hill on the Cobham side of Ripley the machine again stopped. This time my first glance was at the exhaust valve. Yes, again! With assistance the machine was urged back to the village. Here I fled myself a cotter which lasted until I finally sold the machine eighteen months afterwards.

### VERY MANY THINGS DID I SUFFER

during my ownership of that tricycle. Having purchased it second-hand from the makers, I did not expect a very perfect conveyance, but a demon was concealed somewhere within that mass of machinery who caused it to drop to pieces at all the most inopportune moments. Had I a train to catch, or a dinner-party to arrive at punctually, it was any odds on a wheel coming off or an axle breaking. The accumulator had an irritating habit of expiring suddenly with no preliminary symptoms of exhaustion, while the fact that the back axle was out of truth caused a boom in the sale of cones and balls. On wheeling the machine out one morning a wheel dropped off, the axle being broken just inside the bearing.

Well, well! That old machine was a training which has stood me in good stead many a time since then on motor-bicycle and steam and petrol cars.

H.C.L.



**THE INSULAR BRITON**  
BRITON ABROAD: "Where does this road lead to, please?" (No answer.)

B. A. (louder): "Where does this road lead to, please?" (Still no answer.)

B. A. (furiously): "Where does this road lead to, please?" (No answer being forthcoming from petrified native, motist departs with lurid and emphatic ideas of the stupidity of foreigners.)

## MOTORS—HUMAN AND PETROL.

By T. F. EGGLETON.

A glance at the title may suggest the query, "What connection exists between the two?" Well, to the casual observer little perhaps; but anyone who takes sufficient trouble to think a moment will, I fancy, detect an affinity. What is the human motor? The body generally, but the heart, lungs, and internal organisms in particular. The functions of these are, we know, to keep the body in as healthy a condition as possible under all circumstances. To do this certain foods must be taken into the body, the nutriment extracted from them, and in turn passed on to the blood. There must also be a certain amount of pure air (oxygen) taken in, and there should also be a certain amount of exercise both of the muscles of the limbs and of the stomach, heart, lungs and general internal organs. Now a great many people get the food but little or no fresh air, and even less exercise. There is another class who get fresh air in quantities, food also in abundance, but no real exercise. When I say real, I mean something which takes place with as much regularity as the two latter, for after all exercise is really as important as fresh air and food.

### THE IDEAL EXERCISE

must be handy to our reach; it must be combined with the elementary principles of hygiene and physiology; and it must not take up too much time.

In these days of the strenuous life I, for one, have often heard the remark "I have no time for golf, cycling, cricket, etc."; and then again the man of "young-middle" age (say, 40 to 45) thinks he is no longer an athlete, and so sports which require a certain amount of agility and strength are left alone. In his spare time, say at week-ends, this man must, however, do something, and if at all within his means the new method of locomotion will appeal to him at once: he makes a choice—motorcycle, tri-car, or the lordly motorcar—and begins.

Summer evenings are now spent out of doors and the week-end finds him at the coast or right away from town enjoying change of air, scene, and companionship. In the ride down he begins to lose touch of the business world, and with his eyes alternately on the road and surrounding country, while his hands and mind are busy manipulating the throttle, spark advance, or brakes, he is at rest and yet enjoying himself. What a complete change for the tired business man, what a tonic for the neurotic, and what an appetiser for both! To rush through the air at 5, 10, 15, or—well! legal limit, with a palpitating engine beneath you, and by a mere movement of hand or foot to accelerate or reduce speed, secure in the knowledge that in a few yards if necessary you can bring the whole to a standstill: all this must be experienced to be appreciated, and having experienced it few there are who go back to the prehistoric method of horse traction.

As a tonic, a nerve soother and strengthener, and as a quick and cheap method of transit the "motor" is unrivalled; but, without wishing to detract for one moment from any of its virtues, I would like to ask the average motorist what effect it has on his liver, stomach, and digestive organs generally. What is the effect of continuous

motoring such as is indulged in by the enthusiastic? I know one man who

### SPENT HIS HOLIDAYS ON A CAR,

averaging 100 to 150 miles daily for six weeks on end. Rising in the morning he "tubbed," breakfasted, and was aboard by 10 a.m. or before: no dismount until lunch, to which he did full justice, having created an appetite fairly easily: into the car again: at four or five o'clock tea and "etceteras": then about 7.30 another bath, change, and dinner. Here then, but for a little sight-seeing, was six weeks of solid inactivity. With the exception of driving the car no mental or muscular energy was used and yet the body was being nourished far above the normal. Result, return to town to lb. heavier, waist measurement two to three inches increased, an attack of "liver," and a little lumbago; weather-beaten and worn, but that is all; mentally refreshed because of the complete rest and change from "bulls" and "bears," etc., but physically worse for it all. The remaining week-ends of the summer are spent in motoring, and without exercise the whole of the man's physique in a short time undergoes a change.

This man, then, who would use every precaution against over-lubrication of his car engine, who is most careful as to how he changes gears, etc., and who, in short, treats his engine with the utmost circumspection, absolutely neglects his own body—a far more wonderful engine than even the petrol motor he loves so well. Without advocating one method more than another I would like to suggest that 10 minutes night and morning spent in some judicious exercise in the privacy of his own room would have kept the man absolutely healthy, and in doing so would have brought him back to town with the clear eye of the athlete and a brain and body equally benefited by his holiday.

There is no doubt whatever that motoring in its various forms has come to stay, and with the advent of

### THE LIGHT CAR AND LIGHTER MOTORCYCLES,

with the various forms of passenger attachments, motoring will soon be within the reach of most men, and not restricted to "millionaires of moderate means." It will be a common sight, I think, of the near future to see the motorcar conveying the city man to his office preceded by his clerks on motorcycles. The excitement of it all and the exhilaration will cause men and women too to drop other forms of sport. Let us rejoice at it (and particularly at the abolition of the "Noah's Ark" or antediluvian omnibus), but let us not forget our bodies. A few exercises, not necessarily of the "muscle-making" order, but health-giving, practised daily in conjunction with our new love, the motor, will, I think, serve to keep us more healthy, and in so doing give us a keen appreciation of the value of the motor both as a quick means of transit to business and also as a tonic to the jaded nerves and an appetite to the city worker. I do not wish to be considered an "Alarmist," but rather one who, having been an athlete and now a convert to the modern sport, finds renewed strength and energy in the daily combination of motoring with judicious muscular exercise.







## THE CAPABILITIES OF THE LIGHT-WEIGHT MOTOR-BICYCLE.

By "ENGINEER."

One of the signs of progress which give pleasure to every true motor enthusiast is the fact that we now recognise that separate but equally important fields of application exist for the low-powered light-weight and for the high-powered heavy-weight machine. The next step is to realise more distinctly than hitherto what these fields are; and this can only be done after the capabilities of each type have been grasped. The capabilities of the heavy-weight machine are already well understood; it will be sufficient, therefore, to show what are those of the light-weight machine. These capabilities are, indeed, now being tested in actual practice by members of the staff of "THE MOTOR," but the results obtained will apply to only one particular type of machine, whereas the method explained in the present article is applicable to any type whatever. Of course the results of the tests being made by "THE MOTOR" staff will be highly important, and in this article the opinions given are derivable from what is already known about the heavy-weight, high-powered machine, with the idea of showing how the two types of machine compare, and in the hope of affording the prospective manufacturer, as well as the prospective purchaser of the light-weight machine, some additional encouragement from the agreement of the results of the two methods of investigation, and from the satisfactory nature of the experiences themselves.

It is easy to demonstrate, and is in itself fairly obvious, that the average speed attainable and the hill-climbing power which can be exhibited by a motor-bicycle

DEPEND UPON THE WEIGHT PER  
HORSE-POWER.

in this way, that if the weight per horse-power be reduced to one half, the speed and the hill-climbing power will be doubled, and so on. Besides weight per horse-power there are the factors of road resistance and wind resistance, but they exhibit too little change in the passage from one type of bicycle to another to make them of importance in an investigation like the present. The gear needs to be taken into account in considering the capabilities of a machine, and the method is as follows:— In reckoning the weight per horse-power we have to take into consideration the whole of the moved mass, and we have to allow for the loss of power in transmission; that is to say, we have to add together the number of pounds in the weight of the machine and the number in that of the rider, and divide the sum by the number of horse-power available at the driving-wheel of the bicycle.

To estimate the speed and the hill-climbing power of any particular machine, we must first find the weight per horse-power as above, compare this figure with the corresponding one of some machine whose capabilities we know, and then introduce any modifications arising out of the gearing. For example, to estimate the capabilities of the light-weight machine

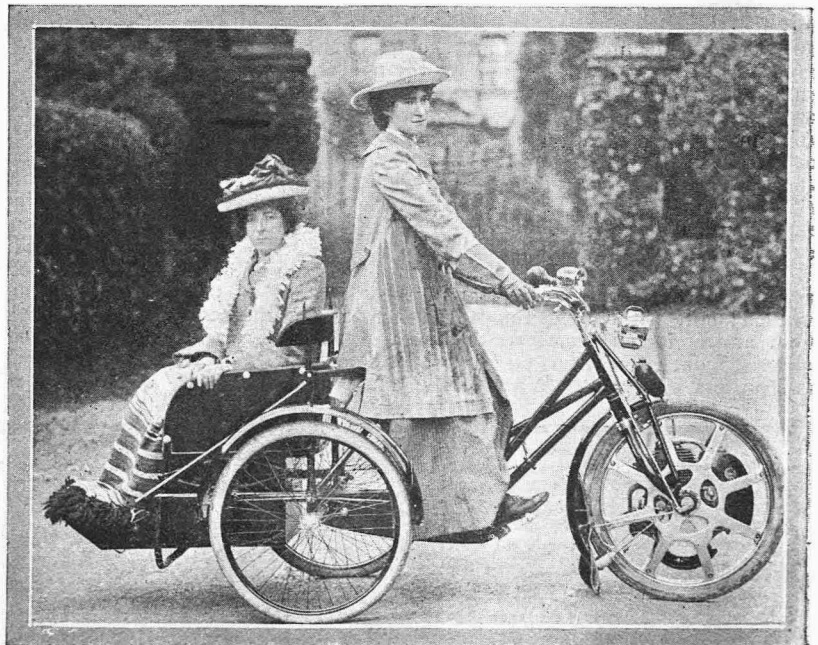
designed by the staff of "THE MOTOR" we proceed as follows:—

Assuming the rider is of average weight, say 12 st., we have—Weight of rider, 168 lb.; weight of machine, 86 lb. (with petrol and two-speed gear; see below for single-speed machine); total weight, 248 lb.; h.p. of engine, 2.25; loss in transmission, 30 per cent. (about right for light V-belt); available horse-power, 1.57. Hence, weight per horse-power is 168 lb. Again, the writer weighs 12 st 12 lb., his machine 200 lb. with two-speed gear and petrol. We have, therefore, total weight, 380 lb.; h.p. of engine, 3.2; loss in transmission, 10 per cent. (chain with counter shaft); available horse-power, 2.88.

HENCE, WEIGHT PER HORSE-POWER IS 132 LB.

This machine has carried him on the level at 40 m.p.h. "THE MOTOR" light-weight machine would, therefore, carry its 12 st. rider under similar conditions at 31.4 m.p.h. (40 multiplied by 132 and divided by 168). The writer's machine carried him recently from Newark to Doncaster along the Great North Road against a heavy gale at an average speed of 23 m.p.h. "THE MOTOR" machine would have carried its rider at an average speed of about 18 m.p.h.

The one machine has carried its rider up a gradient of 1 in 8 without pedal assistance; the other machine would carry its rider up a slope of 1 in 9.5 without pedal assistance. But steeper gradients could be surmounted by both machines with assistance.



This illustration depicts Miss Gibbs, of Bath, about to take her sister for a ride on her Singer tri-voiture. This lady writes that she has covered 6,158 miles on this machine, and as there has been no one to look after it but her sisters and herself, this speaks much for the ease of management and workmanship of this smart vehicle.

**Light-weight Motor-bicycle.—Contd.**

The performance of a motor-bicycle depends largely on the gear, and in making estimates on the plan just illustrated some modifications might have to be introduced on this account. For every petrol engine there is one speed at which the maximum h.p. is developed. Above and below this speed of revolution the h.p. developed is less than the maximum. The h.p. required to drive the machine along depends (1) on the tractive effort, (2) on the speed at which the machine is travelling. Tractive effort is the power which would have to be applied to the machine to pull it along by a tow-line. Suppose for the sake of argument that we run our engine at its best speed. To get high speed on the level, where the tractive effort required is small, we want a gear of the nature of 1 to 4. Remembering that the h.p. is constant, to get great hill-climbing power (that is, to develop great tractive effort) we must

**ARRANGE FOR THE MACHINE TO MOVE ALONG MORE SLOWLY**

than before, though the engine is to run at the same constant speed; that is to say, we must have a gear of the nature of 1 to 6. If we are confined to the use of one gear we must compromise, and upon our selection will depend how estimates made as above are to be modified. However, as regards "THE MOTOR" machine, the above estimates apply with the exception of the hill-climbing one. For the gear is 5 1/2 to 1 with 26-inch wheels, and "THE MOTOR" engine develops most power at 2,200 revs. per min.; that is, with the bicycle running about 32 m.p.h.; while the writer's machine is geared 4.7 to 1 (the high gear, which was exclusively used in all the examples except the hill-climbing one to be dealt with immediately) with 28-inch wheels, and his engine develops most power at 1,800 r.p.m.; that is, with the bicycle again running at 32 m.p.h.

With regard to the modifications made necessary by the gear in other cases, if the machine whose capabilities are being estimated has a "best speed" (in miles per hour) higher than that of the machine taken for comparison, it will be swifter on the level but feebler on hills, in the same proportion as its "best speed" is greater than that of the other. Similarly, if the "best speed" is lower than that of the reference machine, the speed on the level will be less,

but the hill climbing power will be greater in the same proportion.

Coming now to the hill-climbing example, the writer's machine had the low gear, 6 1/2 to 1, in use; and as implied above it was obvious that a much more severe gradient than 1 in 8 could have been climbed. What "THE MOTOR" or any other single-speed machine could do depends on how much power the rider could supply. At 12 m.p.h., which is about the speed a rider would be able to "follow" effectively with his pedalling, "THE MOTOR" engine would be running at about 800 r.p.m., and

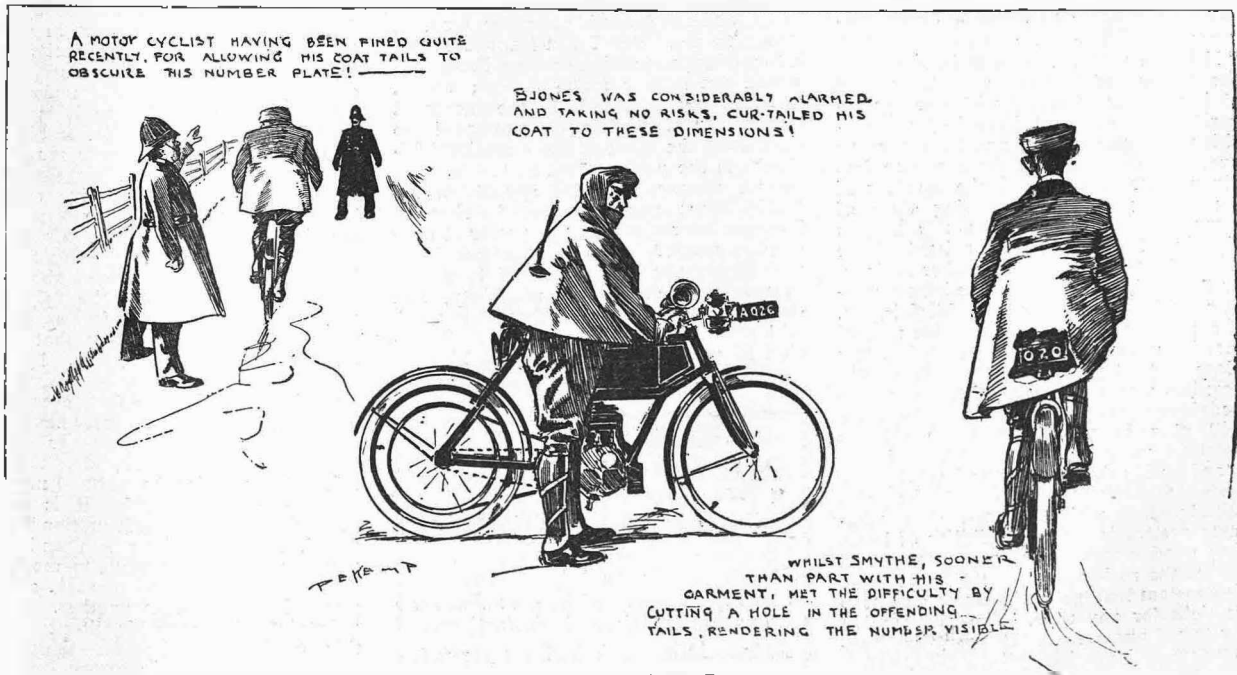
**WOULD BE DEVELOPING ABOUT 0.8 H.P.**

at the rim of the back wheel. The rider could supply, for a short time, 0.2 h.p. Now a weight of 248 lb. scaling a gradient of 1 in 8 at 12 m.p.h. absorbs 0.8 h.p. There is a margin of 0.2 h.p. to cover wind and road resistance, which is just sufficient. Consequently, "THE MOTOR" machine, geared 5 1/2 to 1, with 26-inch wheels, could ascend a gradient of 1 in 8 with a 12 st. rider of average power. With a lighter or a more powerful rider steeper gradients could be surmounted.

If the reader will apply the above method to a few typical combinations of weight, power and gear, he will see that for high average speed and hill-climbing power, a light rider will be as well off on a light low-powered machine as a heavy rider is on a heavy high-powered mount. Moreover, even with a heavy rider the light machine is capable of excellent work if the rider is able to pedal occasionally, or has a two-speed gear fitted, or does not desire high average speed.

It appears, then, that the heavy high-powered motor bicycle is a necessity only for those riders whose first consideration is high average speed, or who are above the average weight and do not wish to do any pedalling. For all other riders the light bicycle is an adequate mount, and no one who has experienced the handiness and economy of the light-weight motor-bicycle would go back to a heavy mount unless his special requirements left him no choice in the matter.

Mainly owing to the paucity of entries, but also to the fact that the additional length of track required for getting up speed and slowing down will not be completed for some time yet, the Blackpool Council have definitely decided to postpone the next motor meeting until June, 1905, when one of the largest motor meets ever held is promised.



**A TALE OF TAILS.**

# OTHER PEOPLES' VIEWS



**NOTE.**—These columns are set apart for the discussion of motor topics by bona fide readers of "THE MOTOR," and trade letters containing veiled advertisements are not admitted. The Editor is not responsible for opinions expressed by correspondents in this section.

### The Hitchon-Wellor Gear.

Sir,—Would any of your readers who have had experience of the Hitchon-Wellor gear give me a few particulars as to its performances, and oblige?—Yours faithfully,  
F. S. KENT.

### Altering Steering, etc., of a 4½ h.p. De Dion.

Sir,—Could any of your readers give me particulars of method of altering a 4½ h.p. De Dion car into tiller steering, fitting a foot lever for actuating the reverse and place to fit the ignition (contact breaker) in a more convenient position for adjustment?—Yours faithfully,  
R. N. PICKERING.

Sir,—I shall be much obliged if some of your readers will inform me how to alter a 4½ De Dion car so that the gear may be put in by a pedal, and also the reverse. The ignition I would like altered to a more suitable place, where it could be more easily got at, and tiller steering substituted for the present method. I suppose the engine could be placed in front if desired, which would involve putting in a shaft? A detailed reply would greatly oblige.—Yours faithfully,  
R.N.P.

### Magneto High-Tension Ignition.

Sir,—In case your correspondent "M.J." in a recent issue is interested in the low-tension magneto provided on the 2½ h.p. Clyde motor, I will give my experience of same. I have had my machine for over a year, and have covered over 4,000 miles, and the magneto has given no trouble, though the bearings of the driving shaft are showing signs of wear now, and will want attention shortly. Renewals have consisted of one trip-rod spring, two little rocker springs, and one sliding plate, also ignition plug—at a total cost of about 14s. Misfiring is, of course, unknown. As regards ease of starting; with air inlet to carburettor closed to get good initial suction it only requires one or two revolutions of the pedals to get it going. I can start upon a hill of 1 in 15. When the engine is warmed up and mixture correct I can stand beside the machine and set it going with one push at the pedals. The great disadvantage with the low-tension magneto system is the impossibility of keeping good compression, as at the point where the rocker enters the cylinder there is constant leakage, and nothing will keep it tight for any time. The high-tension system, I understand, gets over this disadvantage.—Yours faithfully,  
A.21.

### Magneto Ignition.

Sir,—Would Maj.-Gen. H. E. Colville be so good as to say where the magneto he refers to can be procured in England, the cost, and the cost of upkeep? Also, has any reader used a Castle magneto on a Werner; if so, how adapted, cost, and is the conversion from cells to magneto worth cost in changing?—Yours faithfully,  
G.I.G.

### Progress System of Magneto Ignition.

Sir,—In your issue of October 11th Major-General H. E. Colville refers to the "Progress" system of magneto ignition. May I ask him to be kind enough to clear up for me one point about it? Ignition in this system is effected by means of a small push-rod on the top of the piston, which, towards the end of every up stroke knocks against the movable part of the igniter, lifting it, and thus creating a spark between it and the fixed part of the igniter. Now my difficulty is this: Ignition always takes place at a fixed distance from the top of the stroke, i.e., when the engine is working slowly ignition takes place a long time before top of stroke, and the spark may be said to be advanced; when the engine is going fast the opposite takes place, and the spark is retarded. Or so it seems to me. But I can't suppose that a firm of such standing as the "Progress" would use such a faulty device; where, then, is my mistake? Is the increased current at high speeds supposed to counteract the effect of the retarding ignition? Is the push-rod set to produce the correct advance for high speeds, or for low? Must not either back-firing at low speeds or else a loss of power at high speeds result? The device possesses such enormous advantages of lightness, compactness, simplicity, reliability, and cheapness of manufacture that I hope you will think this matter worthy of discussion in your columns.—Yours faithfully,  
HAMBURG.

### Who Invented the Differential?

Sir,—"Autolytus" is incorrect in crediting James Starley with the invention of the differential or compensating gear. It was invented and patented by Richard Roberts in 1832. See "Mechanical World," Vol. XXIII., No. 591, April 29th, 1898, page 195.—Yours faithfully,  
A READER.

Sir,—Will you allow me to correct a rather misleading statement in the article on "The Differential, or Balance Gear on Small Cars," by "Autolytus" in your issue of November 25th. He states that the gear was the invention of a Mr. James Starley, of Coventry, at the time of the introduction of the double-driving tricycle in 1878 or 1879. The identical gear, as shown by the illustration in article, was invented and patented by Messrs. C. Burrell and Sons, engineers, Thetford, 35 years ago, and used by them to drive their traction engines. It has been used, since its invention, by every maker of traction engines, and has been adapted to every type of mechanically-propelled vehicle, where the driving power is distributed to both driving wheels, on the same axle.—Yours faithfully,  
H. DRACUP.

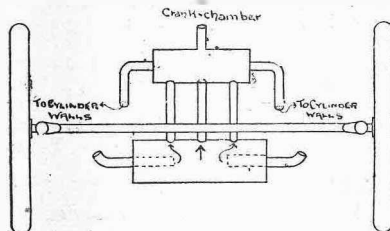
Sir,—In a recent issue of "THE MOTOR" there is an article upon the differential or balance gear, in which it is stated that it is the invention of the late Mr. J. Starley, of Coventry. I beg to state this is not so. Its inventor is not absolutely certain, as it is claimed here in England that a Mr. Houldsworth is the inventor, in the year 1825, but it has also been claimed by the Americans for Asa Arnold, in 1823. I believe the Houldsworth referred to is the father of the present Sir William of the same name. As regards the date, it is certain it was invented about 1825, as it has been applied to the "slubbing," "roving," and "jack" frames used in cotton spinning ever since that period, and it was expressly invented for the above machines. There are several varieties of this motion, in fact, every maker of cotton-spinning machinery has his own "pet" motion, but, however different they are as to gearing, etc., the same principle underlies them all. I may mention that in Lancashire it is referred to as the "Houldsworth motion" or the "Jack i' th' box" or sun and planet motion. Instead of teeth to receive the driving chain motion, there is a wheel, which is driven from another. Perhaps "Autolytus" means Mr. Starley applied this motion to tricycles.—Yours faithfully,  
COTTON SPINNER.

**NEXT WEEK!**  
On Tuesday, November 22nd,  
"THE MOTOR"  
**GREAT SHOW NUMBER**  
will be published.  
It will contain the brightest and best report of the motor exhibits, in addition to special articles and illustrations.  
**Price ONE PENNY, as usual.**



**The Rulax Gear.**

Sir,—The troubles of W. J. Wilson appear to me to be due to the following causes: Instead of using the engine judiciously, so as to vary the speed, he doubtless uses the clutch indiscriminately, and thereby destroys the leather on the clutch. The stopping of the engine when the cone is well home distinctly proves the efficiency of the gear, but the fixing of the gear is deficient, thus showing a



Illustrating letter from W. H. Shutes.

faulty construction, which causes undue torsion of other parts of the mechanism, thereby absorbing the power of the engine. The cones may be faced with copper instead of leather. In conclusion, I may say that your columns are a boon, both to makers and users of motors, and indispensable to amateurs.—Yours faithfully,  
V. C. FOURNIER.

**A Motor-bicycle Tour Through North Wales.**

Sir,—I have read with great interest Mr. Revel Pott's account in a recent issue of his tour through North Wales with trailer on his marvellous 1 1/2 h.p. F.N. motor-bicycle. Living in the North, I make a point of visiting N. Wales practically every week-end during the summer, and it simply astonishes me how Mr. Potts has managed to enjoy his tour over this district. On most of my journeys I have used a 3 1/2 h.p. machine, and have not found it a bit excessive for climbing the gradients, notwithstanding the fact that I have not had it attached to a trailer. Consequently I should be very much obliged if Mr. Potts could inform me how he does such good work. Of course, if Mr. Potts and his friend walked up most of the hills the question is at once answered. I should feel pleased if he would inform me how he negotiated the long hill between Abergele and Old Colwyn, and further, if he went along the coast road from Llandudno to Bangor, how he managed the exceedingly steep hill between Penmaenmawr and Llanfairfechan. Also he does not state (but it would be interesting to hear) how he fared on the Llanfrancon Pass between Bethesda and Lake Ogwen on his way to Bettws-y-Coed. He also omits to give his experience on the Pass between Bettws-y-Coed and Pentrevoelas. I hope Mr. Potts will not object to my asking these questions; but I feel personally it would be a very unsatisfactory journey for anyone to attempt, even on a 2 h.p. machine without trailer. His reply will doubtless interest many readers at a time when the capabilities of various power engines are under discussion.—Yours faithfully,  
A. V. BAXTEN.

**Quadrant Tri-cars.**

Sir,—I see "Ffio" is asking for a rider's experience with the latest Quadrant tri-car. I have now ridden one upwards of 3,000 miles, and the only fault I had to find was that the short belts gave a lot of trouble. The Lycett Belt Company now supply a special belt for the short drive. The last set I had ran me upwards of 900 miles; I have yet to find the hill I cannot get up. I have had no trouble whatever in any other way.—Yours faithfully,  
WALTER HATTER.

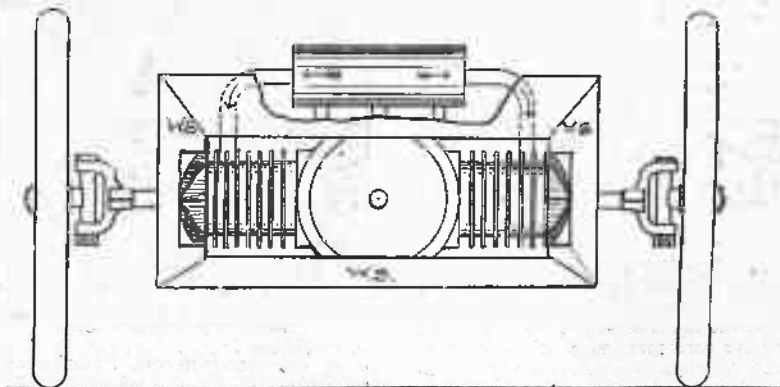
**Air v. Water-cooling for Tri-cars.**

Sir,—There seems to be much interest taken, at the present time, in the question as to whether water or air cooled engines should be used for tri-cars. Personally, I am in favour of the latter type of engine, and am of opinion that a machine incorporating all, or at least most, of the following ideas would prove a very popular form of tri-car next season—viz., opposed horizontal engines, about 70 mm. bore by 75 mm. stroke, with crank-case in the position of Clement vertical engine on Garrard tri-car; valves to be designed and actuated on Wolsley lines; radiating gills to be cast clean and light, similar to those in Kerry engine; cylinder walls to be thin, as overheating is otherwise invited by cylinders being thicker than necessary; wind scoops or apron to come up from under fore-car to underside of cylinders to keep latter clean and catch the air. There should also be air deflectors above and at ends of cylinders for similar reasons, but they should be easily removable. The chief method, however, by which I would propose to keep the cylinders cool would be by taking the exhaust into a large silencer or expansion chamber, say, 6 in. by 15 in. long, fitted low down, within 6 in. of ground, with exhaust pipes entering at each end and carried through, as shown in diagram. Above this, and also above the level of engine, fix a further and smaller exhaust box, say, 4 in. by 12 in., connected at three points with lower one by means of suitable pipes, containing cross pieces to break up the gases. From each end of top silencer a pipe should be carried to front of respective cylinders, through which the gases would steadily flow, emerging out of lip-shaped pipes with bell mouths. This method would automatically cool engine, effectually deaden noise of exhaust, and remove any necessity for water-cooling even when climbing long and steep hills. If thought desirable, a vacuum pipe might be carried from crank-case to top silencer. The engine must have a fairly heavy outside fly-wheel

of large diameter; automatic valve, or Rover type of carburetter; and an exhaust valve lifter for each cylinder which could be worked independently for either cylinder, or together, as desired. Transmission to be by means of enclosed leather-faced clutch, through a Crypto two-speed gear, cardan shaft, and worm drive. The back wheel might be shod with a 2 1/2 in. Palmer or else some other tyre fitted with a leather band. A "butt-ended" inner tube would be an advantage, as would also a detachable stand and mudguard combined, to enable one to repair a puncture with the minimum of trouble. I would have 6 in. or 7 in. diameter band brakes on the front wheels, and a Bowden for the back wheel. The former brakes, as also the clutch, to be applied by the usual pedals. Handle-bars should be brought well back. Felt, and not horn, handles should be used; also rubber-covered platform should be provided for driver's feet. Frame to be on general lines of Raleigh girder, and to be suspended on springs in front. The diagonal to be rather short and carrying a comfortable spring seat. Starting handle should be fitted, but no pedals. A machine designed something on the lines indicated above, and having an engine of about 5 h.p. should take 95 per cent. of the hills on top gear; be light, coming easily under the 3 cwt. limit; and meet the requirements of a large section of the buying public.—Yours faithfully,  
W. H. SHUTES.

**Compression Problem.**

Sir,—I see that W. Hebden and "Compression" are puzzling themselves concerning getting good compression on turning engine pulley reverse way. If they have automatic inlet valves, the following suggestion may help to solve the difficulty. On turning the pulley the reverse way the cycle of operations is gone through in the reverse order, and thus, instead of gas being sucked in through inlet valve air is drawn in through exhaust. Now, on all machines (that go at all well) the exhaust opens much more and for a longer period than the inlet, so a much larger charge is drawn in and the compression, of course, is proportionately greater. I see also that "T.F." is greatly troubled with oil pouring out of his bearings. He might try putting in new bushes to the crank shaft. I experienced the same trouble as "T.F." and had new bushes fitted, and the trouble is permanently cured, besides the running of the motor improved.—Yours faithfully,  
"STIMS-BOSCH."



Illustrating letter from W. H. Shutes.

O.P.U.

**Palmer Cord Tyres.**

Sir,—I have been told that, though Palmer cord tyres are almost everlasting in wear, owing to their construction, they have a tendency, unless inflated to great pressure, to chafe the air tube. I have also been told on the same authority that a car owner who had had these tyres fitted to his car, and had had trouble with his inner tubes, wrote to the makers about the matter, and was informed that the trouble arose owing to the tyres not being sufficiently inflated, and that they should be pumped up to a pressure of 100 lb. per square inch. The owner of the car now has his tyres pumped up to that pressure and has had no more trouble. Now, tyres pumped up to a pressure of 100 lb. may be all right for a well-sprung car, but what about springless bicycles and tricycles? No doubt several readers of "THE MOTOR," who ride bicycles and tricycles, have already given Palmer cord tyres a trial, and would be kind enough to give their experience for the benefit of others who, like myself, are thinking of having these covers fixed.—Yours faithfully,

ANTI-VIBRATION.

**Fan-cooling for Small Engines.**

Sir,—Will you allow me to reply to the remarks of your correspondent "Midland Motorist"? In the first place, I should have stated in my previous letter of October 4th that I was referring more particularly to hot weather when I said my engine overheated even on moderate gradients. Overheating in my case is not present to anything like the same extent in moderately cool weather, but is principally confined to the summer months when the trailer is mostly in requisition. Certainly I cannot claim that my engine is one of those extraordinary affairs which never give their owners a moment's trouble, but I can claim that there is nothing radically wrong with it; and, so far, I am perfectly satisfied with its performance. Adopting the words of your correspondent, I "have travelled many hundreds of miles over all sorts of roads and without the slightest sign of overheating even on long and trying hills," without the fan, when the weather has been cool enough; but I should like to ask your correspondent if he has done much riding with the trailer and passenger during the hottest portion of a hot summer's day. If he has, and if he can travel the road from Dunstable to Dunchurch on the Coventry Road (with the specified load, of course) without his engine overheating, either his capacity for pedalling must be extraordinary, or he has solved the problem of air-cooling, and I should suggest letting the readers of "THE MOTOR" into the secret. I claim for my design of fan a really efficient method of cooling, which can be fitted at a small cost to practically any make of machine (without "encumbering" it), that does not shield the engine from the natural draught, and which, therefore, allows the engine to be run whether the fan is driven or not. Judging from your correspondence columns, overheating of small engines is fairly prevalent.—Yours faithfully,

W. J. COLEBROOK.

**Police Trap.**

Sir,—I should like to inform your numerous readers that there is much police activity at Dunchurch, Willoughby, three miles south of Dunchurch, on the London Road, and all the way to Coventry.—Yours faithfully,

C. NAPIER PATERSON.

**The Chapman Expanding Pulley.**

Sir,—I noticed an inquiry in your issue of October 25th regarding the Chapman expanding pulley, and as I have had one in use for some time, perhaps my experience may interest your correspondent. I have a 1 h.p. Minerva machine, and, wishing to add a side-car, I got the makers to fit their pulley and also their Arctic fan. I find a great difference when hill-climbing with the pulley down at its smallest diameter, and I can get a higher gear than I need on the level. The pulley changes its diameter gradually by pushing a lever over while it is running, and it is curious to watch it expanding or contracting while going at a high speed. What took my fancy about it was the absence of any gearing: you virtually have command of a number of pulleys of different sizes, and only have to push the lever over until the size suits you. I must say I am well pleased with the arrangement, and also with the fan (which gives a good draught just where it is needed). I have set the nozzle 5 in. from the combustion head and find this the best distance. The fan is geared to 4 to 1 with the engine, and literally "hums" at top speed, but the bearing seems to stand all right; and beyond the necessity of oiling it every 30 miles (which can be done from the saddle without stopping), there is no trouble at all. Courteous treatment from manufacturers is always worthy of comment, and I therefore mention that when the firm brought out several improvements in their fan a short time ago they offered to exchange mine (which had had a good deal of use) for one of the new pattern—an offer of which I duly availed myself, with excellent results.—Yours faithfully,

H. ROBINSON.

**TIME TO LIGHT UP!**

Rear-lights for motorcyclists have long been suggested. Pedestrians might well be lighted up also—particularly country folk who choose the centre of the road for their walks.

**Clutch of Rexette.**

Sir,—Your correspondent "Teuf-Teuf" asks the makers to describe the method of removing the clutch on Rexette. We are pleased to reply to your correspondent, and to inform him that the gear is as easily accessible as on an ordinary car. The body is readily detachable by the removal of four clips. The engine is secured to the frame by four bolts. When these are removed the engine with gearbox and clutch can be bodily lifted from frame. There is really no necessity to remove the engine except in rare emergencies any more than there is reason for the curiosity which prompts a boy to tamper with the works of a watch. Of course, in the removal of an engine this is a small job in a workshop, but it is not quite so simple in the hands of the unmechanical. It is gratifying to us to hear your correspondent's opinion that our Rexette is to be preferred to any car he knows costing less than £150.—Yours faithfully,

REX MOTOR MANUFACTURING CO., LTD.

**A Valve Difficulty Solved.**

Sir,—I received your answer to my queries regarding compression. I am sorry to say that your answer does not solve the question, as both valves clear the tappets. But I have found out what is the matter. The other day, after returning from a long ride, I had the valves out and found the exhaust valve was burnt and charred round the seat. Yet, when I ground them in I got a good clean face to them all the way round, so that I concluded that the valve had worn crooked. I therefore turned it up in the lathe, and when ground in again the compression was all right. What I think was wrong is this: the valves, by a coincidence, were worn crooked, and when I put pressure on them to grind them in, the small amount of shake between the valve stem and the guide was sufficient to let the valve fall home on the seat and grind in properly, but the strength of the spring was not enough to pull it home. As possibly other readers may have been in a similar difficulty with exhaust valves and loss of compression, the above may help them to solve it.—Yours faithfully,

DONALD GILL.

**Electrical Terms.**

Sir,—Commenting on "E138's" remarks in "THE MOTOR" for October 18th, may I point out an inaccuracy in his electrical terms which may confuse some? The unit of quantity of electricity is the "coulomb" not the "ampere," the latter being the unit of quantity per second; i.e., one coulomb per second equals one ampere. From this it will be seen that the words "two amps. per hour," as used in the case under notice, have no meaning. Also, further on, he says that two cells in series will not give so large a current as one cell. This could only be true if one cell were out of order, or not so fully charged as its fellow; otherwise, provided there is any external resistance in circuit (outside the cells), the two would give the larger current; if short-circuited, they would give the same; if the two were connected in parallel, they would give double (not four times) the single cell. All this can be proved easily from the standard formula  $C = \frac{E}{R}$ , where  $C$  = current,  $E$  = E.M.F. (voltage), and  $R$  = resistance.—Yours faithfully,

HENRY E. S. VINEY.

O.P.U.

**Dupont Gear Experiences.**

Sir,—I should be pleased to share through the medium of "THE MOTOR" the opinion of any reader driving a tri-car or light car who uses the Dupont two-speed gear and clutch. Is the clutch liable to slip? And does the fibre get covered with oil so as to make it ineffective? Also, how long is the fibre likely to last before requiring renewal?—Yours faithfully,  
LEONARD SADLER.

**Increasing Power of Old 6 h.p. Daimler Car.**

Sir,—As a constant reader of your valuable paper I shall be glad to hear if any of your readers could inform me how to increase the power of my 6 h.p. Daimler-engined M.M.C. car of 1898 pattern. I consider there is not a more reliable car on the market, but it is not fast enough. Would the use of picric acid avail? We have not heard much of this lately. I should like the opinion of someone who has tried it.—Yours faithfully,  
A. BERTRAM.

**The Cremorne Carburetter.**

Sir,—I was rather surprised to find that no one had answered an enquiry from one of your correspondents as to the valve of above carburetter hanging up through dust, etc., corroding it. I have had one in use some six months without trouble, but waited until I had an opportunity to take it apart and examine it before venturing an opinion. I have now done so (a matter of three minutes, I find), and was exceedingly pleased to find the seating and spindle quite clean and not the slightest sign of corrosion. I am now perfectly satisfied, and if I were investing in a new machine I should specify the Cremorne carburetter.—Yours faithfully,  
NOVICE.

**Chenard and Walcker Carburetter.**

Sir,—I take this opportunity of replying to a correspondent who, some considerable time ago, enquired with regard to the Chenard and Walcker automatic carburetter. Firstly, only a limited quantity of these were manufactured, to the best of my belief; they were only intended for use on the 18-30 h.p. cars, and were not sold separately. Secondly, inasmuch as the nature of this carburetter requires a more or less constant suction to ensure perfect action, such as is attained on a four or more cylinder engine, it is doubtful if its advantages would be apparent on the single-cylindered 6 h.p. De Dion, to which your correspondent proposes to fix it. Under such conditions, the action of the combined air and petrol valve would be somewhat noisy and irritating, as I have satisfied myself by experiment. While on this subject of carburation, I may say that the old De Dion carburetter may be considered as one of the best of its kind, and I should strongly deprecate any change being made to another type in the case of the genuine De Dion engine. The Viet carburetter, as this type is named, is simple, gives an ample supply of gas, and is sensitive, thus combining all the desiderata of a good carburetter. (I am, of course, not alluding to the De Dion tri-cycle surface carburetter.)—Yours faithfully,  
PETROLIA.

**Measuring Gradients.**

Sir,—Can any reader inform me of a simple and reliable way of estimating gradients? I notice "Mersey," in your issue of September 27th, mentions a method, and I should be grateful to him for a description of it.—Yours faithfully,  
C.W.S.

**The Pedal Problem and Engine Acting as a Brake.**

Sir,—I had not intended a further reply to "Q Rios," as it seemed to me that the explanation of his difficulty depended on the application of the laws of mechanics and cannot be mathematically or mechanically demonstrated. I will try briefly to make my first letter clearer. We know that weight does not change; therefore, let us call it by another name. What power, then, can to any extent lift the bicycle or its rider or both and keep them so, as they advance up hill? The only possible application of power, for this purpose, is through the point of contact with the road, and as action and reaction are equal and opposite, any power applied to this point increases the force of contact with the road, and if a weighing machine could be interposed at the moment the weight would appear greater. That is, the force which is to lift (i.e., make light) first increases the pressure (i.e., makes weight). If C. E. Squire would stand on the table of a weighing machine, the only way he can take off his weight, without touching the ground, is by jumping; as he jumps the weight first apparently increases, then lightens, and then increases again as he lands. Let him also tie a rope to the table and pull; it will not lessen the weight. Working a bicycle is analogous, except instead of the table being steady the worker is so, the pedals representing the table. Pulling on the rope is analogous to pulling the handlebars. Mr. Squire is quite correct in his reasoning, etc., but if he considers, I think he will see that the forces which make a bicycle press more or less heavily, at different times, on the road cannot be measured. I should like, if not taking up too much space, to bring another question before your readers for their opinion. It was asked some time ago, and, according to a writer in "The Field," not answered, "How does the engine act as a brake (as seeing all were agreed) that expansion and compression balance each other?" Is this statement correct? Yes, in a car at rest with the engine moving (not working); but when the car is moving down hill by the force of gravity, its piston movement, due to gravity, is with expansion but against compression. The more rapid compression, the greater the compressing force, but its reaction (expansion) depends, not on the speed, but on the amount of compression, and is, therefore constant, and its piston speed also constant. The conclusion seems to be that when the piston is moved by gravity at a greater speed than its expansion alone would cause, the effect of the latter is purely negative on the piston movement due to gravity, whereas the resistance due to compression is always positive and increases with the speed of the car. Thus, in the car moved by gravity, the engine brakes because the positive resistance of compression is much greater than the negative aid of expansion. I should be interested and obliged if any one would relate his experience.—Yours faithfully,  
KI14.

**Hub Two-speed Gear.**

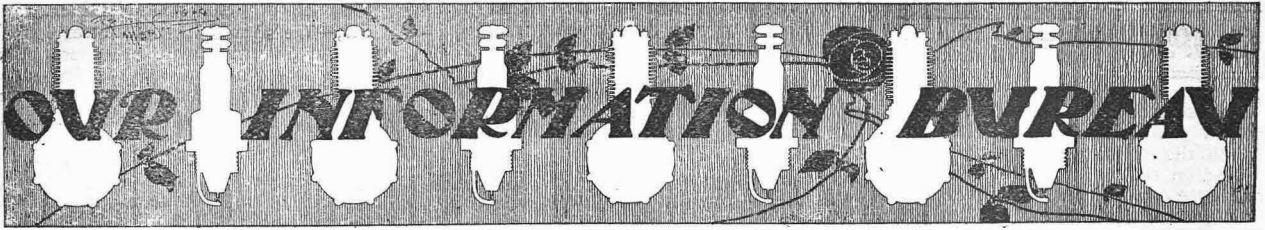
Sir,—We should like to inform you that we have given the Hub two-speed gear a good test of nearly 1,000 miles on all kinds of roads, fitted to a 3 h.p. Fafnir bicycle having ordinary bike attached with our cycle attachment. For anything up to 3 h.p. the gear, in our opinion, is a great success. The combined weight of machines and riders is quite 5 cwt.—Yours faithfully, WOODLAND AND WELL.

**The Tri-car.**

Sir,—May I suggest to our obliging manufacturers, who are expending so much ingenuity in attempting to perfect the tri-car, that they may be overlooking the one thing useful, in my opinion—viz., two back wheels? Against the two-guinea license and that entirely imaginary bogey, the differential, we have, first, the possibility of perfectly suspending the entire frame. (By-the-by, the jolting to driver forced me to dispose of my new 1904 tri-car after two weeks' use.) Second, the substitution of the well-tested double drive, with tyre accessibility, for the single wheel, which, by all past experience, seems impossible as a permanent type, except for a bicycle. A twin-cylinder light tandem four-wheeler, capable of motor-cycle speed, rising from the ashes of the "good old quad," seems to fulfil the desires of one condemned, at present, to "get left" on a 6½ h.p. light car.—Yours faithfully,  
FREDK. R. JOHNS.

**Compression and Suction.**

Sir,—Referring to the letter on the above in your issue of October 18th, I would point out that the suction of an engine can never be as great as 20 lb. per square inch; for, taking the usual cylinder capacity as four times the compression space, atmospheric pressure 15 lb. per square inch, and remembering that pressure  $\times$  volume is constant for a gas, we get  $\frac{15}{4} = 3\frac{3}{4}$  lb. per square inch as the maximum suction on the inlet valve (supposing the valve to remain shut during the movement of piston through its stroke). This, however, would only be with a cold engine: under normal conditions the suction must be much less, owing to imperfect scavenging of the cylinder on the exhaust stroke. While admitting that the suction in the inlet pipe must increase with the speed with an automatic valve, owing to the inertia of the valve and gases (and perhaps with a mechanical valve also), I cannot at all admit that the compression can increase; rather must it diminish. Taking the most favourable case, that of a mechanical inlet, and supposing the engine to be driven round slowly, say, at 30 revs. per minute, at this speed a full charge can enter the cylinder and maximum compression be attained. Now, increase the speed to, say, 1,500 revs. per minute. The effect of the inertia of the gases at once comes in, and the charge lags behind the opening of the valve, which consequently claps down on an attenuated charge, and this manifestly cannot be compressed to so high a degree. All this when the engine is being driven by an external force; how much greater must be the effect when the engine is actually running, and the heated contents of the combustion chamber meet the incoming charge and prevent its ingress till the former has been cooled by expansion and conduction of its heat by the cylinder walls?—Yours faithfully,  
HENRY E. S. VINER.



### SPECIAL NOTICE.

The Editor is at all times pleased to answer any queries put to him by the readers, or to receive correspondence from readers upon any motor topic. In consequence of the large number of letters received, however, he must insist upon the following simple rules being strictly adhered to:—

1. Plain writing. Type writing for preference.
2. All letters to be written on one side of the paper only.
3. Questions to be clear, terse, and to the point, without tedious preamble or needless flattery.
4. Should an immediate reply be required, an envelope must be enclosed bearing a penny stamp, and the name and full address of the sender. NOT a stamped undirected envelope.

A.B.C. (Holt).—If you pour out the acid from the cells, wash the plates by filling and emptying the cells two or three times with water, and finally fill up with water, the cells will keep for any length of time without any harm resulting.

I. K. Hillier (Herne Hill).—If it is the composition used to cover the tops of vulcanite accumulator cases you refer to, this consists of a mixture of pitch and gutta percha, or you can make a very fair job of it by using ordinary pitch alone.

T.F.S. (Yate).—It is quite possible to damage even a sheet-steel exhaust box if violent explosions occur in it. It is not the fault of the aluminium casing. You can entirely prevent explosions by making arrangements for lifting the exhaust valve before switching off. The particular silencer you have has a very large capacity, and if a number of unfired charges get pumped into it a violent explosion is bound to occur.

### Increasing Compression of Car Engine.

C.J.H. (Mottram St. Andrew) writes:—Some time since I saw it stated in "THE MOTOR" that by putting a plate in an engine of a Benz car it would give higher compression and more power. I have put in a 3/4-inch turned iron plate bolted to the cylinder head, and also shrunk a band weighing 30 lb. on the fly-wheel rim. I now find the engine overheats. The water circulation is all in good order. It commences to make a noise like what would be caused by a heated vacuum when cold air rushed in, and then loses power. This is after it has run, say, five miles.—What we think is the matter is that you have increased the compression too much, and thereby get premature ignition of the charges after engine has been running some time. The peculiar noise you refer to points to this. We should suggest you reduce the thickness of the plate you have fitted to 3/8 inch, and see how it answers.

H. Wynne (Moss Side).—Send 6d. in stamps to Continental Caoutchouc Co., 104, Clerkenwell Road, E.C., for the book mentioned.

C. Archer (Chorlton-cum-Hardy).—We cannot trace the address of the gentleman you mention.

"Reef" (Woodford).—Our "Motor Manual" (post free 1s. 1d.) gives full description of the F.N. carburetter.

"Amateur Mechanic" (Burton) writes to the effect that he proposes to assemble a motorcycle in the coming winter. His idea is to purchase the cycle frame and wheels, tank and engine. He would add levers, tank fittings, pipes, carburetter, etc., to his own liking. He intends to adopt high tension magneto ignition, but no complications, such as two-speed gear or clutch. The engine would be 2 1/2 to 3 h.p. He asks if any readers who have had experience in constructing a machine on these lines would supply some details or hints through "O.P.V."?

H. W. Dixon (S. Woodford).—(1) The probability is that the hub and rim of the wheel are true with each other, but owing to defective work in the frame, it has been necessary to tilt the wheel to bring it central in the forks. The wheel could not possibly run if the hub was not parallel with the section of the rim. (2) Your best route to Portsmouth would be to make for Kingston, and get on the main Portsmouth Road. (3) Afraid you can do nothing with cracks at the edges of tyres. It is due to the rubber perishing. (4) Impossible to advise re the variable gear without knowing the type of machine and engine you have.

B.L. (Snodland) writes:—I have a four-cylinder set of Mutuel engines in my car, and after running a few miles the water begins to boil. I am thinking of replacing the coil radiator of 2 1/2 rows of 10 pipes for a honeycomb radiator. (1) Do you recommend this pattern of radiator? (2) What is the necessary cooling area? (3) What quantity of water should I carry in the tank and radiator (separate)? (4) Does it matter where the tank is. Mine is under the car at the back.—Before going to the expense of a honeycomb radiator, make certain that your present circulating system is in order. If you have a tap in any portion of the water circuit open this with engine running and see if water comes out in a strong stream: if you have a tap at lowest point of water circulation drain all water off, and then refill with this tap open, so as to prevent any air lock. (1) Gilled tube or coil is best for all-round work. (2) Length of piping you mention is ample. (3) Four to six gallons in tank. (4) Any position suitable if a pump is used.

H. Wimpenny (Dunedin, N.Z.).—We have asked the E.L.C. Co. to send you one of their booklets giving diagrams of connections for their coils.

G. H. Holmes (Bourne) writes: I have a 1 1/2 h.p. Clement-Garrard motor-bicycle, the surface carburetter of which does not answer well in cold weather. Would a F.N. spray carburetter made for 1 1/2 h.p. be too large?—No; it should suit well.

W.B.C. (Gravesend) writes: I have disposed of my motor-bike and purchased another, having retained my number plates. I presume I can use them on the new mount after advising the authorities. What fee shall I have to pay for alteration of register?—The number plates are for the particular machine for which issued and not for use on anything else: you must re-register and procure new number from local authorities. The old numbers could have been transferred to purchaser of the machine to which they were attached upon payment by him of transfer fee of 1s. to the original issuing office.

### Motor Insurance Problem.

M.M.C. (Stratford, E.) writes:—I am insured against accidents in an Assurance Company. I recently had a side-slip causing damage to the extent of £3. I wrote to the Company claiming compensation for this amount; they replied that by the clause in policy stating "bad roads excepted" I am debarred from claiming compensation for damage caused by side-slips. Now, this is the point I wish to raise. The Company do not state anything about side-slips on their policy, and I think the words "bad roads" are exceedingly vague, and that every road (if you had an accident) is liable to be called "a bad road," and evidently is so, by the Insurance Company when they receive claims for compensation. Am I justified in asking for this compensation?—This seems to be one of those knotty legal points that require careful examination by a lawyer to give a definite ruling on. In our opinion a side-slip accident certainly should be covered by the Insurance Company's policy. The term bad roads, as you say, is vague. An excellently-made road can obviously very quickly become in such a condition through a change in the weather as to be exceedingly dangerous. Take some of the perfectly level concrete or wood paving in London. In every sense of the word these are good roads, and yet a slight shower would render them greasy and dangerous for a car or cycle. On a really bad road there would be less danger of a side-slip, as a driver would travel much more slowly than he would be tempted to go on a good road. In our opinion you are entitled to press your claim.

The Best Report of the motor exhibits at the Stanley Show will appear in the Special Show Number of "The Motor" on November 22nd.

ONE PENNY.

**BUREAU.**

R.C. (Hastings).—Sorry we cannot give you any details on the subject.

P. A. Stewart (Poona, India).—Many thanks for your letter and photos safely to hand. The photos, although interesting, are too small for reproduction. We got your previous letters all right.

A.S. (Stoke Newington) writes:—I have a 2½ h.p. Minerva. Would this have enough power for a fore-car with passenger and driver weighing 20 stones, gear 4 to 1, Essex and Hertford roads? I do not mind slightly helping on fairly steep hills. Which would be the best belt for same? Please reply in "THE MOTOR."—Nothing less than 3½ h.p. will give you satisfaction on a fore-carriage; anything smaller will necessitate walking up most of the hills in your district. With a 3½ h.p. and a gear ratio of 6 to 1 pedalling will only be needed on the very steep gradients. We hear excellent reports from our correspondents of the Watawata belt and also the Hallas.

**Small Car Difficulty.**

J.F. (Southport) writes:—As a very old subscriber I should be glad of your advice re my 5 h.p. Coventry Humberette, which I bought second-hand. I think it had been badly used before I had it, as I have never had the compression I could wish for. At present my difficulty is that, after being out on the road, say, 30 or 40 minutes, sometimes when going against a slight wind, and at others when going up a slight gradient half a mile long that would hardly be felt on a bicycle, the engine will labour and take all the spark and gas I can give it, and then come to a stop, but after a rest of five minutes, without doing anything to it, the engine will start again and go all right for another half-hour, when the same thing happens again. I thought it was due to being short of petrol somehow, and have twice cleaned the carburetter. This having no result, I thought it might be the petrol was air-bound in the tank, so gave that vent—still no improvement. For some time I have noticed that after I have switched the spark off on the dash-board the engine will still fire three or four explosions, caused, I presume, by an accumulation of soot on top of piston, that gets red-hot. Now, I want to ask you if you think that may be the cause of my trouble by its firing the charge before the sparking-plug does?—The symptoms undoubtedly point to overheating of the engine. It is very important, in the first place, to improve the compression as much as possible, otherwise you will have to be using full gas supply the whole time to get any power. The water circulation being faulty is another very probable cause of the trouble. We should advise you to see that the whole system is clear, as a partial block in any of the pipes would cause mischief. A simple method is to connect up a high pressure water supply to the radiator, which will force any obstruction out. Also see that no leakage occurs at the pump, and that it drives all right. The explosions continuing after switching off the spark might be due to some red-hot carbon, but just as likely to be due to the head of the exhaust or inlet valve being nearly white-hot.

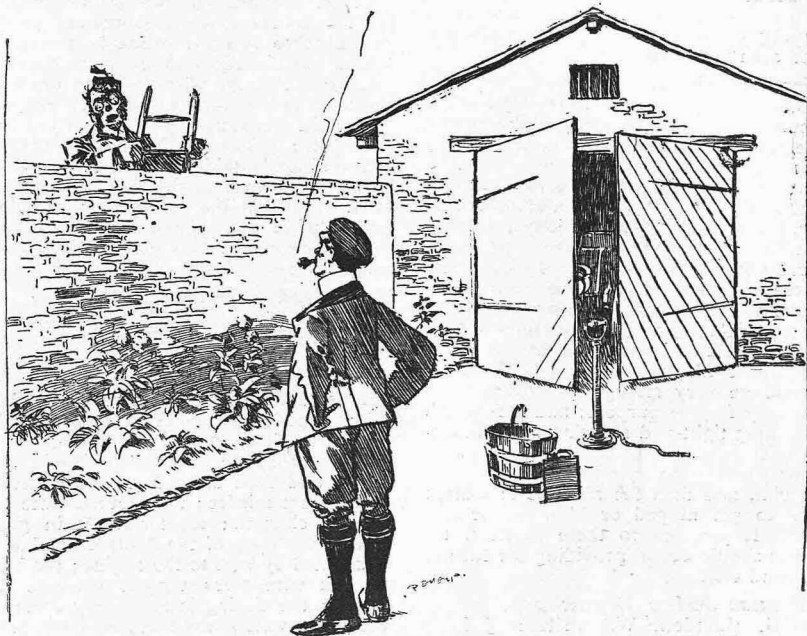
"Motor-tricycle" (Glasgow).—Your design is quite practicable, but we do not think you could claim that it is original.

B.V. 24.—If you have two lamps on your forecarriage it suffices to paint the number on the outer side of each plate. With one lamp only you would require to have figures on both sides of the plate.

W. Wright (Pickering).—To remove the exhaust valve from the 2 h.p. Humber engine, remove the gas supply pipe and inlet valve, and, having removed the exhaust valve, cotter and spring, draw it right out. (2) The wires are already covered with a waterproof material, and there is nothing to be gained by putting any further covering on. (3) The cut-out you refer to is made by Parry and Oliver, 158, High Holborn, London, W.C.

P.C.B. (Kent).—Should advise you to keep your present position. We hear numerous complaints concerning the methods of some so-called schools and institutes advertised in the daily papers and professing to teach driving and find their pupils' situations. As a matter of fact some of them do nothing of the kind.

F.J.W. (Manchester) writes: I have a 4 h.p. Excelsior tri-car and find the gear, 4 to 1, too high for hills. I am thinking of fitting a two-speed gear. (1) Which is best—belt or chain? (2) What make of gear would you advise? (3) Would the Excelsior two-speed gear suit me, this being a belt drive?—(1) Chain. (2) Write the firms who are making a speciality of tri-cars and state your requirements fully (3) Answered by (1).



**CAN'T STOP**  
**THE MAN NEXT DOOR:** "I say, you sir, we can't get any rest with that motor of yours snorting away in the shed. You've kept it pounding now for forty-eight hours."  
**MOTIST:** "Awfully sorry, old chap, I can't stop to oblige you; you see I'm doing a seven days' non-stop."

**Car Skidding.**

C. Chiappa (Manchester) writes: I have a 10 h.p. car, two cylinder. I have had leather-studded bands fitted to driving wheels, and I find them answer splendidly on greasy roads, but, to my astonishment, on Saturday I was going at 20 miles an hour on stone setts, when I had to apply the brakes suddenly, and the car skidded right round. Do you think there is any fault with the brakes, or could you suggest any other reason?—The pace (on greasy stone setts) and the sudden stop would cause the car to skid, whether bands are fitted or not. Never take liberties with your car on such surfaces. If the foot-brake only was applied, the mere stoppage should not have caused trouble; if the side brakes were applied, it is possible the two brakes act unequally, and the wheel upon which the pressure first came would act as a pivot upon which the car would turn. Jack both wheels up and test as to whether one band comes on earlier than the other.

**Accumulator Matters.**

W.B. writes:—(1) I wish to lay up a 50 amp. 4 volt. accumulator for the winter. What is the best way to treat it? (2) Is three months too long to keep cells in use without charging, although showing 4 volts, and sparking properly? (3) Is a voltmeter or amperemeter the best to test cells with?—There are two methods you might adopt. (a) Have the cells fully charged, and then give an hour's charging every four weeks. (b) Charge up the cells, then pour out the acid and replace with water. The cells will keep any length of time. When required to use, pour out the water and replace the acid. (2) Yes, it is not good for the plates to leave uncharged for three months. It causes sulphating. (3) Never use an ammeter with accumulators. You would short-circuit the cell and burn out the coil of ammeter. Always use a voltmeter or test lamp. Special lamps taking 1 ampere of current are now easily obtainable.



# BUREAU.

**E. Gliddon (Colombo).**—The Riley tri-car will meet your requirements well.

**J. H. D. (Chester)** writes:—Could you oblige me with the names of one or two firms who might be approached with regard to the hiring of a motor bus with view to purchase? It would be used to run from a suburban into a large town, and would be required to carry 18 to 20 passengers?—You might write to Milnes-Daimler, Ltd., Tottenham Court Road, London, W.C., Stirling Motors, Ltd., Granton, Edinburgh, and Messrs. Clarkson, Ltd., Chelmsford. These firms make a speciality of motor omnibuses, but we doubt whether you could hire, as they have plenty of work for months to come in keeping up with demand for orders for spot cash business.

## Tyre Troubles.

**C. R. B. (Hunstanton)** writes—My trouble occurs with the inner tube, which has of late frequently given way at the points where the spoke heads seem to rest. I have since fitted a fresh tape over the spoke heads, so as to make a softer covering, but still experience exactly the same trouble. The tyres are Dunlops, with wired edge; machine F.N. I cannot see where any "nip" in the tube takes place. —Are you sure that there are no spoke ends projecting through the nipples? You should get a half round file and go carefully over all the nipples. The tape should be very strong, such as is sold specially for the purpose, and it requires stretching tight and securing well; otherwise, it is liable to shift out of place when pushing the wire into the groove in the rim, and then the air tube is almost sure to get nipped or blow under the tape. If you see to these matters, no bursts should occur, providing the tube is a sound one.

## Exhaust Valve Breakages.

**W. G. (London, W.)** writes:—I have a  $3\frac{1}{2}$  h.p. tri-car. The exhaust valve is always getting burnt, and requires grinding-in about every fortnight. I do about 100 miles every week. I have been told that it is through using too much petrol. Am I damaging any other part of my engine, or can you tell me the cause of the valve wearing like this? I have also let an extra passenger ride in the tri-car (driver and two passengers). By doing this, does the extra weight in any way injure the engine?—The most likely reason it seems to us is that you either get the engine overheated, which may be due to defective water circulation, or the exhaust is throttled somewhere. Perhaps the silencer could do with opening-up by drilling more holes in the outlet. It is evident also that you overwork the engine at times by having an extra passenger, but this would not affect matters unless the extra load was kept on continuously. This would mean that you would have full gas on the whole time. You should see that you have a pure nickel or nickel-steel valve, and that it has the full amount of lift. The primary cause of the valve breaking is that the stem gets overheated and burnt, and loses its metallic nature. We should not advise taking three passengers as a regular thing.

**H. Reeves (Lewisham).**—The motorists you refer to must surely have been fined for not having a registration number on their car. It is evidently a newspaper reporter's error in saying they were fined for not having the weight of the car painted on.

**I. Mason (Bradford-on-Avon)** writes:—I am about putting new piston rings on my Humberette, and shall be much obliged if you will tell me whether the slots should be in line or otherwise; also if the piston and rings should be lubricated before putting together.—The slots of the three rings should be as far apart as possible, or gas will leak past if slots are in line; be sure and have piston, rings, and cylinder perfectly clean and not a particle of grit about; lubricate everything well before assembling.

**C. A. Lienard (Batticaloa, Ceylon).**—  
(1) The increased consumption of petrol you observe is most probably due to a falling off in the compression: careful grinding in of the valves should put this right. The knocking noise when you increase the gas supply proves that you are getting the engine overheated and premature ignition is taking place. This would be a consequence of the loss of compression. See that the combustion chamber and top of the piston are free from charred deposits: this will cause premature ignition. Also examine piston rings.

## Too Highly Geared.

**H. A. C. (Lewisham)** writes: I have a 2 h.p. 1903 Minerva motorcycle; weight, with tanks loaded and everything on, 150 lb. This machine has never developed sufficient power to get up any hill without pedal assistance; it goes all right on the level, when it will reach about 20 miles per hour; but the slightest rise slows and then stops it unless assisted. It does not misfire; the accumulators are freshly charged; all terminals in good order; the base of the contact breaker is connected by wire to the engine; the high tension wire gives a good spark to the frame; the timing is absolutely correct; the valve well ground in; and compression seems good. The makers have just fitted new piston rings and overhauled the engine and cylinders, yet this effected no improvement. The engine pulley is 4 in. and wheel pulley 18 in., with 26 in. tyres. Is this gear too high, and how would you advise me to alter it? I could have a larger wheel pulley, if it is not wise to reduce the engine pulley. A Longuemare carburetter is fitted; the needle valve is well ground in, and there is no flooding; I have experimented with 4, 5, and 6 nipples and 16, 17, 18 choke tubes, and find I get most power with No. 6 and 17 together. Yet I cannot with these get a quarter the way up Bromley Hill without pedalling. Can you suggest a remedy, and say whether a motor of this power should take me from here, through Bromley, Keston, and Cuxham without assistance?—The gear is certainly very much too high for an engine of 2 h.p. with such a dead weight to pull. It works out  $4\frac{1}{2}$  to 1; it should be nearer 6 to 1. Fit a  $3\frac{1}{2}$  in. engine pulley and you will probably find great improvement. To get the same gear by altering the rear rim would mean fitting one of 2 $\frac{1}{2}$  in. diameter. The carburetter is probably all right.

The Great Show Number of  
"The Motor," November 22nd.

**V103.**—The simplest attachment for preventing side-slip on your 3 h.p. machine would be a Parsons' chain non-skid. Another alternative would be to have a leather tread with steel studs. This would have to be vulcanised on to the outer cover. Several patterns are advertised in our pages.

**H. T. S. (Shoreham).**—Your requirements would not be met in a light-weight mount, as your weight (16 $\frac{1}{2}$  stone) demands a very strong and powerful mount. Nothing less than 2 $\frac{1}{2}$  h.p., and about 140 lb. would be advisable. You will require 2 $\frac{1}{2}$  inch tyres, spring seat pillar, and spring front forks. We fancy the 3 h.p. machine (A on your list) comes nearest to your requirements. We place the others in order of merit as follows: E, B, C, F, D. (2) The Simms arc light ignition is quite satisfactory. (3) The Ariel two to one gear gives very good results. You will find our Manual of considerable help to you in making a selection.

## ANSWERS BY POST.

In addition to answers appearing on these three pages the following correspondents have been replied to through the post.—

**Thursday, November 3rd.**—G. H. Binning (Romsey), W. Motton (Deptford), F. H. Grove (Halesowen), J. Waugh (Monmouth), J. G. W. Gordon (Bloemfontein), E. Searle (Worthing), B. Hole (Watchet), F. Smith (Brighton), H. Tallents (Oxford), G. Powell (Bridgend), W. Dudley (Kidderminster), C. Ward (Wetherby), A. A. Tallent (Clapham), H. Gray (Moberley).

**Friday, November 4th.**—H. Grant (Bourne), P. Jackson (Hounslow), L. Mallinson (Catford), C. Mossop (New Romney), J. Kennedy (Knocknacarry), S. V. Wasbrough (Crownhill), R. Fuge (Templemary).

**Saturday, November 5th.**—S. Burley (Ilford), A. Pearson (Aberdeen), H. Burrow (Luton), K. Ross (Manchester), A. Bayley (Oxford), E. D. Eaton (Atherstone).

**Monday, November 7th.**—A. Cayley (Salisbury), F. W. Bond (Steventon), R. Prescott (Ulverston), W. H. Beale (Tenterden), F. N. Hamilton (Baronscourt), J. W. Mackenzie (Forres), H. G. Beckwith (Altrincham), F. R. Wood (Poona), R. S. Potter (Ilford), R. Rollo (Clonmel), J. Hirstop (Brisbane), A. Eaton (Portsea), J. B. Livesey (Blackburn), H. Jones (Clonmel).

**Tuesday, November 8th.**—C. E. Sotham (Leicester), P. W. Turnor (Penkridge), W. H. Arnold Forster (Hurley), F. D. Spencer (Coleshill), H. S. Burke (Chelmsford), T. Jowett (Stockton), J. Stewart (Salford), F. Bainford (Leeds), P. W. Hobbs (Blandford), W. Hamilton (Uddington), R. B. Smith (London), G. L. Haslehurst (Lincoln), W. Finlay (Larne), L. D. Donald (Aldershot), D. L. Bucknall (Petworth), J. Stonehouse (Spennymoor).

**Wednesday, November 9th.**—G. J. Lever (Tonbridge), W. J. Hilborne (Cardiff), W. Peek (Lingfield), L. Maidment (Selsey), G. Binge (Plymouth), F. Ley (London), A. J. Sheen (Aberdare), J. Shiel (Dublin).