

THE CHANGE-SPEED LEVER.—CAN IT BE IMPROVED?

By "VEEAITCH."

The article in the issue of November 29th upon proper methods of changing gear could not cover every portion of the ground; but one of the points raised was the difficulty the novice experiences in making the gear changes with certainty and without noise, and the nearly universally-adopted method of placing the controlling lever at the side of the car needlessly enhances the trouble. Messrs. Panhard and Levassor usually receive credit for having first used the side lever, and as numberless good things have emanated from their factory they may be justly entitled to claim it as their own. If the inference be correct those firms who in the late 'nineties used "to sit upon Panhard's door-step" and copy the designs of the then leading house in the industry, were not going the easiest way to work for the comfort of the driver. The side lever may or may not be the cheapest factory method for attaining the desired end, and because the originators (and their copiers) continue to use it, we must not thereby conclude that finality has been reached. In thinking whether something better is not possible several things have to be considered; ease for the driver, cheapness of construction for the manufacturer, the position of the lever and the proper adaptation of the quadrant or sector in which the lever works. Taking these in the order stated, just think for a moment of the awkward position the driver has to assume in changing from second to third or third to fourth speeds. The clutch is released by the pedal, and the driver then, having clasped the trigger closely to the lever handle, has to stoop down and forward, and push the lever around the arc of the circle it makes until the right notch is found. He has necessarily to steer with one hand, and this is disconcerting enough; but in stooping forward he loses the purchase he had obtained for the depression of the pedal, both by his upright position upon the seat and the two-hand hold upon the steering-wheel, and if the clutch-spring is stiff, he can hardly help losing control over the pedal. Thereby the clutch is slightly released and the gear shafts fail to greet each other in the amiable fashion he desires. The driver blames his own want of adeptness and improves with practice; but, however skilful he may eventually become, it is always a trouble to get into his top speed, whether that be the third or fourth, and it is equally troublesome to change

downwards. With a small-powered car in hilly country the frequent changes become positively irritating, not so much for the changes themselves but because of the muscular strain imposed by the cramped positions he is compelled to assume in making them. Two reasons are responsible for this cramped position—the fixing of the lever at the car-side and the closeness of the notches upon the quadrant. Is it absolutely essential for perfect car manipulation that the lever must be at the side? Deponent troweth not; and desires no better confirmation of his views than the Darracq car. Now Darracq is not and never has been a small unknown maker turning out cars by the 20 or 30 in a season, but is one who completes an immense quantity in a twelve-month, and it is believed that his output increases annually. It is therefore instructive to note that Darracq has always placed the change-speed lever upon the steering column; it was in this position upon the first 6 h.p. single-cylinder cars he manufactured and is used in exactly the same way, without the slightest alteration, upon his very latest 24 h.p. four-cylinder. It is quite certain that if the steering column position were not the correct one the maker referred to would have changed it in response to complaints he might have received; but each year goes to prove that both for the novice and the skilled driver it is far easier to handle than the side lever. To those who have driven cars with the two types of levers there is an added charm in the Darracq solely for this ease of control, apart from any points which may take the fancy of the purchaser; whilst for night work there is no manner of doubt that having the lever just below the wheel in a perfectly accessible position makes for certainty in changing. At night if the driver is not sure of dropping into the right notch he can feel along the quadrant with thumb or forefinger and push or pull the lever to reach one

or the other; in changing up the forefinger would of course be the guide and the thumb for changing down. One further great advantage of the column position is the possibility it affords of abolishing the tooth-releasing trigger. The lever, being made of tempered spring steel, has a triangular tooth upon its lower face which drops into a similarly-shaped notch made to receive it. All that one has to do is to slightly lift the lever, slide it along the top

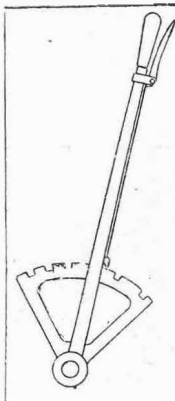


FIG. 1.
Usual position of change-speed quadrant.

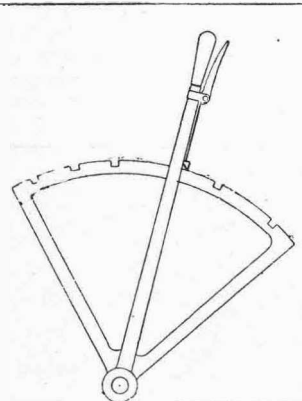


FIG. 2.
Suggested alteration in position of quadrant.

The Change-speed Lever—Contd.

face of the quadrant, and it falls quite naturally into place with scarcely an effort upon the driver's part. MM. Gobron et Brillie also

USED THE STEERING COLUMN FOR THEIR CHANGE-LEVER,

and still do so for their 12 h.p. cars, but not upon their larger patterns; they had to fix a small, easily-manipulated trigger to the lever because the notches were on the front face of the quadrant; but even so it was possible for one quite unused to the car to make a sweet change. One might say that it was somewhat easier to change speed whilst driving a Gobron-Brillie than a Darracq, because the notches upon the quadrant were farther apart upon the former than upon the latter. This position of the notches brings us to the consideration of the spacing of these in relation to the movement of the lever, and whilst the faults of the existing system can be pointed out opportunity is offered for suggesting something better. The first of our sketches shows how the quadrant is usually attached to a car, but attention is called more particularly to the way the notches are cut and their closeness to each other. Considering how quickly a mistake can be made it is possible to appreciate the veritable trap which is laid for a driver to fall into when changing down from second to first speed. The distance between the notches of the second and third speeds is sufficient to ensure the driver being quite certain of the difference in position of the lever in relation to the notches; but it is when he leaves the second speed to get into the first that he begins to call down blessings upon the designer. In his first attempts he found it needful (presuming his driving lessons were taken upon a quiet, level road) to carefully watch the notches as the lever approached them and let go the trigger at the critical moment; but watching the notches will be useless for his purpose as he approaches the first-speed notch, for he finds that the lower portion of the lever entirely hides the notch he wishes to reach and also the neutral immediately to the rear, and he must therefore rely entirely upon his judgment and sense of touch in determining when to let go the trigger. If he adopts the method of changing by releasing the trigger-tooth as recommended in the article upon "Changing Gear," the difficulty would to some extent be removed. But

TO ENSURE THE TOOTH DROPPING INTO POSITION

in the notch the spring which forces the tooth downwards must needs be somewhat stiff, and thus compels considerable muscular effort in pulling the trigger back for every occasion the gear-lever is moved. Supposing the typical light car is driven over 100 miles of switchback country the strain upon the hand and wrist muscles is greatly intensified by a stiff spring; if a weak spring is employed to ease off the strain, it may fail in its duty at a critical moment, and instead of getting back into first speed, the driver may mis-

takenly go past the right notch and get into neutral or even the reverse. In saying that it is possible to get into the reverse when the first speed is desired I am perhaps open to some criticism, because, normally, the driver should be able to tell by the position of his lever whether he is in the reverse or otherwise. But supposing the change be made in the dark it is physically impossible for him to see the angle at which his lever stands, and to obviate this difficulty many men use a four-volt incandescent lamp (having the light directed upon the quadrant or else the lever), which is switched in and out by hand. This little fitment can be rigged up by any owner, and if a small reflector is arranged behind the lamp the light rays are kept from the eyes. A little improvement upon the usual arrangement of this quadrant lamp can be effected by the removal of the usual hand-switch and by making the lever itself its own switch; contact is made upon the portion of the quadrant between each notch and is broken as the notch is reached.

Why is it that every manufacturer who uses a side lever fixes the quadrant as near to the base of the lever as the frame will allow? The only argument advanced for the retention of this position is the arrangement of the driver's seat on the off-side and that he must have space to mount from the off. But how many drivers (except under compulsion of extraordinary circumstances) mount the car from the off with all the attendant wriggling and squeezing to get in front of the levers and past them and the steering-wheel? Why not boldly decide that the driver should always ascend from the near-side, and thus having all the off-side space free,

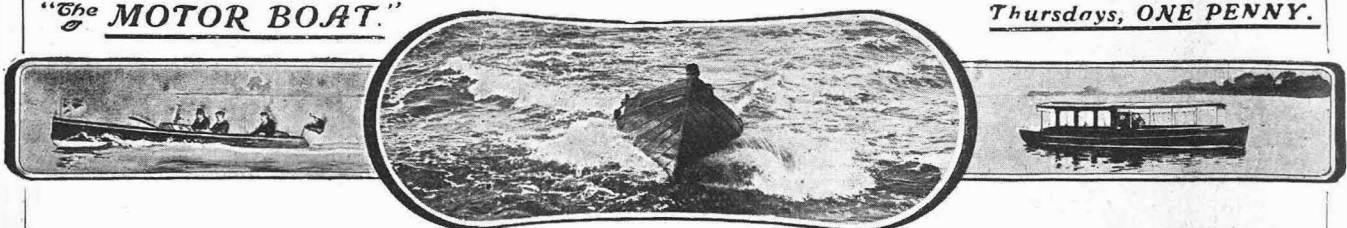
MOUNT THE NOTCHED QUADRANT CLOSELY UP

to the top of the change-lever instead of the base. Compare the second sketch (Fig. 2) with the first (Fig. 1). Both are drawn to the same scale and the lever itself is exactly the same length and the same angle in each. Observe the wide range of movement permitted in Fig. 2, as between the reverse and neutral, and the neutral and first speed, and then consider the small amount of range allowed for these functions in Fig. 1. The comparison is also instructive if it be remembered that the lever itself moves no more and no less in Fig. 1 than in Fig. 2.

Apparently the hand would have to move farther around to get the lever into top speed, but this is not so and is purely an optical delusion. Where only three forward speeds are fitted to a car there is not usually any trouble in changing up or down on the two highest; but when four forward speeds are used it frequently happens that in coming down from fourth to third the latter is run through, and consequently the remainder of the ascent has to be made on the second. The higher position of the quadrant (in relation to the lever) would enable the driver, if he so desired, to have the movement right under his eyes; but, as before stated, watching the change is not good driving, as the eyes of the steersman should watch the road and its occupants and not the car. If he must use the side lever, instead of the preferable steering column position, at least let us have some larger range of selection for the notches than is at present obtainable.

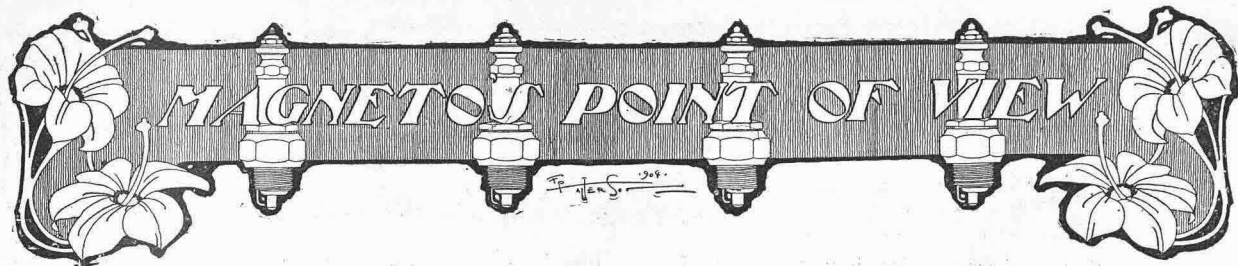
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Concerning Multi-cylinder Motor-bicycles.

The striking departure from conventional lines in motor-cycle construction introduced by the makers of the F.N. machine is undoubtedly one that calls for comment. Let us consider briefly what the new F.N. machine is. There is a four-cylinder engine, each cylinder giving a little less than 1 h.p. The engine is mounted in a cradle, the crank-shaft being in line with the frame of the machine, and not at right angles, as is usual. This arrangement, however, is not absolutely novel, as something of the same type was shown at Paris in 1903. With regard to transmission, neither the belt nor chain is adopted, but a very complex system of spring clutch, spur gears, propeller shaft, and finally a bevel gear on the rear wheel. That this system has been most excellently designed to economise space and not interfere with the symmetrical lines of the machine must be admitted, but that it is distinctly complex as a transmission system compared with chain or belt cannot be denied. High-tension magneto electric ignition is adopted in place of the coil and accumulator. The dynamo is provided with a distributor to switch the current on to each cylinder. This system of ignition is of course practically the only one applicable to a four-cylinder engine on a motorcycle, as it would be quite impracticable to use four coils and a very large accumulator; at least, this is so if it is desirable to keep the machine of moderate weight and dimensions.

What are the Advantages?

The makers of the F.N. machine must obviously have convinced themselves that the new model would offer decided advantages over more conventional patterns. A machine of this type must cost considerably more to manufacture than the single-cylinder type. Firstly, the four-cylinder engine should give an ideally smooth and vibrationless drive, as there are two power impulses per revolution of the crank-shaft, as against one impulse for two revolutions for the single-cylinder engine. The degree of flexibility or range of power control should be much greater than with one cylinder. A little consideration will show that it should be possible to throttle down to walking pace and get a perfectly regular drive, as the feeblest explosions would keep up a steady torque or turning effort on the crank. This cannot be done with the single-cylinder engine, be it fitted with a big fly-wheel even. It is possible to run slowly, of course, but only by switching on and off, and probably with occasional help from the pedals. To be able to run very slowly in traffic with perfect steadiness is certainly a great advantage at times. When power is wanted for hill-climbing, the four cylinders will respond to the throttle and spark to perfection, and it will be even possible to give more advance to the spark when climbing a hill. Starting should be quite an easy matter—in fact, if it was not that it is necessary to give a few revolutions to the dynamo to get the spark the machine should start from a standstill by pressing a switch; this is, of course, assuming trembler coil ignition was fitted. But a very slight push forward of the machine should enable it to be started. This advantage would be much appreciated in re-starting on a hill more especially. There is no chain or belt to require attention, and the whole driving mechanism being perfectly enclosed, it should be absolutely weather-proof, and the muddiest of roads need have no terrors for the driver. As a winter machine it would thus be specially useful. And another good feature would be immunity from side-slip by reason of the steady drive.

Possible Disadvantages.

In what respects is it likely to be at a disadvantage with the simpler mount? The multiple-cylinder engine entails the use of a multiplication of fundamental parts, and the chances of these going wrong are in proportion to their numbers. Thus there are eight valves as against two, four pistons and sets of rings as against one. There are also four sparking plugs as against one. The rider has to see that the compression is perfect in all four cylinders. Lubrication and carburation are not features involving extra complication on the new machine. Will the engine give any trouble through overheating? As they are arranged lengthwise, and so shelter one another, doubt might reasonably be expressed on the point. The fact that the cylinders are very small is, however, a feature in their favour, but the last cylinder of the series must in a degree get less efficiently cooled than the three in front, and thus, unless each cylinder is at the same temperature, they cannot be giving the same power.

Efficiency of the Transmission.

What percentage of brake horse power will reach the tyre of the road wheel after it has gone through the gearing? Now, we know that with a well-fitting flexible V belt direct from pulley to road wheel we get as near as possible an ideal economical transmission, even less than that of a single chain working under normal conditions, because only when a chain is quite new and perfectly in pitch with the sprocket teeth and well lubricated does it give a low percentage of loss. Gearing is well known as a wasteful form of transmission, in what degree depends upon the accuracy with which it is cut and finished. It would be interesting to know what the loss between engine and road wheel is, as upon this will obviously depend much of its hill-climbing capabilities.



THE SPUR OF THE MOMENT!

FIRST MOTORCYCLIST: "But, man! Surely you don't mean to ride in spurs?"

SECOND DITTO: "Yes, old chap, it may look strange, but I've a machine built, entirely controlled by the heels—grand idea, you know—leaving the hands perfectly free!"

TRI-CAR IMPRESSIONS.

By "PETROLIA."

(Concluded from page 487.)

It is obvious that all three-wheelers have this grave fault, which is reduced in a car, which has only two tracks, and is least present in a bicycle with only one. Indeed, the single track is one of the chief advantages of the motor-bicycle, and renders the use of a rigid frame possible. Even here I think the use of springs will come more and more into favour, and I myself am now riding a machine fitted with spring forks which are all that can be desired. I have no intention of ever reverting to rigid forks again, and can only recommend my readers to try the change for themselves. The spring suspension increases the pleasure of motor-cycling a hundredfold, and does away with the feeling of fatigue felt after a long ride. I now ride further and faster than I ever did before, and think nothing of 150 miles in a day. With rigid forks I used a spring handlebar and spring seat pillar, which only slightly reduced the vibration by comparison.

But it is not only in saving the rider from the effects of vibration that spring forks are so useful, but also in protecting the entire machine. In other words, the annoyance of nuts and screws shaking loose is almost entirely eliminated, and the effect on the engine cannot be otherwise than beneficial. Comparatively few motor-bicycles are fitted with spring forks, since they have not been held a necessity. Far otherwise is it with the tri-car, for numerous makes are fitted with some form or other of spring suspension—many being still quite inefficiently sprung and but little better than a rigid frame.

This brings me to a point which I cannot too strongly emphasise, viz., above all

AVOID A RIGID FRAME TRI-CAR.

On all sides I find my experience of the tremendous vibration of these machines borne out by that of other riders, who one and all declare that the rigid tri-car cannot be regarded as a practical touring machine owing to the fatigue it creates.

But even if the front axle be attached to the frame by leaf springs, as is done with some machines, only part of the road shock is intercepted, and the driver who sits over the back wheel (which is not sprung in the type of machine under consideration) gets practically as much vibration as before—as witness of which I can produce other riders, owners of these semi-sprung machines, who likewise declare themselves sufferers from excessive vibration.

Finally, we have the machines in which springs are intercepted at at least three points, thus isolating the entire frame more or less from road shock. These machines are few and far between, and at the best must vibrate far more than even a badly-sprung car owing to the additional track.

I should say that in all tri-cars, rigid or sprung, the passenger's seat is usually so well hung on long cee springs that he suffers very little of the discomfort which falls to the share of the unfortunate driver. I have yet to come across a tri-car in which provision is made for the possible collapse of one of the springs on which the passenger's seat is suspended. In the event of a spring breaking the seat would sag downward, and the unfortunate passenger be tilted forward and thrown out. All this could easily be avoided by running a light stay from one side tube to another, so placed that it would hold up the seat in case of breakage of one or both springs.

In a good many tri-cars the seat comes too near the ground for my taste when the passenger leans forward. An extra bad bump in the road, or a large stone, may easily cause

trouble, and it is astonishing how much a forecarriage will swing when travelling fast.

Having touched on this great defect of all tri-cars—vibration—I will now pass on to another, viz., the difficulty in steering.

Here again we are confronted with the undeniable fact—gloss it over as you will—that the tri-car is at best a glorified tricycle with two steering wheels, and hence has all the defects of its type. Why, the very butchers' boys and tradesmen's messengers riding the carrier tricycles (which are tri-cars of a sort, with the exception of being man, or rather boy, propelled, and not having the "Ackerman" steering) should be able to tell us how unstable these machines are when rounding corners. You motor-bicyclists who gaily swing round an easy curve at 15 m.p.h., with perhaps a short lift of the exhaust valve, will be very much surprised to find that the same pace on a tri-car will find you with one wheel off the road, and possibly, if you have not been sufficiently careful, the entire contraption overbalancing and depositing you and your passenger in the ditch.

No, the tri-car is not a pleasant vehicle to take round corners or even sweeping curves, and all the time there is the sickening feeling for the driver of being

POISED ON SOMETHING IN UNSTABLE EQUILIBRIUM.

This may seem paradoxical after riding a motor-bicycle, but is nevertheless true. I fully imagined that I should



A JONAH.

UNFORTUNATE MOTIST (who has had a casualty): "I admit the justice of my conviction and the loss of my license is deplorable; but, man, they've got my portrait model in the chamber of horrors, and that is too much."

**Tri-car Impressions—
Concl'd.**

feel more comfortable and steadier on the tri-car, whereas the reverse was exactly the case, and I never felt really safe as I do on a motor-bicycle. The least camber of the road sets the driving-wheel dragging sideways; while, if the road be at all sharply cambered and one has to drive to one side, the whole machine slopes sideways and gives the impression of being about to topple over on one side. Of course, all this is due to the fact that these machines have only three points of contact with the road instead of four as with a quad.

I further imagined that tri-cars, like tricycles, were free from side-slip. Of course, they do not send you sprawling sideways in grease like a motor-bicycle, but they skid atrociously, especially on tram-lines. They have a cheerful trick of running with the driving-wheel in the rail, so that when it becomes necessary to steer right or left trouble results. With a motor-bicycle or car you at least have some idea of what your back wheel is up to, and can afford to attend exclusively to the steering, whereas on a tri-car, with its three distinct tracks, when you strike tram-lines you begin to wonder what your driving-wheel is doing.

I tried to overcome the skidding by the use of a leather band fitted with steel studs vulcanised on to the driving-wheel tyre. This simply resulted in a fierce grip of the road, so fierce that the tyre was torn from the rim, the inner tube split, and a new tyre necessary—not to mention two miles of "shoving," with a machine weighing over two cwt. The damage to the tyre was quite beyond a roadside repair. These bands slow the tyre considerably, and have a comparatively short life. Moreover, they tend to skid on dry, hard surfaces, such as asphalt or stone setts, since the steel studs give a far inferior frictional contact to that of the ordinary rubber tread, although they certainly reduce the risk of puncture.

In any case, whether the driving tyre be fitted with a protective band or not, there is no doubt that it should be firmly held to the rim by holding-down bolts. I used four of these, and found they prevented the tyre from creeping, but, of course, added considerably to the trouble of detachment and replacement.

The enormous wear on the driving-wheel tyre is, to my mind, another grave disadvantage of the tri-car. In the majority of cases the tyre fitted to the driving-wheel is of too small diameter, considering the weight it has to bear and the power it is called upon to transmit. In addition to these two normal factors affecting the life of the tyre, the tri-car driving-wheel tyre is exposed to sideward stresses,

which are largely absent in the case of the motor-bicycle. I allude, of course, to the strains set up in the driving-wheel tyre when describing a curve, for, whereas in the motor-bicycle the wheel is free to tilt over, in the tri-car only the steering wheels take up the proper angle, and the rear wheel is often partially skidded at such times. This can only have a detrimental effect on the tyre.

On exceptionally greasy roads it sometimes happens that the driving tyre fails to bite and revolves without propelling the machine. I have had this happen to me on a car, but it is far more likely to arise when the entire drive is taken from one wheel only. Needless to say, the effect upon the tyre is hardly beneficial.

To the best of my belief, not a single tri-car on the market is fitted with irreversible steering. In my own case I soon found out the evils of reversible steering, for every irregularity in the road or obstacle encountered tended to deflect the steering, and it was necessary to keep a firmer grip of the handlebar than with a motor-bicycle, which is practically self-steering. I think makers would find the advantages of irreversible steering to fully warrant the extra cost. The steering connections on the tri-car wear rapidly, and the steering then becomes very loose and most decidedly unpleasant. Some provision should certainly be made for taking up the wear.

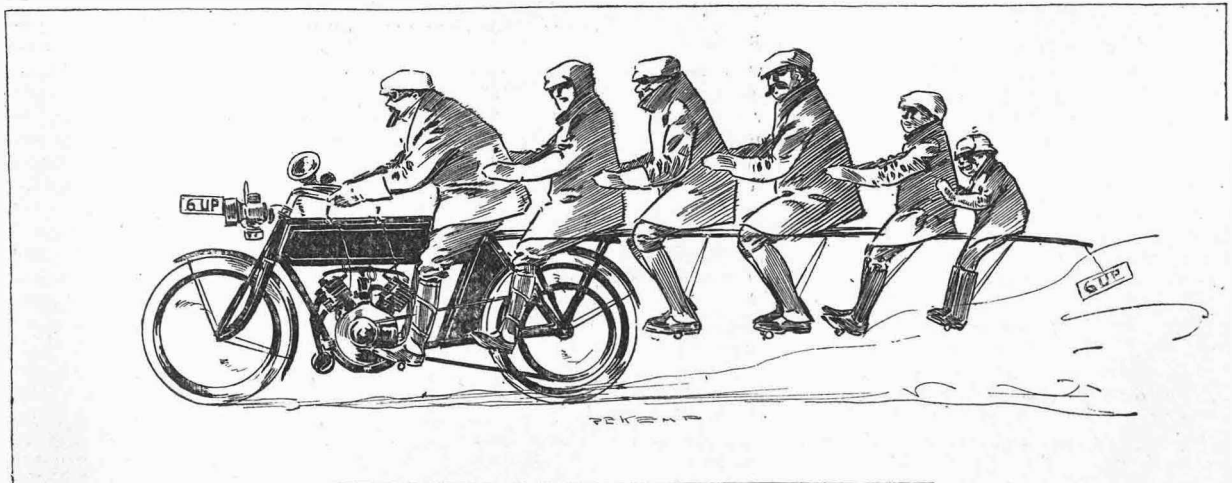
Owing to the large engines fitted, and the necessity for opening the throttle more than with a motor-bicycle, owing to the increased work, it goes without saying that the tri-car is less economical as regards petrol consumption. It is therefore surprising to find so many machines fitted with decidedly inadequate petrol tanks. It should not be necessary to carry a spare can of petrol in the front seat, as so many tri-car drivers are compelled to do. In hilly country some tri-cars are

INCAPABLE OF RUNNING MORE THAN 50 MILES

on one tank of petrol, and this is certainly not sufficient. Lack of petrol with so heavy a machine is a thing to be dreaded.

In many machines such details as the attachment of the mudguards and tanks have received insufficient attention. In my own case, in spite of enormously thick and strong stays, the mudguards continually worked loose owing to the excessive vibration, causing me a deal of annoyance.

I think I have said enough to show that the tri-car has serious faults which are absent both with motorcar or motor-bicycle. For my part, I do not consider that any tri-car is to be compared for all-round efficiency to a really good motor-bicycle; and, after all, the results of the latest 1,000 miles trial are sufficiently eloquent; for only one tri-car got through successfully, and even that was driven by an acknowledged expert in this class of machine.



A suggestion from an enthusiast of weak (not intellect!) constructional ideas.

WILL ELECTRICITY RIVAL PETROL AS A MOTIVE POWER FOR ROAD VEHICLES?

Electricity is the power of the future—at least everyone says so, and unless some unexpected discovery takes place we may safely consider the statement to be true. Will it be the motive power of the future road vehicle? This question time alone can settle; meanwhile, with the improvements in construction and the cheapening of the supply of electricity, there is no doubt that the electric car will, as time goes on, form a more serious rival to the petrol car than it does in the present day. In considering the subject of electricity as a motive power for road vehicles we will exclude electric tramcars, although they may be considered road vehicles; they run upon a special track and have special facilities for supplying the motors with the motive power, and thus have great advantage for economical working over a car upon which the supplying unit must be carried on board. We will first consider the various ways in which this most perfect form of energy may be applied to road vehicles.

Broadly speaking, four methods of supplying the electric energy may be used, by primary cells, by secondary cells, by transmitting power from a generating station by means of overhead trolley wires, and by a dynamo carried on the vehicle.

The first of these methods may at once be dispensed with as being, at present, impracticable. We say at present, because, although, so far, no one has succeeded in deriving electric energy direct from coal or other such substance, it is within the bounds of possibility that our scientists may yet discover a method of obtaining energy from some such natural source other than combustion.

The second method of supplying electricity, by means of secondary cells, which is the one most commonly in use, is, in spite of recent improvements in accumulators, a very inefficient one, and is likely to remain so until a cell is produced which combines lightness with large capacity and freedom from rapid deterioration. The stringent conditions under which a cell is used for traction work render the present-day article entirely unfit for its purpose.

It was hoped that the Edison cell would remove all these disadvantages, but, although an improvement upon former attempts, it can hardly be considered ideal. In a motorcar a means of obtaining power for long periods continuously is required; the fact that secondary cells take some time to charge is a great deterrent from their usefulness; and this, added to their low capacity, renders them more suitable for broughams than touring vehicles.

The third method, that of transmitting power from a generating station by means of overhead trolley wires, in a somewhat similar way to that used with tramcars,

ALTHOUGH NOT SUITABLE FOR PRIVATE CARS,

is an economical method for vehicles which always traverse the same route, and might with advantage be employed by such users as railway companies, who are now employing motor buses to feed their lines from outlying districts. Without entering into a technical description of the system, we may say that, used in conjunction with accumulators, this method has many advantages; the cells need only be large enough to drive the car over those parts of the route where there might be no overhead conductors, and, therefore, need not be as large as when they have all the work to do. By arranging the cells so that their voltage when charged equals that of the normal voltage of the line, no current would be taken from them when the trolley is in use; and should there be any reduction of pressure on the line, due to overload or other causes, the cells would help to supply the motor with power. On the other hand, if the cells were below their full voltage a charging current would be taken from the line, and by this means the cells would be always kept in good working condition. Various modifications of this system are in use on the Continent: for in-

stance, in Westphalia and in the vicinity of Dresden, but it has not yet been employed in England. The trolley connection is only used as required, so that it never hangs loose or interferes with traffic passing underneath. The fourth method of obtaining electric energy—by means of a dynamo carried upon the car and driven by

SOME PRIME MOVER SUCH AS A PETROL ENGINE, although at first sight apparently a wasteful one, has been found to give good results in practice.

By special arrangement of the engine a direct drive may be obtained without the intermission of the electric motor; thus, should any of the electrical equipment break down, the car is still provided with a means of travelling. The writer remembers seeing a private motor bus of the above type which was furthermore equipped with a battery of accumulators—was, in fact, a complete generating station in itself. Thus three means of driving were obtained—the petrol engine running the dynamo which supplied the current to the electric motor (or when the car was stationary charged the accumulators), the electric motor run by means of current from the accumulators, or direct drive from the petrol engine. The weight must have been considerable, but the method appeared to give every satisfaction, and, at any rate, one could always feel sure of having enough motive power to get home with!

If one might look into the future, one might perhaps enumerate a fifth method of supplying electric energy to the vehicle—through the medium of etheric vibrations, in a somewhat similar way to that now employed in wireless telegraphy. One would then have an energy transmitter at home, and a receiver on the car, which would collect the energy and conduct it to the motor. This reads more after the style of one of Jules Verne's or H. G. Wells's tales, and most people will say they don't believe it possible—the only rejoinder is, "Wait and see." No one would have believed it possible 50 years ago that we would ever be able to transmit signals hundreds of miles without any tangible medium. To return to electricity as we have it in the present day—not one of the least disadvantages of the electrically-propelled car is

THE DIFFICULTY OF GETTING THE CELLS CHARGED

—petrol can now be obtained almost anywhere, but it is not such an easy matter to get a battery of accumulators charged. This disadvantage will gradually disappear as electric power comes to be more universal, but meanwhile, central station engineers might do much to improve their load curve by accumulator charging during the slack hours of the day. If the necessary connections were made to the yard which generally adjoins every power station, cars might run in and have their batteries charged without causing any inconvenience whatever; and if this were so, one could always feel safe in the fact that a charge could be obtained anywhere where there was electric light. That such a state of affairs will arrive may be predicted with confidence, but in conservative England we may have many years yet to wait before it comes to pass. Summarising, then, the demerits and merits of electricity as a power for road vehicles—applied in the manner at present in most general use, that is, by means of accumulators, we may say, demerits—low capacity, weight, and weak mechanical construction of accumulators, time taken in charging them and lack of facilities in charging. Against this we have merits—freedom from vibration, odour and noise, ease of control, and simplicity of motor and gearing. The smooth running qualities of an electrically-propelled vehicle have a fascination which, when once experienced, can never be resisted, and, as improvements take place and charging facilities increase, the electrically-propelled vehicle is bound to gain in favour; hence we may agree with the dictum—electricity is the power of the future.

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OPINION.

The Paris Show.

We are writing these lines before the opening of the great Show, and therefore it is early to be fully impressed by the splendour of all that will be eventually displayed in the Grand Palais. Vast as was the exhibition last year, the 1904 show is even greater, and the Petite Palais has had to be requisitioned for an overflow of exhibits, including machinery, heavy motors, and motor boats. In a word, the Paris Show is magnificent! We refer our readers to the first instalment of our report which appears elsewhere for particulars of those exhibits that embody novel features, and which come within the scope of the programme of this journal. It has been our endeavour to illustrate as many vehicles and novelties as possible, but our staff has been greatly handicapped by reason of the fact that the exhibition opened a day later than last year, and that it was then in a somewhat backward condition compared with previous shows. Despite these difficulties, however, "THE MOTOR" is able to place the first illustrated report of the Show before its readers, and although considerable space is devoted to the subject, it will be obvious that some further exhibits remain to be dealt with in subsequent issues.

Dust.

"If I were asked the greatest enemy to automobilism today, I should reply unhesitatingly, 'Dust.' . . . The Romans, when they wanted to conquer a country, paid special attention to roads and road-making. If we want to achieve eventual victory over the prejudice and dislike of a large section of the population, we must pay continuous and earnest attention to the roads also, and concentrate our forces in order that dust may be gradually and finally defeated." With these two sentences Mr. Scott Montagu began and finished his paper addressed recently to the Automobile Club on the dust problem. The truth of Mr. Montagu's statements will not be questioned by anyone, motorist or non-motorist. The remedy for the evil is not so universally acknowledged. The motorphobe can see nothing for it but the abolition of the motorcar; while the rabid motorophile is equally sure that nothing but the instant expulsion of the horse and the reconstruction of every road in the kingdom will do away with dust. Between these two extremes there should lie, we think, a mean of common sense which (without any such root-and-branch policy as the abolishment of the automobile or the horse vehicle—to say nothing of the impracticable idea of an instantaneous reconstruction of roads) may be brought to bear with beneficial result on this

vexed and vexing question. Mr. Montagu's paper, which contains a wealth of useful information and practical suggestion, makes two things very clear—first, that recent experiments with dust-laying liquids of a viscous nature show that this method of fighting dust is on the whole successful, but at (for the present) a cost which precludes it from universal acceptance; and secondly, that the present method of laying dust by means of the water-cart is only indifferently successful in preventing dust, and is directly responsible for the destruction of nearly every form of road surface to which it is applied. But it needed not the corroboration of Mr. Montagu's evidence to condemn the water-cart—an institution which (like the two-horse 'bus) seems destined to lag superfluous on the stage for many a long year. The question of expense is no doubt the great stumbling block to the more extended use of scientific dust-layers, the employment of which seems to us to be the only remedy for the dust evil until some genius gives us a dustless material from which to make our roads in the first instance. But in this matter of expense it cannot be too often pointed out that a mere comparison of the costs of the water and the oil methods is a narrow view to take of the subject. To tinker with the roads from day to day with the water-cart may cost a few pounds less than to treat them boldly in some more permanent way, but the ultimate gain, both to the road itself and to the users of it, will be taken into account by the more fore-seeing authorities. Another point which concerns motorists more especially is—and it was not forgotten by Mr. Montagu—that in the construction of the car itself something may be done to check the evil. A low front, a smooth underside, and plenty of clearance behind, all help in diminishing the volume of dust raised. When we have our ideal road surface, or our ideally-treated road surface, there will be no dust on it, and the fancy of the car designer may run riot; but until that millennium it is as much a part of his duty to study to produce a body which shall raise the minimum of dust, as it is the duty of the road manufacturer to employ (where possible) those materials which have been proved to be least creative of this universal nuisance.

The Police and Hoods.

It is necessary to warn those of our readers who have fixed hoods to their cars that the police are evincing signs of activity in cases where hoods are not fitted with side windows. The side window, as fitted to many of the vans about the streets, is a mere farcical conformity with the law, but if it be little more than a pin-hole it is sufficient, apparently, to pass muster as a window. The fact is that a motorcar fitted with a hood must conform with the regulation as it applies to hooded vans, and must be provided with side windows. It will be well to bear this in mind when purchasing a cover, and makers of these necessary fittings should be acquainted with the fact that the fitting of side windows is a necessity. Meanwhile, those who have covers without the needed openings had better at once have them made, because the police seem to have an unhappy knack of fixing upon the conspicuous motorcar for minor infringements, whereas the commonplace van has a habit of evading their vigilance. Our own car, in use daily in the city streets, has already been stopped on several occasions, and the driver has been called upon to shut down the hood.

TRI-CARS AT A GLANCE.

The little pocket booklet which we prepared during the Show, entitled "Light Cars at a Glance," has given such great satisfaction and proved so popular, that we are now preparing a similarly handy booklet giving the salient features of every Tri-car on the market. This will be ready shortly, and in the meantime applications should be sent in accompanied by an **addressed** and stamped envelope. A few copies of "Light Cars at a Glance" remain to be disposed of and will be sent free to applicants under the same conditions.

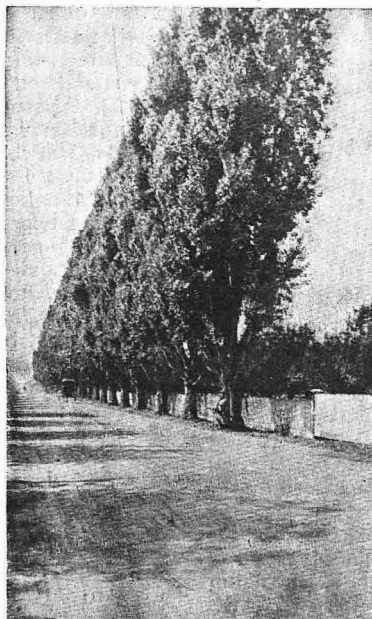
PROF. OLIVER LODGE, F.R.S., ON ELECTRIC IGNITION.

The lecture delivered by Professor Lodge on the subject of electric ignition at the Institute of Mechanical Engineers proved highly instructive and interesting. The audience consisted largely of members of the Automobile and Cycle Engineers' Institute, who had journeyed up from the Midlands. Prof. Lodge first dealt with the constitution of an explosive gas mixture, and explained that the real difference between a vapour and a gas was simply one of the degree of subdivision of the molecules. In a vapour the molecular subdivision was much coarser than in a gas. From this fact might be deduced the conclusion that the more subdivided the particles of an explosive gas the stronger would be the explosion; and the propagation of the ignition would be more rapid. Contrary to what was thought to be the case, it had been proved that an excess of the inflammable component (hydrogen) of the gas increased its rapidity of ignition, as the atoms moved very much faster through the mixture; whereas the inert component reduced the inflammability. Another means of increasing the rapidity of ignition would be to start the flame in the charge from several points at once, which meant having a series of spark plugs at different points in the cylinder head. Prof. Lodge deduced from certain reasoning that a better effect on the piston would be obtained by exploding the charge at a point

CLOSE UP TO THE END OF THE PISTON,

as the force of the explosion would be exerted on it before it had moved away. If the charge was exploded at the top of the cylinder the piston was already well on its stroke before the propagation of the ignition was complete, and thus effect was lost. Prof. Lodge was of opinion that water-jacketing a cylinder was, at all events theoretically, wrong. The cool walls lowered the activity of the molecules of gas. The hotter the cylinder the more rapidly could the charge be fired. There were doubtless difficulties in the way of getting a charge into a very hot cylinder and keeping the moving parts

lubricated. But it might be possible to pump the charge into the cylinder. Prof. Lodge then went on to describe the principles of methods of ignition, and showed first a series of slides of various arrangements of the early forms of tube igniters; and then the electric system, which was



Section of road in Alameda county, California, between the towns of Haywards and San Leandro. Alameda co. has more miles of good, well-kept roads than any other county in the state, and it is a favourite section for motoring and cycling. For forty-four miles the road is lined on both sides with fruit orchards and tall poplars and palms.

infinitely safer and more efficient. A simple and highly-effective analogy of the action of a low tension magneto was that of a swinging weight being suddenly arrested in its movement by a piece of board. The suddenly-arrested energy broke the wood. When the current flow-

ing from a magneto generator was suddenly interrupted by an obstacle such as a layer of gas or air, it smashed this layer, and as a result an energetic and hot spark was produced. The new coil invented by Prof. Lodge was then described and illustrated by experiments. There are two sparks given by the coil—one known as the "A" spark, which has the usual properties of a high-tension spark, and the "B" spark, which occurs simultaneously, but has entirely different properties. It is extremely rapid,

LESS THAN THE MILLIONTH OF A SECOND

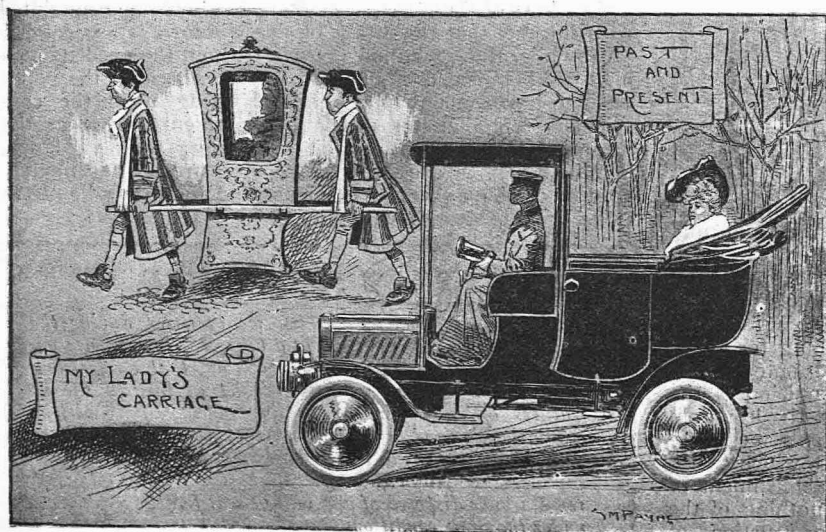
in its discharge, and is curiously averse to taking a long path and leaking away, if there is a shorter path. It ignores a short circuit; the sparks occur equally well under water; and the wires carrying the current can be handled with no fear of a shock resulting. A partial short circuit across the points of a plug caused by soot and oil has no effect. This "B" current is obtained by placing a suitable condenser across the terminals of the secondary winding. The connections are made to the inner coatings of the condenser, and a spark gap is arranged to cause a discharge. The outer coatings of the condenser are connected to the actual sparking terminals of the plug. The "A" spark jumps across two electrodes on the coil itself. Prof. Lodge compared the condenser to a spring which was stretched slowly and then suddenly released. The energy thus released was like the "B" spark, sudden and powerful in its effects. The coil involved no extra complications; and in cases where it was difficult to keep up the insulation, such as in a motor launch, the new coil should meet the case well. The Professor illustrated the theory of his coil by means of a Holtz electric induction machine and two large Leyden jars. This apparatus gave powerful explosive sparks; and though to touch the knobs across which the "A" spark jumped would have been dangerous, Prof. Lodge grasped the "B" knobs quite safely. Amongst the apparatus shown in action was a Lanchester magneto, an Eisemann magneto, and a Simms-Bosch arc light magneto. The lecture was highly appreciated by the members present, and a hearty vote of thanks was given the lecturer at its conclusion.

German Motorcycle Association Trials.

The German Motor Cycle Association purposes holding next year a reliability run for small low-power cars, trimos, etc. Frankfurt-Eisenach-Berlin is the projected course. On the score of experience the Association anticipates a big demand for cheap, low-power vehicles in the forthcoming season, and its object in organising the run is to give them the much-needed trial.

An American Oil.

The South British Trading Co., 13-15, Wilson Street, Finsbury, London, E.C., are marketing the three-in-one oil—an American speciality for lubricating, polishing, and preserving machinery and metal of all sorts. The makers claim that it is adapted for the working parts of motor vehicles, as well as for cleaning the body work. It is a thin, non-greasy oil of a pale colour with a very agreeable smell. It is put up in bottles containing 1oz. (6d.) and 3oz. (1s.).



WITH A BELT-DRIVEN FORE-CAR TO FALMOUTH.

By FRANK F. BRIDGEWATER.

With what a yell of derision my non-motoring friends greeted my announced intention to voyage from a Buckinghamshire town to Falmouth by the aid of my modest tri-car. And when I mentioned one of their number—weight 12 stone—as the occupant of the front seat, how they chortled with glee! “You will never get anywhere near Falmouth!” “Has Edward (the passenger) insured his precious life?” And so on. And eventually a little bet was made on the event. Time allowed, four full days.

The party numbered three, my brother on a $3\frac{1}{2}$ h.p. (A.V.) Rex fore-carriage, belt driven, carrying our bags as his passenger; and myself with a $3\frac{1}{2}$ h.p. (M.O.V.) Minerva-Ariel tri-car, belt driven, with my champion light-weight in front. Heavens! how heavy, how elephantine even did Edward seem before the heights of Falmouth loomed in the offing!

To Maidenhead all went well. The engines pulled; the few hills on the road mattered not at all; we had negotiated that erstwhile toll-ridden bridge, and were preparing to take the riverside town by storm, when—buzz, brrr, our pace died down to that of an errand-boy ordered to “rush,” and the engine proceeded to tear its little heart out. Only for a second, however. I hung on to the exhaust valve lifter, poured oil on the troubled water, as it were,

AND WE CAME TO A FULL STOP.

My passenger turned round and enquired what was the matter? I told him, quite amiably. I could afford to be amiable. Succour was but a few yards distant. It was easy to discard that poor old belt. Never had it slipped till then, and if it had not slipped it would probably have parted never to meet again. I decided to keep it as a memento, and proceeded, minus passenger, on a *very* low gear, to the motor depot on the left-hand side of Maidenhead's High Street. Had our friend a really reliable belt? Yes, he had. Had he good reports of them? Yes, he had. How much a foot were they? Could he fix one on at once? Yes, he could, and he did.

I noticed that there was a lot of dressing on that belt. It looked oily, not to say greasy. Before we arrived at Maidenhead Thicket I was in the same state. My eye and Betty Martin! what a business it was going up that hill. But we managed it at last, and, having conquered it, viewed the fair vista of the Bath Road still unbeaten, still determined to win that bet, still bound for Falmouth!

We got along to Reading very nicely. Sometimes the belt slipped a little, and sometimes rather a lot. But I put it down to the dressing. After 50 miles it will be all right, said I to myself. And so, to Basingstoke. There was a hill on that road to Basingstoke which really was annoying. I saw it coming, and I mentioned to Edward that here was an opportunity for pedestrian exercise. He got out obediently, and I waited for the engine to cool down (the fan had not been working too well). Then I made a dash at the mountain and climbed it. It was a warm day, but fortunately there was an inn at the top of the hill, so before resuming we imbibed some of the local brew.

Basingstoke seems a nice place, but its inhabitants are frightfully hazy as to its location in regard to the position of other towns. In their view, apparently, all roads lead to Basingstoke, and having arrived there one ought not to

want to go anywhere else. Well, who am I that I should sneer at local pride? It was in Basingstoke that I first saw a Quadrant fore-car on the road, all complete with a lady passenger and a two-speed gear. I positively envied that man, as I saw him bravely going up hill, with both little engines buzzing along finely on the low gear. When I saw him later on the road to Andover, with *his* belt slipping (the Quadrant drive is or was partially by belt), I didn't feel so jealous.

But we were both of us more or less in the same boat, for my belt, which kept on

OOZING OUT POUNDS OF DRESSING,

with unabated ardour, was bad-tempered. It certainly was hot. To make matters worse, I lost the little belt that drove the fan on this stretch of the road, and I am afraid the scenic beauties, which were many, were rather lost on Edward and me. However, perseverance does it, and we managed to progress after one or two frightful struggles. We reached Andover, via Whitechurch, in good style, and decided to make Salisbury our objective for tea, which was duly secured at the “Red Lion” in that fine old town. Then, since there were yet a couple of hours of daylight to spare, we decided to go on to Shaftesbury. The country hereabouts is positively delightful; the belt slipped not at all; the engine, enjoying the cool evening air, was like a war-horse sniffing the breeze. Edward was glad to find himself still alive, and all went well. It was a bit of a climb up into Shaftesbury, and the inhabitants seemed unnecessarily interested in the two fore-carriages; but a little pedalling at the right time and it was accomplished with credit. A good supper; good company; good service; an “early English” air, as though we had done the journey by coach, and so to bed.

Next morning a little delay was caused by the discovery that the advance spark lever of the “pantehnicon,” as the fore-carriage with the luggage was disrespectfully called, had worked away from the petrol tank. This necessitated a call on the local motor engineer and the application of some solder and flux—a minor matter, but it swallowed the best part of an hour.

From Shaftesbury the route we decided upon lay via Wincanton and Ilchester. Early on the road we encountered quite a steep hill, which we had to go down, not up, thank



A contrast. Snapped on a road in Germany.

**Belt-driven Fore-car
etc.—Contd.**

goodness. A nasty accident was avoided on this hill by about one inch. Rounding a corner, we saw a pony-trap a few yards ahead, and no room to pass. We had no chance to pull up in the little time available. Fortunately, the man with the pony-trap acted promptly; he lugged his near-side rein with vigour; got on to his right side of the road; and just left us room to get by. But

IT WAS AN EXCITING HALF-MINUTE!

Before we reached Wincanton, we stopped for a grand belt-shortening display. The day was again very hot, but the engines behaved splendidly. The country was magnificent, and though it is believed that somewhere here we missed the road, we eventually found ourselves in Ilchester, which place we wanted to get to, and stopped there for lunch. Thence we lifted anchor for Taunton. A couple of miles outside this town we noticed—Edward and I—that the tri-car seemed wayward, the steering seemed affected, and the old-time steadiness a thing of the past. A stop was made and an examination effected—verdict, a small puncture in back tyre. We concluded to make a dash for it; so, advancing the spark and correcting the mixture, we descended on Taunton at a rare pace, and arrived before getting down on the rim. Here we had tea, the while the tyre was repaired. From Taunton to Exeter is a rare run, but we had a very trying time on some of the hills. A few miles north of Exeter the silencer fell off, and it was decided to proceed without it. This was really an interposition of Providence, as the increased power enabled the hill into Exeter to be climbed, passenger and all, in great style. The engine developed great power, the belt pulled well, and Exeter was at our feet. Hooray!

The next day's run was rather abbreviated, but we did not start till about 12 o'clock, owing to time taken in refitting the silencer. Anybody who knows the road from Exeter to Plymouth, especially the first portion of it, will understand that a big contract had been undertaken. My word, as poor old Dan used to say, *what a hill!* And, ye gods and little fishes, *what a time we had!* But Edward

pushed off beautifully, and after two failures I got going, and never stopped till the hill had been beaten. And then I tumbled, exhausted, into the front seat, and waited for Edward, who presently appeared, red in the face after his climb. Down through Chudleigh, and there was another precipitous descent, followed by another tremendous climb. Tea at Buckfastleigh, where resin was applied to the belt, which had again developed slipping tendencies. Thence to Plymouth, which is to be noted as possessing

MORE HOOLIGANS TO THE SQUARE YARD

than most country towns, and as possessing on its north-east side two miles of the most shocking road. In Plymouth—extraordinary as this may appear—it took about an hour to find a garage. It is a nice town. I saw the Hoe, which is, no doubt, very charming, but as the shades of night were falling fast the hotel was more attractive.

The next and last day's run I claim to have been excellent. From Plymouth to Falmouth is a proposition even for a car. But we did it. We got to Truro at lighting-up time, and we then had a little hill (this is sarcastic!) of, I believe, 1 in 9 to tackle. Well, it was done—Edward walking again. At last, the lights of the Greenbank Hotel appeared and the bet was won. But we wanted all the time allowed, and I think that the next time I go touring with a passenger I shall have about me that handy little thing known as a two-speed gear; for the passenger's sake, if not for my own. And a seat is better than a saddle—that is one of the conclusions I have arrived at. Perhaps one of these days the tri-carist will cease to be a martyr in the cause of motoring, and be allowed some comfort. I think that 1905 is likely to witness this reform, and it will not come too soon for those of us who do not want their machines for little promenades but for practical use and hard wear.

"Light Cars at a Glance" is the title of a handy pocket booklet containing the salient features of practically every light car on the market. It will be sent post free on receipt of stamped addressed envelope. It will be found extremely useful by the man who is in search of a vehicle of moderate price, as the various points of each car can be quickly seen and easily compared. A booklet, "Tri-cars at a Glance," is now in course of preparation.



Learning to steer at the first chauffeurs' school in Germany.



The Paris Show.

A RECORD NUMBER OF EXHIBITS MAGNIFICENTLY DISPLAYED

(By Our Own Special Representatives.)

Magnificent! That is the only word which describes the seventh annual great Salon de l'Automobile, which was opened in Paris by President Loubet on Friday last. Great as have been the successes of previous years, the 1904 Salon, which will remain open to the public until Christmas Day, easily surpasses them both as regard the artistic nature of the stands and the number of actual exhibits. From all points of view the Exhibition is a veritable masterpiece of skill and good taste. It cannot with truth be denied that the French possess in a wonderful degree the faculty of combination. The Grand Palais des Beaux Arts, which houses the Salon, certainly lends itself to decorative effect, and every advantage has been taken of this fact. One heard beforehand of

THE QUARTER OF A MILLION ELECTRIC GLOW AND ARC LAMPS

which were to add brightness and grace to the beautiful interior, but the artistic and dazzling nature of them must be witnessed if the true extent of their beauty and brilliance are to be fully realised. The mighty dome which rears up its head like that of St. Paul's is graced with a huge suspended half-globe, from which tapered rays radiate in all directions; this structure possesses over 30,000 white electric glow lamps, which, when lighted, are almost blinding in their brilliance, and the stands are marvels of colour and decorative art; while the thousands of palms, festoons of flowers, and clustering flags combine to produce an effect striking and magnificent beyond all words.

Visitors to the Palais on Thursday

last could hardly realise that the opening ceremony would take place on the following morning. All was excitement and activity. Thousands of workmen were engaged all over the huge building (which, it is interesting to note, occupies an area exceeding three times that of the Agricultural Hall), and the noise and the dust were both nerve-racking and confusing. Not a third of the exhibits had arrived, and those that were present were entirely covered up; while in the majority of instances the stands themselves were only in a semi-state of completion; we marvelled how it would be possible to have everything ready for the morrow. But in the making of shows everything is possible in France, and when we arrived on the scene shortly after eight o'clock on Friday, a wonderful transformation had been wrought.

OUT OF CHAOS HAD GROWN ORDER,

or at any rate something approaching it; for, although many exhibits were not ready, the majority were available for inspection, and presented a scene of delight to the eye. Ten o'clock was the time for the official opening, and sure enough, as the clock struck the hour, the splendid Dufayel band, in one of the galleries, burst forth with the majestic strains of the "Marseillaise," deciding that M. Emile Loubet, Président de la République Française, had, in accordance with his unvarying custom, arrived punctually. The little man who heads the great French nation was, as usual, looking bright and happy, and bowed and smiled upon all, as he unostentatiously made his way through the huge crowd which had assembled. He was followed

by several ministers and by M. Gustave Rives, the president of the organising executive; M. A. Ballif, the vice-president; and the other leading officials, as well as a number of French officers and gentlemen wearing the Legion of Honour. Quietly, and with a wonderful lack of undemonstrativeness on the part of the visitors, the President walked round the Salon, pausing ever and anon where something particularly appealed to him, and engaging in animated conversation with M. Rives, who was ever ready to answer his interrogations. Particularly interested was the President in

THE RICHARD-BRASIER EXHIBIT,

which is situated in the centre of the building, immediately under the big dome. Here is to be found the original 80 h.p. Richard-Brasier car upon which Thery secured his glorious victory in the last Gordon-Bennett contest. The intrepid driver was chatting with M. Brasier at the time the President drew near to the stand, and they were both the recipients of his warm congratulations. Resting upon the historic car was a replica of the famous Gordon-Bennett cup, and above the sign bearing the name of the makers a realistic picture was shown of Thery driving at full speed in the contest. Proceeding, President Loubet gazed for a few moments at the three-arched Darracq stand, which is beautifully decorated in gold and dark and light blue tints, and with scores of small electric lamps. Hard by is the Decauville stand, looking chaste in its whiteness and ancient pillars, reminding one of the classics. A few yards away, and one haps upon the Argyll exhibit, which, with the Wolsley and Messrs.

Introduction —Contd.

Rolls and Co., are the sole representatives of the British Automobile industry. The Argyll cars have a most imposing staging, the structure being a striking tableau of an old Scotch baronial hall built of imitation granite and made realistic by the presence of four stags' heads and Scotch claymores and swords. Old-fashioned chairs and tables add to the effect of the display, which is rendered more picturesque by the addition of a pretty cluster of flags, these comprising the French tricolour, the Union Jack, the Scotch Standard, and the St. Andrew's Cross. The Hozier Engineering Company—the makers of the Argyll productions—are certainly to be congratulated upon the handsome character of their stage which, if not large, is certainly one of the most unique in the Show, and affords a fine setting for their exhibits, which are 10-12 h.p., 12-14 h.p., and 20-24 h.p. chassis. Keeping on we next strike the stand occupied by Cottureau of Dijon—a lofty and imposing white erection tastefully decorated with gold and ivy leaves. That of Tony Huber, of Brillancourt, with its delicate green tints and artistically

arranged lamps, greatly pleases; as also does its neighbour, where a fine array of large Boyer touring cars are to be seen. The stand itself is an archlike edifice, on the top of which are various coloured electric lamps representing flowers. Pope (American) automobiles are staged amidst a mass of flowers, palms, and evergreens, and F.N. machines (principally the new four-cylinder motor-bicycles) find a resting place on a platform with an erection conveying the idea of a Roman arch or entrance. The Oldsmobile surroundings impressed us principally on account of their simplicity—four white marble pillars with a crescent top on which is a drooping laurel wreath bearing lighted coloured globes representing fruit. Opposite, a beautifully finished Hotchkiss chassis is set off in a striking manner such as has never yet been seen in an English exhibition. The superstructure is covered with hundreds of lights and sparkles with diamond-like whiteness and glitter; in very truth it may be likened to a wing from a fairy palace. A close companion is the De Dietrich exhibit, which is attracting large crowds owing to the revolving turret on which a De Dietrich motor boat and car are represented in movement. The turret is illuminated like a light-

house, and the whole is surrounded by large blue lamps of a delicate hue. Almost dazzled by the grandeur of the whole surroundings one passes on to the Krieger display, the scenic effects of which are very fine. They take the form of Egyptian pillars, on the top of which two figures of the Sphinx with glowing green eyes, have a proud place. We saw the President Loabet pause and admire this interesting and classical creation. Immediately facing it the famous Gardner-Serpollet cars are staged on a plainly decorated platform, the uprights of which have entwining them honeysuckle blossoms made real by the skillful intermingling of miniature white lights.

The popularity of the Salon is remarkable and the opening day witnessed a tremendous influx of visitors. In the afternoon it was filled to the utmost capacity, it being computed that no less than 50,000 persons were present. The first day only those ladies and gentlemen who had received special invitations from the French club were admitted, and it is estimated that out of the 100,000 tickets issued fully one half were presented at the doors. Altogether this year's Salon is a marvellous institution, and should be visited by all automobilists who can afford the time and money to do so.



General View of the Paris Show at the Grand Palais des Beaux Arts.

LIGHT CARS AT THE PARIS SHOW.

In one respect the Salon is disappointing. There are not so many light cars as one would have expected. And when it is found that well-known makers who include voitures and small cars among their types are not showing them, the only conclusion that one can come to is that space is so scarce a commodity at the Salon that the small car is practically only shown by those who make a speciality of it. Thus, we see the little car is being ousted from the great Paris Show which is growing so congested and so vast that the weakest reed has to give way to its more powerful rival. In this we see an augury for the future. The time must inevitably come when the light car industry must commence to fight its own battle, otherwise it will be smothered by the big car interests, being pushed to one side because there is a much greater margin of profit upon the more luxurious vehicles. That the little car should be crowded out of the only Show held in Paris is bad, because it thereby runs the risk of having its existence entirely overlooked by potential purchasers. This condition of affairs naturally does not encourage the demand for, and considerably hampers the development of,

THE MODERATE-PRICED VEHICLE.

To prevent this must be the aim of those who specialise with this particular type

and, even if the French makers do not care to trouble about the matter, it behoves the British light car industry to carefully watch the course of events and jealously safeguard its interests to the most minute degree. If needs be the small vehicle must have its own section—even its own Show, otherwise it will become obscured much in the same way that the motorcycle was when it was shown with cars under the same roof.

Progress, not unnaturally, is slower with the small car than with the higher priced vehicle because the chief aim and object of makers is still price reduction, or, if not that, improvement without increase of cost. But for all that, distinct advances are to be found in many directions. The rush for the honeycomb radiator has died out in the small car, as it has done on the bigger vehicle, and gilled tubes are generally employed, water tanks surrounding the radiator in many cases. The separate water tank sometimes carried on the dashboard of a small car is not the ideal arrangement because, apart from the strain which such a position must impose upon weak joints,

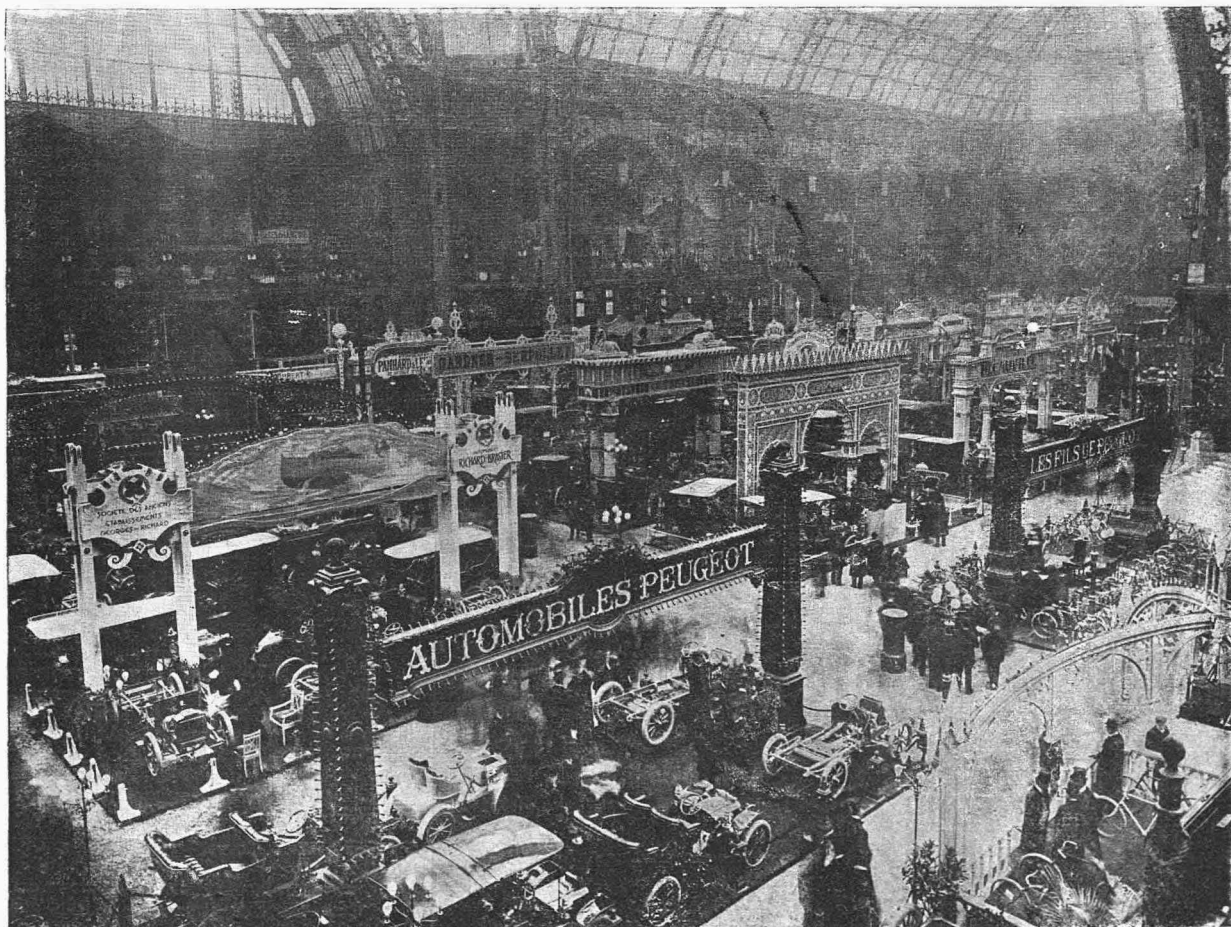
THE ACCESSIBILITY OF THE ENGINE is affected. To our way of thinking, the position below the frame is unjustly disregarded. With forced circulation there is no objection to the position on the score of efficiency, nor can there be on

the score of appearance, whilst with so little space below the bonnet of a one or two-cylindered car the removal of the radiator to below the frame makes a lot of difference in the matter of accessibility to the mechanism.

The power of the engine shows a tendency to increase to 8 or 9 h.p., whilst the two-cylindered engine of about 10 h.p. is rapidly multiplying. In the case of the latter, mechanical valves, disposed in separate pockets, the inlet valves on one side of the engine and the exhaust valves on the other, are being more and more generally employed. The Renault is the only instance of the valve pocket being extended so as to accommodate the mechanically-operated inlet valve in front of the exhaust valve. This may simplify the two-to-one gear, but it is wasteful of power. Magneto ignition is an expensive luxury, and, therefore, its introduction into

THE INTERNAL ECONOMY OF THE LIGHT CAR

must be slow; consequently it was a rarity at Paris. The clutch is not altering; the metal-to-metal type running in oil being virtually an exclusive feature of the big car. The reversed cone is not found on many little cars, as, with good thrust blocks, the ordinary type is open to few objections. The live axle, the power being transmitted by propeller shaft, is



GENERAL VIEW OF THE PARIS SHOW FROM THE GALLERY.

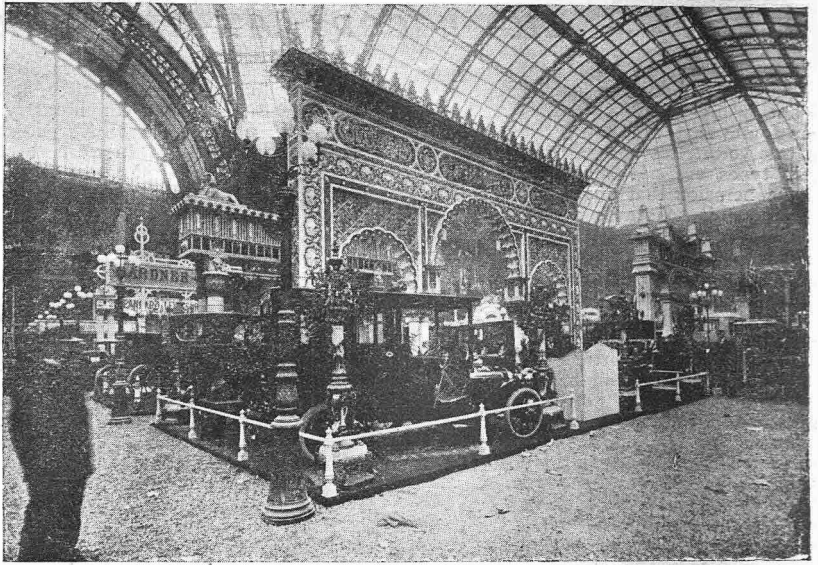
Light Cars—
Contd.

the general type of drive, the side chain being found in use in very few instances. Brakes are being improved all round, the internal expanding type becoming very popular. Methods of adjusting the brakes with the least trouble to the driver are being introduced—and they will be welcomed!

THE CONTROL LEVERS FOR THE ENGINE are ambitious! The Mercedes style of fixing quadrants on the top of the steering-wheel for the ignition and throttle levers, thus bringing closer to the driver's hand and enabling the connections to be concealed in the steering-pillar has been adopted in quite a number of instances. The type of pedal which was introduced on the same notable car and which pushed forward instead of downward, is being employed on many of the little cars and it is a feature that will be popular owing to the added comfort given to the driver. The Wolseley light car is worthy of special mention because it is the first public display of a vertical engine by that company. The car is very well designed indeed and it should enjoy a well-deserved popularity. Other notable French cars are the 8 h.p. De Dion, the 9 h.p. Prosper Lambert, the Renault of 8-9 h.p., and the 10 h.p. Peugeot. These and others will be dealt with fully in the succeeding pages of this report.

Messrs. Prosper Lambert, of Nanterre, are showing some very fine models of their light cars, chief among them being the 9 h.p. single cylinder and the 12 h.p. double cylinder. The Prosper Lambert cars are already well known—and deservedly so—in this country, and when the 1905 models shown at Paris are introduced to the British buyer they will be certain to gain enhanced popularity. The finish is excellent, whilst

EVERY POINT SHOWS INDIVIDUALITY and careful thought and design. The



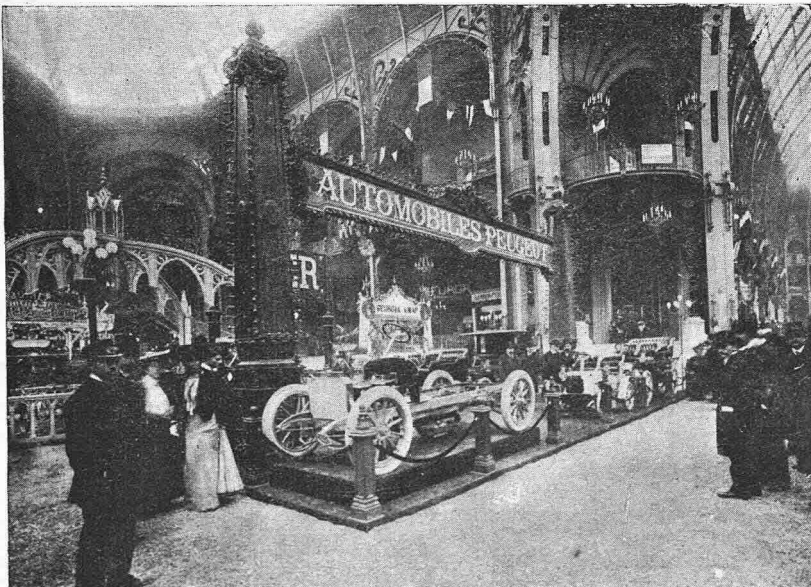
The ornate stand where the Darracq Cars are staged.

engine of the 9 h.p. car has mechanical valves operated through cam-shafts and a train of pinions revolving in a casing on the forward end of the crank-case. The starting-handle device is in two parts and is designed to gear up on to the crank-shaft so that one turn of the handle revolves the crank shaft about four times. This method is employed in order to render easy the act of starting the engine. The contact breaker is placed in front just below the radiator so that it is accessible without entailing the opening of the bonnet. The engine is governed on the induction, and a very large-sized fly-wheel and clutch have been adopted. The pedals for the clutch and brake are of the push forward type, the former having its spring arranged in a novel way, a tension coil spring pulling the pedal back towards a bracket on one of the cross members of the frame and, through the clutch fork, taking the clutch into engagement. The

clutch is thus made easy of adjustment. A new feature of the car is the employment of the thermo-syphon system of circulation, thus dispensing with the pump. Another new feature is a cast front axle. The internal brakes to the road wheels are applied through rods instead of wires, and a well-arranged brake acts on the propeller-shaft, which communicates the power to the rear live axle. Engine control is brought to the pillar, whilst the three speeds and reverse are obtained by means of a single lever, which goes direct to the gear-box without any joints or bell crank-levers. The frame is of pressed steel and is supported on the axles by long semi-elliptical springs, the rear springs being placed outside the frame, their after ends being secured to a transverse spring of the same type. The engine is lubricated by means of a Dührille pressure lubricator on the dashboard. The price of the 9 h.p. chassis is only 3,600 francs, whilst with a two-seated body and tyres the car retails at 4,700 francs (£188) and with a five-seated tonneau body at 5,200 francs (£208). The 12 h.p. car has a twin cylindered engine and is generally similar to the one already described, but it has magneto ignition and a fan to the radiator. With a five-seated tonneau or a double phaeton body with entrance through a passage formed by swinging the seat alongside of the driver, the 12 h.p. car sells at the low price of 6,500 francs (£260).

M. A. Bailleau, of Longjumeau, is showing a little car driven by a 6 h.p. De Dion engine. It has three speeds and a reverse, and has a tubular frame and a double bucket-seated body with tool-box on the rear platform. With the exception of a folding bonnet the car has no special features, being one of the type already well known in England under various names.

Messrs. Corre, 37, Rue de Villiers, Neuilly-sur-Seine, are displaying a 9 h.p. car with a De Dion engine driving direct on the top speed, the gearing giving three speeds and reverse. The engine is fed through a De Dion car-



A corner of the Paris Exhibition, showing the Peugeot stand.

**Light Cars
—Contd.**

burette and is controlled on the exhaust valve, the lift of the latter being capable of variation by means of a lever system which can be operated both by a hand lever on the steering-pillar and by a foot-pedal. Thermo-syphon circulation is employed, the radiators being placed at the sides of the bonnet (as in the old Renault system) and the water tank on the dashboard below the bonnet. The car is designed on ordinary lines, possessing no novel features either in engine or body. It sells at 4,500 francs (£180) for the chassis and at 5,500 francs (£220) complete with a tonneau body.

Whilst devoting their attention very largely to the more luxurious cars, Messrs. Renault Freres are not neglecting the moderate man, their 8-9 horse-power car being a very fine little vehicle. It has a single-cylindrical engine with an extended valve pocket, so that the mechanical valves are one in front of the other, the inlet valve occupying the more forward position. Brass plugs above the valves permit their ready removal, and one of these is tapped to accommodate the sparking-plug. The engine is governed on the induction pipe, has enclosed fly-wheels. A spindle revolved by the half-time shaft and, having an eccentric at its outer end, rocks a vertical rod on the dashboard, and this is taken up to the lubricator and operates a pump, so that whilst the engine is working

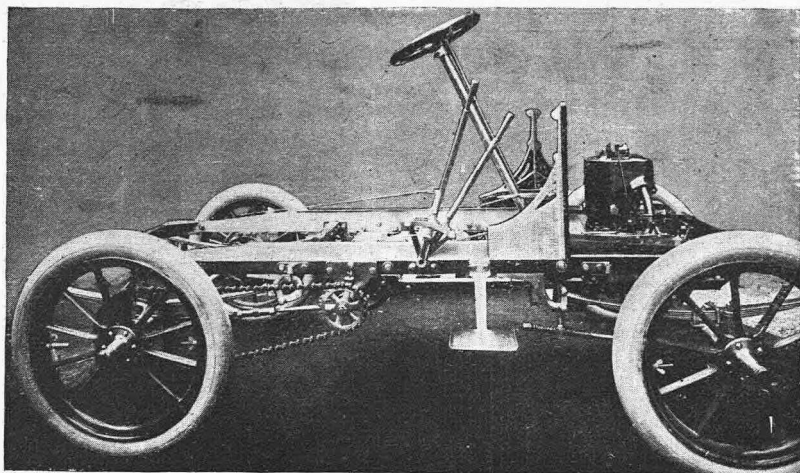
THE OIL IS AUTOMATICALLY FED

to the bearings and crank-case. The clutch is of the internal (reversed) cone type communicating the power in the usual way to a live axle. Magneto ignition is employed, the machine being placed centrally in front of the engine, the armature being connected up direct to the half-time shaft. The whole of the mechanism is perfectly protected by a strong undercasing. The frame is of pressed steel, as is also the supplementary frame for carrying the engine and gear-box. The Renault car at £240 (6,000 francs) has a particularly fine appearance with its double phaeton seat and side entrance, whilst it can be obtained with a long chassis to accommodate a Coupe body for £316.

Automobiles Peugeot, of 83, Boulevard Gouvion, Saint-Cyr, Paris, are showing a 6 h.p. voiturette, which presents a very fine appearance in its coat of grey and white and its brown leather upholstery. The engine has mechanical valves and is fed through a self-adjusting carburetter. A fan is placed behind the radiator, which is of the honeycomb type. The clutch is rather small, but is no doubt efficient, because few makers have had longer experience of motor design than Messrs. Peugeot. The power is

TRANSMITTED TO A LIVE AXLE

by means of a propeller shaft, three speeds and reverse being obtained through a lever working on a quadrant on the steering pillar. The frame is of pressed steel riveted at the angles, the supplementary frame being tubular. With a double bucket-seated body the little Peugeot is priced at 3,950 francs



The 8 h.p. Minerva.

A two-cylindrical 10 h.p. chassis is also shown by Messrs. Peugeot, the price, with tyres, being £312. A train of gears at the forward end of the engine drives the governor, the magneto machine, the pump, and the current distributor, which latter is conveniently mounted in a sloping position and is rotated by bevel wheels. The gearing is on the sliding pinion principle, the gear-box and the differential casing being bolted together, the power being taken from the cross-shaft by side chains. The side brakes are of the internal expanding type and are particularly powerful. To the chassis on show there are fitted patent friction-plate buffers, which check the oscillation of the semi-elliptic springs. These buffers are recognised to be thoroughly sound and practical.

Minerva Motors, Ltd., of Antwerp and London, are showing a Minervette and two chassis, one of the single-cylindrical 8 h.p. and one of the 14 h.p. four-cylindrical models. The little Minervette has already been fully described by us, and therefore we need not go over the details of this—one of the cheapest cars in the Show. Whilst the Minervette is small and moderate in price (£108), it compares very favourably, in the matters of efficiency and reliability, with many even more ambitious attempts that have been made in the past to produce a cheap car, and a large sale is to be anticipated for it.

THE 8 H.P. MINERVA

has a governed engine, with mechanically-operated valves. A very good notion is introduced on the starting handle: on its shaft is a cone which, when the handle is pushed in to engage the crank-shaft, lifts a lever, which, through a system of rods and levers, opens the compression tap, thus relieving the compression for starting. The pump is gear-driven through a chain and sprockets; a very large fly-wheel is employed, with the ordinary cone clutch. The gearing gives three speeds and reverse, and thence the power is conveyed to the differential on the countershaft (the gear-box and differential case being in one), and thence by side chains to the road wheels. The frame is of wood, with

steel fitch plates, the dashboard being supported by two large cast aluminium brackets. The steering gear is well designed, concussion springs being introduced on the horizontal rod. The 14 h.p. four-cylinder car is a very fine piece of work, and should attract a considerable amount of attention. As has already been stated, the sole concessionaires for the Minerva cars in England are Messrs. C. S. Rolls and Co., of Conduit Street, W., who are prepared to give trials to any potential purchaser.

A handsome two-seated car is being exhibited by Gregoire and Co., of Poissy. Of taking design, and thoroughly well made throughout, it has impressed a large number of visitors who favour this type of vehicle. It possesses an

8 H.P. TWIN-CYLINDER ENGINE

(80 mm. by 110 mm.), the features of which are that the valves, plugs, carburetter, etc., are placed in very accessible positions under the bonnet, the shape of which is arch-like. Three speeds and a reverse are provided (direct drive being on top speed), and the transmission is through a metal-to-leather clutch of large diameter, universal joint, gear-box, and from the driving shaft by two chains to the rear wheels, which are in possession of internally expanding brakes worked by a side lever. A third brake operates on the driving shaft, this being actuated by the pedal engaging and releasing the clutch. The control is extremely simple, two pedals, two side levers, and two hand levers constituting this. Ordinary wheel steering has been adopted, and also the high-tension system of ignition. The radiators are carried in front of the bonnet, as in the Mercedes, and the water is circulated by means of a gear-driven pump. A two-way switch is attached to the dashboard, as are also sight-feed lubricators leading to the engine and change-speed gear mechanism. In connection with the engine, we may add that the exhaust is carried to a large silencer which is fitted behind and parallel to the rear axle. The body is nicely finished, and has buckets, etc., and the price, £175, is very cheap considering the value offered. The carriage work is a good feature of this car.

Light Cars— Contd.

A beautifully-made little car is the Helle, constructed by Messrs. Léveque and Bodenreider, of 10, Rue de la Mairie, Boulogne-sur-Seine, Paris. It has an 8 h.p. De Dion engine driving through a jointed clutch-shaft. By the removal of a divided piece (entailing the removal of but six bolts) the clutch, with its spring and

SHAFT, CAN BE TAKEN OUT FOR ADJUSTMENT

or re-facing, the operation being one of but a few minutes. The power is communicated direct on the top speed to the propeller shaft and the rear live axle, the second motion shaft of the gear-box lying directly above the first shaft. The frame is of pressed steel with outside rear springs, which are connected at their aftermost ends to a transverse semi-elliptic spring. The brakes are all of the internal expansion type, the pedals are of the modern push style, whilst the dashboard carries the coil, manometer, voltmeter and lubricators. The radiator is combined with a tank and is shaped in a series of curves which suggest a graceful bonnet (this latter not being fitted to the chassis on view).

The Compagnie Française des Cycles et Automobiles, of 6, Rue Francoeur, Paris, show a smart 9 h.p. car with a tonneau body, which is priced at £200, a smaller two-seated car being made at £40 less. The engine is a De Dion, three speeds and reverse being provided, the drive on the top speed being direct. The frame is of wood, strengthened by a fitch plate, long dumb irons, and long semi-elliptic springs being employed. The car is of sound construction and possesses one or two up-to-date features such as push-forward pedals and control on a quadrant

above the wheel. The front seat beside the driver is hinged so as to give access to the rear double phaeton seat.

Messrs. H. P. Rochet et Cie., of 23, Avenue des Champs-Élysées, Paris, have a couple of voiturettes of the cab type. One is entirely enclosed, the driver sitting and controlling the car entirely from the interior, the other has an extra seat on the front (the chassis being extended for the purpose) for the driver. The former is priced at £128 and the latter at £152. The engine is 4½ h.p. water-cooled and is placed at the rear, driving direct on to the differential through the gear, which gives a choice of two speeds and reverse. These little cabs are simple in method and management and should be useful for the medical profession.

The Oldsmobile Co., of Detroit, U.S.A., have earned a reputation on the Continent for turning out one of the best of American-built cars. The chief features of the exhibit include the Phaeton Touriste car and the Phaeton Oldsmobile. The former car has a most symmetrical and pleasing outline with two bucket seats and roomy footboard. The appearance of this car is further improved by a handsome bonnet—although the engine is placed at the rear under the seats. The engine is 7 h.p. horizontal cylinder and has a large exterior fly-wheel. There are two speeds forward and a reverse. The steering is by inclined pillar and wheel. The tanks and radiator are fixed under the bonnet, and the coil is now placed on the dashboard. The capacity of the petrol tank is approximately 2½ gallons and water supply 3 gallons. The wheels are of the artillery pattern.

THE PHAETON OLDSMOBILE

is a simple type of car with a 7 h.p. engine. There is no bonnet provided, the tanks being mounted on the rear end of the chassis and accessible by raising a

cover at the rear of the seats. Steering is by a front tiller. A special feature of the Oldsmobile is the method of springing by long transverse springs clamped to the frame and an elliptical cross-spring to support the front axle. The ignition on both cars is on the high tension make and break principle. The speeds consist of two forward ones and a reverse.

M. J. B. Mercier, 6, Rue St. Ferdinand, Paris, is showing a little 9 h.p. Elegante, and also a 16 h.p. car. The engine of the smaller is a De Dion or a Tony Huber, at the choice of the purchaser. The car is practically similar to the 6 h.p. French cars which have been so largely imported during the past year or so, but it has the higher-powered engine, side radiators as introduced by Renault, a double bucket-seated body with a hood and a glass screen. The drive is through a cardan shaft, with three forward speeds and reverse. The car is very well planned, and the maker assured us that he was turning it out in such quantities as would allow him to sell it at 3,200 francs (£128) complete as shown—a statement which was not altogether easy to believe.

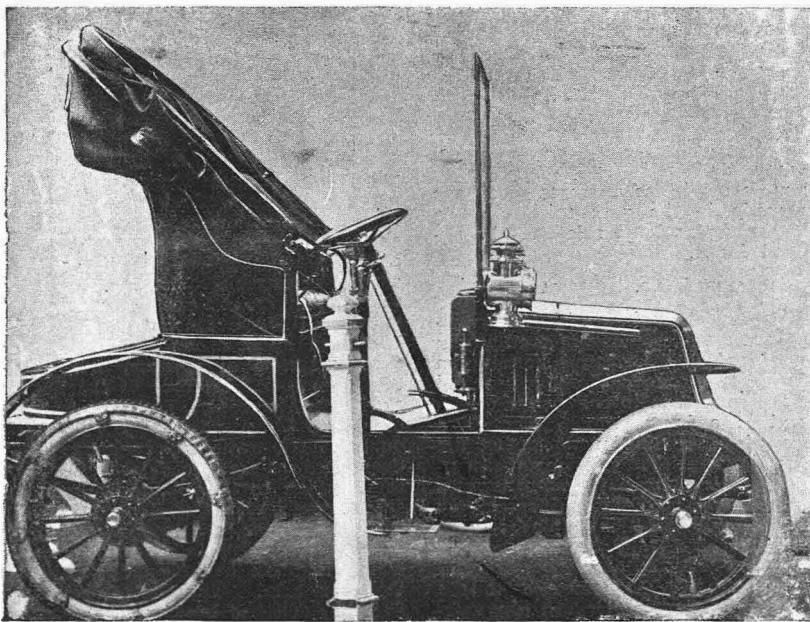
The Automobiles Motobloc, of Bordeaux, are showing an exceedingly well-finished chassis of the 10 h.p. Motobloc car, which we so fully described in our last issue. The pattern for 1905, which was the one to which we devoted our description, is

THOROUGHLY WELL DESIGNED,

and is full of excellent details, many of which were dealt with last week. In the chassis form one can gain an exceedingly good idea of the thoroughness with which these details have been carried out. The brake-work particularly strikes one, and also the axles, driving gear, and steering mechanism. The oil tank, which is carried on the front of the dashboard below the bonnet, has a gauge glass in the front panel, and there is a connection through the dashboard to the sight-feed lubricator placed in a position convenient to the driver's hand. Quite a new model is the four-cylindered Motobloc, with vertical engine: the fly-wheel is placed at the forward end of the crank-shaft, close to the radiator, and the crank-case of the engine and the gear-box form one complete casting, the clutch—of the metal-to-metal type, and only nine inches in diameter—being enclosed, and running in oil. The rocking tappets for the inlet valves are mounted eccentrically upon a long spindle across the heads of the four cylinders. By means of a lever on the steering pillar, this spindle can be revolved, thus increasing or decreasing the height of the fulcrum of the rocking tappets and varying the opening of the inlet valve.

A SHORT PROPELLER SHAFT

transmits the power to the differential on a countershaft, whence side chains take it to the road wheels. The pressed steel frame apparently taken (its longitudinal members and the three cross-members) from one sheet of metal, is a particularly fine piece of work. The new four-cylindered vertical-engined car will, we feel certain, create as good an impression as has the original sloping-engined Motobloc.



The 9 h.p. Mercier.

Light Cars
—Contd.

The Wolseley Tool and Engineering Co., Ltd., of Birmingham, show three chassis and a landaulette. The one which strikes the attention first is the 6 h.p. light Wolseley with a vertical engine and a live axle. The engine bears the Wolseley stamp, the water-jacket and upper part of the crank-case being one casting. The head of the engine, with its water-jacket and valve chest is a separate piece. The engine has an equal bore and stroke of 4½ in., and is designed to run normally at 800 revs. The fly-wheel is external, and contains an internal clutch, actuated by the left pedal. The valves are mechanically operated, a rocking bar, pivoted on the inlet valve dome and operating the valve, being actuated from the two-to-one shaft. The pump is driven direct from the same shaft, from which also the commutator is operated through bevel wheels and a vertical shaft, so that the commutator is brought into a most accessible position. The pump is well designed, being removable with little trouble. The drive is direct on to the first motion shaft in the gear-box, the second motion shaft, with its sliding pinions lying below it and communicating the drive through a cardan shaft to the differential on the rear axle. The shaft and the axle are completely encased with aluminium—a particularly nice piece of work.

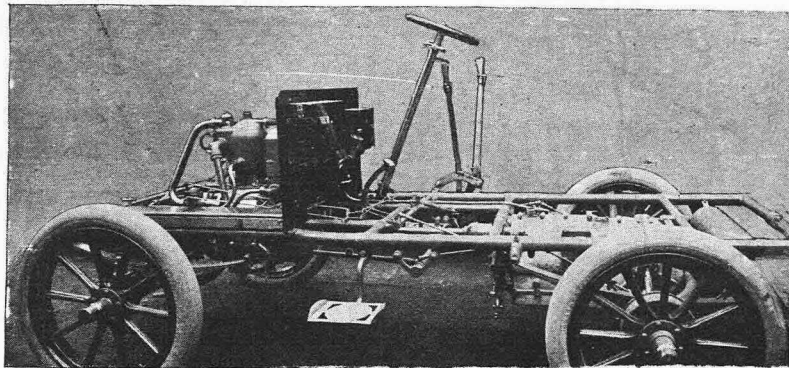
THE CHASSIS OF U-SECTION STEEL,

with long dumb irons to the rear springs, which are external and of exceptional length. The foot-applied brake acts upon a drum on the cardan shaft, and the side brakes on drums on the rear wheels. The engine, crank-case, and gear-box consist of two castings secured together so as to form a complete screen, the gaps at the sides being covered with sheet aluminium. The large casting is then rigidly attached at its rear end to each side of the frame of the car and is supported in a central hanger on the front member of the frame, thus giving three-point suspension and permitting the frame to whip without binding the bearings. The radiator and tank are com-

bined. The side brake lever is arranged to pull up, whilst the pedals are designed to push forward. The petrol tank is carried on the front of the dashboard below the bonnet, which will be jointed. The steering-wheel is dished, and control of the engine is brought to the steering pillar. The box on the front axle, which has always been a Wolseley feature, has now given way to the Panhard system of steering. The throttle has been arranged to act when the foot brake is applied. Altogether, the new vertical-engined Wolseley is a most creditable piece of work, and is moderately priced.

then ready to engage with the first notch it meets. Thus, it is impossible to overrun one's gear in changing. The new 8 h.p. car takes the place of the old 7½ h.p. car. Altogether the Wolseley exhibit is an extremely fine one.

Messrs. De Dion-Bouton, Ltd., are showing the 6 h.p. voiturette on a supplementary stand under the gallery, and the 8 h.p. car on the main stand. The latter has been altered in certain particulars. Thus, the engine has been enlarged, having a bore of 106 mm. and a stroke of 120 mm., whereas last year's engine was



The new 8 h.p. De Dion.

The horizontal-engined 6 h.p. Wolseley shown has no new features, but a new model is the twin-cylindered 8 h.p. car with horizontal engine.

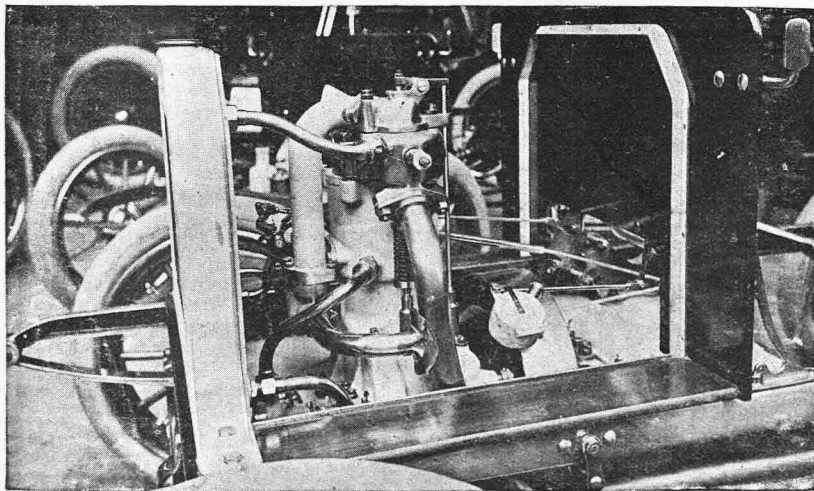
THE ENGINE IS OF THE NEW TYPE

without central bearing to the crank shaft, the cranks driving on one crank pin, so that there is an impulse every revolution. The drive is by central silent chain to the gear-box, which is in one with the casing to the differential and countershaft, whence the power is conveyed to the road wheels by side chains. This car has the new gear-lever quadrant. A thumb-piece on the handle releases a trigger on the quadrant, which is immediately caught and held by a bell-crank lever. On the gear lever being moved forward a cam on the top of the quadrant moves the bell-crank lever and releases the trigger, which is

106 by 100. The fly-wheels have also been considerably enlarged. A new contact breaker is now employed, which gives a plain make and break, and is claimed to be perfectly regular in action. For starting purposes a trigger is brought to the exterior of the frame above the starting handle. This being pushed in introduces a small cam, which slightly relieves the compression through the exhaust valve just before the firing moment. The same effect is secured when the brake pedal is depressed, so that the engine is automatically throttled when the brake is applied. An entirely new form of clutch is employed on all De Dions of 8 h.p. and upwards. Inside the clutch drum, which is keyed to the crank-shaft, there is a fixed ring having small blocks of graphite let into it. A disc bolted up to the first motion shaft of the gear floats between this ring and another similar one which is kept up to its work by a dozen small spiral springs, the plate thus being gripped between the two rings. The act of depressing the clutch pedal pulls back the free ring, and so releases the clutch.

THE DEVICE IS REALLY SIMPLE

in itself, and looks much more complicated than it is. The control of the engine is brought to the steering column, very neat levers on small quadrants being employed. The gear-box and differential are in one, three speeds and reverse being given. The frame is tubular, and the cardan live axle, with a curved fixed axle, is employed as usual. The brakes are designed to be adjustable by the turning of three butterfly nuts, those on the road wheels being of the internal expansion type. The clutch pedal is placed on the right, De Dions having adopted that position on all their cars. The price of the tonneau car is £234, and with a double



Motor of the 8 h.p. Wolseley. Close view.

Light Cars
—Contd.

phaeton seat, the front seat pivoting to afford an entrance to the rear, is £244.

The 6 h.p. voiturette has not been altered, except that a three-speed gear is employed instead of a two-speed, and the whole of the clutch and change-speed mechanism has been made stronger. The second and third speeds are obtained by means of the handle lever on the steering column, the first speed now being obtained by depressing a pedal and putting the change-speed lever over to third speed position. The reverse is secured by the movement forward of a side lever, the change-speed lever being in third-speed position.

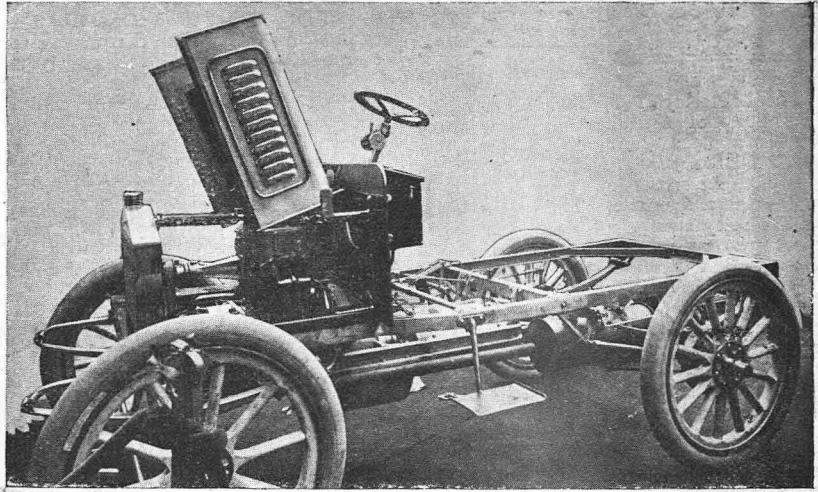
A SECOND PEDAL APPLIES A BRAKE

on the propeller shaft, and a side lever applies side brakes. Engine control is brought to the steering column through upright columns as before. The 6 h.p. De Dion has not been altered in any other essential detail, but the compression release, which is effected when the brake is applied, has been perfected. The price of the car in France is now 4,450 francs, or £178.

M. Alfred Dinin, of 2, Quai National, Puteaux, is showing three electric cars, the method being similar all through, but the bodies differing. They are shaped exactly like petrol cars, with a false bonnet in front of the dash. The batteries are carried two-thirds on the body below the seat and one-third upon the bonnet, and will drive the car 100 kilometres at a speed of 30 kilometres per hour. The control is obtained through one pedal; when fully depressed it applies a brake on the rear wheels, and as the pedal is released

THE POWER IS INCREASED

until at top speed the foot can be removed from the pedal. By means of a two-way switch on the steering wheel, the current can be cut out or switched to the positions for forward movement and for reverse. An arrangement blocks the switch so that the current cannot be switched on unless the pedal be depressed. The price of the car, with large wheels and double bucket seats, is 6,000 francs (£240). Supplementary side brakes are fitted.



The 8 h.p. two-cylinder Cottereau.

M. Geo. Richard, who has now entirely separated from the firm of Georges Richard-Erasier, which he founded, is now established as Georges Richard and Co., of 108, Rue Saint Maur, Paris. He is devoting his attention to cars of the small type, and shows a neatly-finished chassis of the 12 h.p. car. It has a governed two-cylindered engine cast in one piece, and has mechanical valves placed, the exhaust on the left side and the inlet on the right side of the engine. The valve caps are held in place by yokes, as is also the exhaust pipe casting.

THE CARBURETTER IS WELL DESIGNED, being self-regulating. On the starting-handle shaft a lever system is introduced, so that as the handle is engaged with the crank-shaft the ignition moment is retarded. Magneto ignition is employed, the machine being mounted for accessibility, the pump is gear-driven, and the radiator is of the honeycomb type. The clutch is large, and direct drive is provided on the top speed, the gears being of the sliding type. A pressed steel riveted frame, with long outside springs, is used. Interior brakes are employed throughout. The work all through is good, and the design excellent. The price of the chassis only, with tyres, is 6,500 francs (£260), the body being at purchaser's wish.

Messrs. Denis and De Boisse, of 38, Rue Chauzy, Paris, are showing a car bearing their patent methods of communicating the power to the live axle. The gear-box and differential are the axle, and

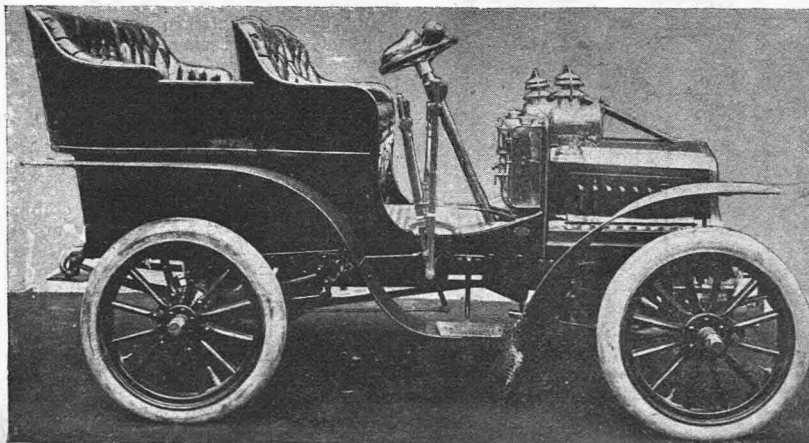
THE GEAR IS CHANGED

by means of four parallel rods, which engage and disengage the secondary shafts with the propeller shaft. The clutch is four-armed bronze to steel. The live axle can be drawn out, leaving the road wheels on the sleeve of the extra dead axle, and a certain amount of vertical play in the connections prevents any shock from the road wheels being transmitted to the differential. The car can be obtained with a De Dion or other motor of 6-8 h.p. for 5,600 francs (£224), body being an extra.

Messrs. Cottereau and Co., of Dijon, are showing a very complete range of models for 1905. The Cottereau cars can be had with engines of one, two, three, or four cylinders, the three-cylinder engine being

A PARTICULARLY NICE PIECE OF WORK, and one of the very few cars in the Show with that number of cylinders. The 7-8 h.p. Cottereau at £140 has a tubular frame, a well-shaped sloping bonnet, and a double bucket seat. Three speeds and reverse are given, the changes being effected by a single lever. Transmission is by a single chain to the rear road wheels. The engine has mechanical valves, and is governed on the inlet, all control being brought to the top of the steering wheel. A Longuemare carburetter is employed. This car sells at £180. The two-cylindered 8 h.p. tonneau-bodied car is a well-designed vehicle, and sells at £200.

Messrs. A. Lambert and Co., 27, Avenue de la Grande Armée, are showing a 9 h.p. car, driven by a single-cylinder De Dion engine, having rather a long chassis for a little car, so that, whilst ample foot room is given to the driver and the front passenger, the rear passengers can be seated with comfort. An internal cone clutch communicates the power through the gear-box, and thence the transmission is by propeller shaft, three speeds and a reverse being provided. The car is substantially made, and well finished for the price, £208.



Henroid single-cylinder Car.

ACCESSORIES AT THE PARIS SHOW.

The accessories are located, as last year, in the vast galleries and annexes, and so extensive are the exhibits that to take even a superficial view of them requires several hours. To find anything strikingly new is a task indeed. What there is new is mostly in the way of details. To take ignition fittings first: there are almost innumerable arrangements of spark-plugs, mostly with some simple device to prevent fouling of the points, or with an improved terminal connection. Numerous plugs are shown in which the parts can be readily taken to pieces for repair or replacement, but whether this is an advantage availed of to any extent is doubtful. The majority of motorists, it is fairly safe to say, would sooner put in a new plug complete than go to the trouble of replacing a broken porcelain. Coils remain much the same as before, but improved tremblers devised to vibrate at higher speeds and be as far as possible self-adjusting are numerous. Most of the best-known electrical firms in France, such as Bassée-Michel, Lacoste, Guenet, Bara and Pascault, Chauvin and Arnould, etc., show high-tension magnetos with distributors for firing two or four cylinders.

A VERY COMPACT TYPE FOR MOTOR-BICYCLES,

weighing 5lb. only, is shown by Bara and Pascault. Accumulators innumerable are shown in all shapes and sizes. The Schmidt light-weight accumulator, which was described in our last issue, is well to the fore, and is evidently a type very popular in France. The well-known firm, Alfred Dinin and Co., have a fine display of electrical fittings, which includes some capital lines in instruments and charging sets. Primary batteries for charging accumulators at home are particularly conspicuous.

The use of small electric lamps for illumination purposes on cars is extending, and, as evidence of this, many firms show dashboard lights, tail lamps, lamps for

inside of canopies, etc. Various forms of contact breakers are to be found in almost endless profusion. Lacoste and Co. show a four-cylinder type brush contact, self-lubricating, and fitted with a glass cover for inspection. The tendency in carburetter construction is clearly in the direction of making the air control self-adjusting. The Longuemare stand is one of the most extensive as far as this accessory is concerned. The 1905 model is shown, in which

AN IMPROVED AIR REGULATOR IS FITTED.

Several carburetters are to be found which are made to vaporize paraffin. The Sthenos, Vauvs, F.N., and other well-known makes are all shown. In lamps a most extensive variety is to be found. In the acetylene headlights improvements are in the direction of more powerful lenses and reflectors, and the adoption of separate gas generators. Several lamps are shown which can be used with compressed acetylene. The Ducellier Co. have, as an attraction, a very powerful electric searchlight, which projects its rays the full length of the vast building. The Bleriot stand is also a very fine display. In general accessories such as tools, pumps, horns, jacks, oilers, etc., nothing strikingly novel is to be found. Brown Bros., of London, have a large stand in a prominent position in the gallery, on a section of which they have a good show of general accessories. The Bowden Co. also have an effective display of Bowden wire control mechanism. There is shown on a stand away back in the annexe a rather valuable invention in the shape of an unbreakable glass window for mounting on the dashboard of a car. Plenty of cars have ordinary glass shields, it is well known, but there is undoubted serious danger of accident. In fact, several have occurred in which the driver and passenger, owing to a collision, have got pitched through the window. The unbreakable glass has a fine

wire network as a base, and, although it might crack,

THE WIRE HOLDS IT FIRMLY TOGETHER.

The firm showing this is the Cie de St. Gobran, Place des Saussaies, Paris. Markt Bros. show a new dashboard distance recorder, in which an instrument of the cyclometer type fixed on the dashboard is connected by a flexible shaft with one of the front wheels through a piece of gearing. The electrical speed indicator of Chauvin and Arnould is a most effective little device, and enjoys much popularity in France. Although, strictly speaking, not an accessory, mention might be made here of a nickel-plating set shown in the annexe. This is a simple set for home use, by which a piece of rusty mechanism can be nickel-plated in a very short time without having to send it away to the platers. There are two bottles of solution, one for plating the part with copper, and the other for putting on a coating of pure nickel quite equal to regular plating. The tyre display is a vast one, and it conveys the impression that tyre-making is one of the greatest of the French industries. There are a large number of solid and semi-solid tyres shown, most of which have improved methods of fixing. The cellular principle of tyre construction is well represented, and one firm shows a solid tyre with a very soft and porous centre, which gives it

A SURPRISING DEGREE OF FLEXIBILITY.

In the ordinary pneumatics less attention seems to be paid to making the covers with non-skidding mouldings, doubtless because most people prefer to have leather and steel studded bands vulcanised on. The Michelin Co. have a big attraction on their stand in the shape of a huge goblin or figure representing a pile of Michelin tyres. This figure is inflated with gas, and floats about in a most uncanny manner.



A view of the exterior of the Grand Palais during the Paris Show.

MOTORCYCLES AT THE PARIS SHOW.

The motorcycle exhibits this year are, if anything, more numerous than last, and many interesting features are to be found. Nearly all the firms of any note have adopted some form of spring fork for reducing vibration, and there can be no doubt that the problem of how best to get over the bugbear of vibration has received serious consideration on the part of the French makers. The devices adopted cannot, in many cases, be said to improve the appearance of the machine, but they all have the element of efficiency to a greater or less extent. In some instances both wheels are insulated by springs, which, of course, is a step in advance of having the front wheel alone insulated. Chain-driven machines are still in a great numerical inferiority to the belt-driven, nine out of ten machines having the V section belt. Several smart ideas in free engine clutches are shown, and a larger proportion of machines than last year have magneto electric ignition of the high-tension variety, but FULLY 90 PER CENT. OF MACHINES RETAIN THE COIL.

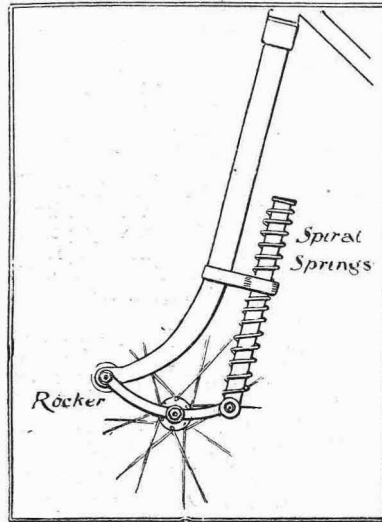
In the matter of weight, it cannot be said that French makers have made special efforts to turn out a featherweight, but excessive weight is certainly not a predominating feature. The average $2\frac{1}{2}$ h.p. machine scales between 95 and 110 lb., and even high-powered twin-cylinder machines of 4 to 6 h.p. do not exceed 140 lb. in any instances. The twin-cylinder machine seems to be installing itself as a favourite type in France, for the number of these shown this year is greatly ahead of last year. Doubtless this is because a higher average speed is possible than in England on account of the long, straight, and comparatively deserted roads in that country. The popularity of long-distance running in France has called for larger petrol tanks. Those fitted in many cases hold three gallons. In the way of brakes, THE BAND BRAKE SEEMS TO BE THE MOST POPULAR

type, and it is noteworthy that nearly all machines have two brakes. For general finish, the English manufacturer is far ahead of the great majority of French makers. Sound work in engine and frame and high speed seem to be the main considerations. Adjustments and control arrangements are a weak point in the French machines. In carburetters a few attempts have been made to fit automatic or self-regulating types, but on the whole the ordinary type predominates. Tri-cars are by no means numerous in the Exhibition, and it is quite evident that the ENGLISH MAKERS HAVE PRACTICALLY THE WHOLE TRADE

in this class of machine. Perhaps a dozen or so are to be found. The idea of the "Avant train" came from France, and it is certainly surprising how French makers have neglected to develop it. The machines shown mainly have separate attachments, the fore-car bodies being wicker work, and the frames lacking the important main side tubes as adopted over here. Only in two or three instances have two-speed gears been adopted.

IN THE MATTER OF RACING MACHINES, the French are far ahead of us, as they manage to get as much as 10 and 12 h.p.

on a machine scaling under 110 lb. These machines are geared very high, about 1 to $2\frac{1}{2}$ being the usual ratio. An idea that seems to have been well developed by the French is that of providing an auxiliary exhaust passage to the engine. They do this by making a port near the end of the stroke. A series of baffle plates are arranged to trap any oil blown out, and the port is simply joined on to the main exhaust pipe. The tremendous speeds French racers get out of their engines certainly seems to show that there is something in this idea.



Spring Fork on Georgia Knap Motor-bicycle.

A very interesting machine is shown by Legosier and Co., 106, Boulevard Voltaire, Paris. The engine of 3 h.p. is mounted so as to drive by a propeller shaft and thence by bevel gear.

A CLUTCH OF LARGE DIAMETER with fork spring and engagement (just as on a car engine) is used. The driving shaft is carried through one of the horizontal stays, this being re-inforced at the wheel end. A very novel spring fork is also fitted: the wheel axle is carried on a short rocker to which is fixed one end of a flat coil spring, the other end of the spring being clamped on to the end of the main fork: when running over rough ground the spring is tightened up: it is in fact a coiled suspension spring.

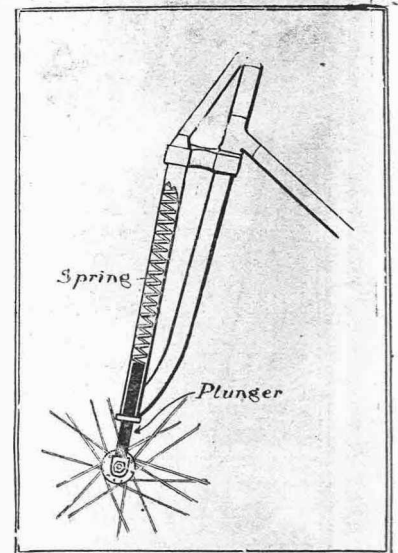
Lurquin and Coudert, 19, Rue Planchette, Paris, show a series of well-finished mounts of 3 h.p. The transmission is by V section belt, and the ignition by high tension magneto with gearing cased in. The engine has mechanical valves, and a special cut-out is fixed on the exhaust. Control is effected by levers on the handlebar. The front forks have spring suspension, the arrangement consisting of a duplicate fork pivoted on the main fork and acting against a spring in a tube mounted in front of the steering column.

Minerva Motors, Ltd., of Antwerp, exhibit a very wide range of their productions, in which their celebrated motor-bicycles stand out prominently. Perhaps

the most interesting in this category is the $3\frac{1}{2}$ h.p. model fitted with magneto ignition, the very appearance of which denotes great speed abilities.

THE ENGINE, WHICH IS FITTED VERTICALLY into a strongly-built cradle, has mechanically operated valves, and the other well-known Minerva features. A Longuemare carburetter sprays the petrol, and the new double-eccentric rocking bar drives the magneto—a feature which was fully described in our Stanley Show report. The machine is amply provided with brakes, there being a back-peddalling brake and another acting on the belt rim. The spring forks which attracted so much attention at the Stanley Show are retained, and the head is strengthened by twin stays. Long handle-bars are fitted, and the machine (which is built entirely on the well-known Minerva lines with which our readers are thoroughly acquainted) cannot fail to maintain the reputation of this important firm. The new 6 h.p. twin-cylinder engine, which was seen at the Stanley Show, is also shown.

Terotot and Co., Dijon, have some interesting models. Chief amongst these is a machine having flat belt transmission. The engine and rear pulley are about equal in diameter, being about six and seven inches respectively. The shaft of the rear pulley drives an internally toothed ring connecting to the rear wheel hub, and thus a positive drive is obtained. The driving belt is about $1\frac{1}{2}$ inches wide. The engine is $3\frac{1}{2}$ h.p., vertical, and with the usual coil and accumulator ignition, and spray carburetter. A powerful double-acting cable rim brake is fitted on the rear wheel. No front brake is used on account of a new type of spring fork used. This consists of a duplex fork, one being of the usual oval section blade. The other one is a round tube about one inch diameter. The front wheel is secured to a pair of plungers or pistons acting against springs in each side of the tubular fork. The arrangement looks mechanically correct and neat. Other Terrot models have V



Terrot Spring-forks.

Motorcycles
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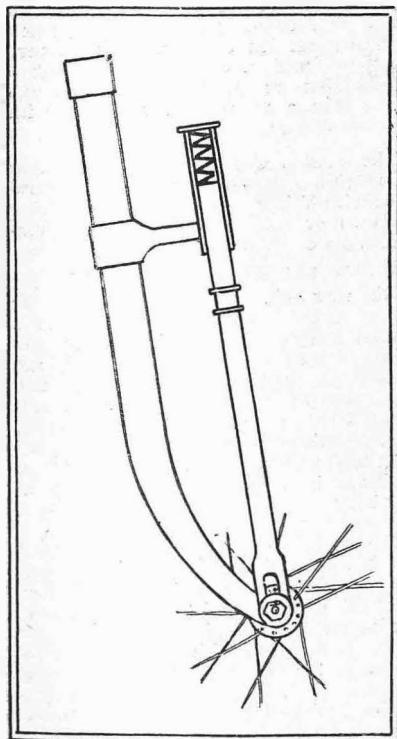
belt transmission. One machine has twin cylinders, V belt transmission, and spring forks, and the new Longuemare carburetter. All these machines are well equipped as touring mounts, but look rather heavy.

More than a dozen motorcycles are to be found on the stand occupied by the makers of Werner machines. These include the 2½, 2½, and 3½ h.p. models which were exhibited recently at the Agricultural Hall. Of these the most taking machine is, we think, the 3½ h.p., which we have already fully described. The engine has twin-cylinders (these being parallel to each other and cast together), and the inlet valves are now automatic—the mechanically-operated ones having been abandoned: the free engine pulley is also retained, and a new rim brake adds to the control efficiency. The spring forks which we recently illustrated are a feature of the machine, as is also an electrical controller for regulating the speed. Undoubtedly, the 1905 Werner motor-bicycle is an admirable production, and well worthy of the consideration of those about to purchase new machines.

The Société Anonyme Constructions Mécaniques de la Loire show the Automoto cycles.

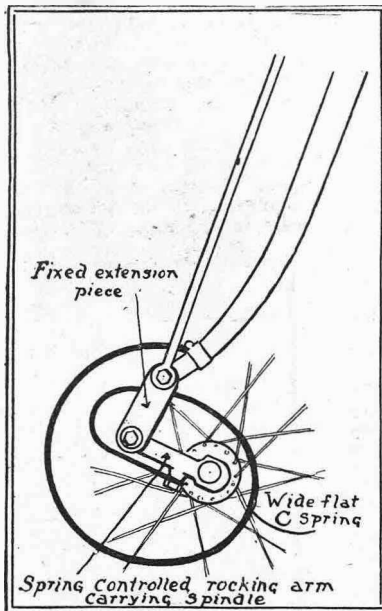
THESE ARE POWERFUL MOUNTS

with 4 h.p. engines, air-cooled. Transmission is by V belt, and the usual accessories are adopted. A novelty introduced in this machine is a spring front fork; which does not, however, by any means improve the look of the frame. The wheel is carried in a supplementary fork, at the upper end of which is a plunger acting



Spring attachment on Automoto motorcycles.

against a spiral spring carried in a tube supported direct from the fork crown. The ends of the main forks have slotted plates brazed on, and in the slots the front wheel axle moves.



Spring fork—Legosier machines, referred to on preceding page.

Gayon and Co., Rue Danton, Levallois, stage about 20 Magali motor-bicycles. This machine has recently accomplished some excellent performances in road and track races. The transmission is by gearing and then from countershaft by chain. The gearing is cased in by an aluminium cover. A clutch is provided on the large gear wheel, this being actuated by a lever mounted on the horizontal tube.

THE SPECIAL NOVELTY

about this machine is the spring front fork. The action is obtained in a curious manner: the main forks carry a bearing at the end for a supplementary horizontal pair of forks which can rock on the bearing. These forks extend back to the mud-guard and look like, and in fact serve as, tubular mudguards stays. The springs are fixed in a curved tube inside the mud-guard, and the end of the fork carries a stop which presses against the springs. The coil box is clipped to the steering column. Two rim brakes are fitted on the back wheel.

Lamaudier, Mauger, and Co., Levallois Perret, show the Audax machine in numerous types. These are mostly fitted with vertical engines of the 3 h.p., and V belt transmission. The outside fly-wheel of engine originally made by this firm appears to have been abandoned, as all the engines shown have inside fly-wheels.

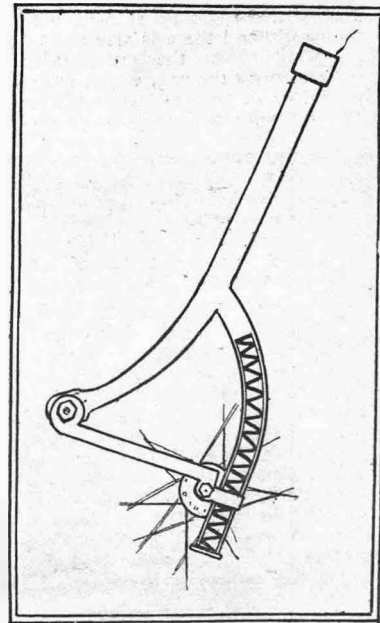
A CURIOUS ARRANGEMENT

on one racing machine shown is an extra exhaust passage near the end of the stroke. There is an exhaust pipe bolted on and some arrangement for trapping the oil provided: this extra pipe joins the main pipe. A new spring fork calls for special mention: the main fork branches off into two arms, the forward one carrying a rocker at the end of which the wheel axle is fixed, the other arm containing a spiral spring; a projection on the rocker

engages with it: the arrangement seems to give a good action. The brakes used act on the back wheel rim and belt rim. Several types of spray carburetter are shown, but the Longuemare type predominates. The engine is supported at the cylinder head by four bolts screwing into it: the main supports are on the crank-case. A feature calling for comment is the scarcity of radiators on the engine, there being only four, spaced wide apart. One machine has the Griffon spring fork fitted.

Buchet and Co., 15, Rue Greffulhe, Levallois, show some 4 h.p. machines with Buchet engines. Both valves are mechanically operated by outside rockers. These machines are obviously for racing purposes, as the saddle pillar is simply an extension of the horizontal tube of the frame. Transmission is by V belt, and the carburetter is of the Vours spray type. One brake only is used; this acts inside the belt rim and is actuated by Bowden wire. One machine is fitted with the Griffon type spring fork.

Bruneau and Co., Tours, have specialties in motorcycles with combined water and air-cooling for the motor. A 3½ h.p. bicycle and a 3½ h.p. fore-car with chain transmission have some interesting features. The back chain wheel has a spring centre to absorb the engine shocks. On the outside of the free engine clutch drum a band brake, actuated by Bowden wire, is fitted. The water tank is placed in the fore-part of the frame and holds about one gallon. Two neat radiators are mounted alongside the tank. The circulation is on the thermo-syphon principle. The head alone of the engine is water-cooled. The fore-car frame has no stays running from the front cross tube to the rear axle, as is considered the best practice in this country. The carriage has open sides on a tubular frame; and the brakes consist of one on the engine clutch and a back wheel rim brake. A very strong chain is supplied. High tension ignition and F.N. spray carburetter are also fitted. Illustrations appear on page 530.

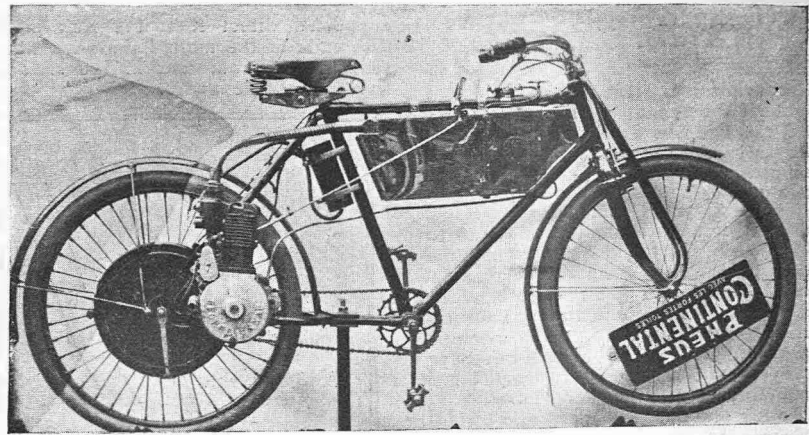


Spring attachment on Audax motorcycles.

Motorcycles
-Contd.

A well-made 4½ h.p. water-cooled engine bicycle is shown by L. Bonin, Paris. There are no pedals, but footplates are provided. The radiator and tank are mounted in the fore portion of the tank, and is arranged on the thermo-siphon principle. A novel type of clutch is fitted on the engine shaft, worked by vertical rods and handles from the top tube of the frame. The ignition is on the usual high-tension principle, and drive is by a flat belt. The engine is arranged to be started by a handle on the engine shaft. A racing machine shown has the same engine as the touring machine, but the frame is of a different type, the saddle being arranged over the centre of the rear wheel. The steering handles are brought right back in a long sweep. The transmission on this machine is by chain, and has the free engine and clutch, as in the other model. Duplex forks and extra large tyres are special features of this machine.

Georgia Knap, Troyes, stages a series of Knap motorcyclettes built on the direct drive principle through spur gearing. The engine is mounted on one side of the back wheel by a clamp on the stays. A small spur gear on the engine shaft engages into a large spur gear connected to the back wheel hub. This gear is in two parts, an outer and inner ring being connected by springs to render the drive less harsh. A gear-case encloses the spur wheels. The engine is the usual pattern, but none of the models have silencers proper, the exhaust valve box being enlarged and perforated. A rather obsolete type of surface carburetter is used, connecting to the engine by a flexible metal tube. A novelty shown on one machine is a spring fork. The main fork is curved rather sharply at the end, and carries a pair of rockers to the centre of which the wheel axle is fitted. The free end of the rocker moves against a spiral supported against a stop brazed to the main fork, and there is also an additional spring above the latter, acting against a stop on the rod, which is fixed to the end of the rocker. It is, in fact, like two springs acting in opposite direc-



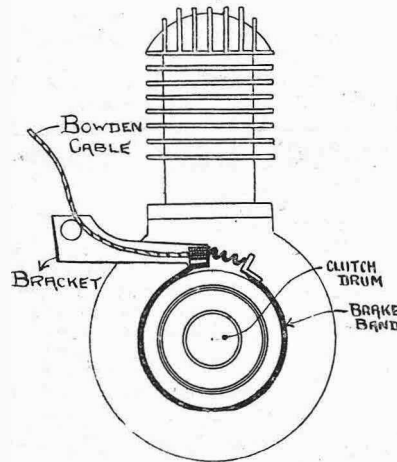
The Knap Motor-bicycle.

tions. It looks an effective device. The Knap machines are made in several powers from 1½ h.p. to 2½ h.p.

The Brilliant motor-bicycle shown by

worked by a Bowden wire calls for attention. The Griffon type spring fork is fitted.

A very light racing machine, fitted with a 5 h.p. Buchet engine, is shown on the Alcyon stand. It is fitted with a very capacious tank for long-distance work. A special feature are the tyres, which closely resemble the first Dunlop tyre made in 1889, being canvased on to the rim. A neatly designed twin-cylinder 5 h.p. touring machine is also shown here. The cylinders are inclined with the carburetter placed between them. Both exhaust valves are arranged to lift together. Two brakes are fitted on the back wheel, one being a metal-to-metal band brake, and the other acting on the belt rim. A single cylinder machine shown has a 2½ h.p. engine with high-tension magneto ignition and Simplex spring fork.



Band Brake on Clutch Drum of Bruneau Engine.

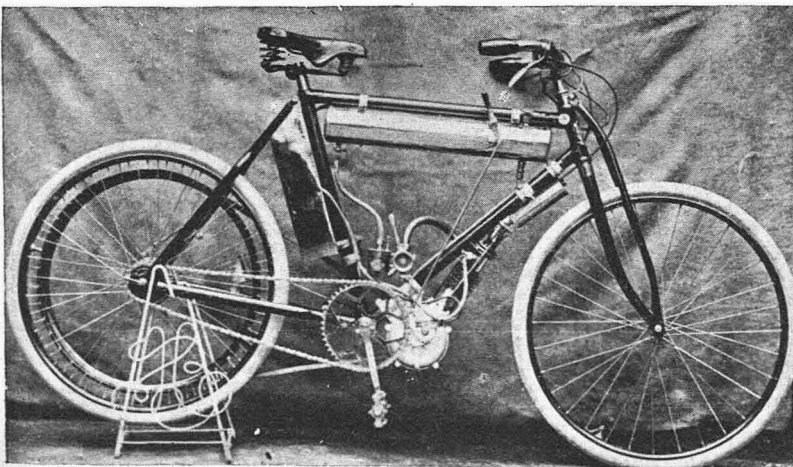
F. Brosse and Co. is built on standard lines with vertical engine, spray carburetter, coil ignition and V belt drive. A rather neat metal-to-metal band brake

On the Liberator stand are shown a series of nicely-finished machines fitted with the Sarolea engines. Some have magneto ignition. Two very effective band brakes are fitted. A 6 h.p. machine shown has a twin-cylinder engine with transmission by V belt.

The Griffon Company stage a number of machines mostly built on standard lines with V belt transmission, and either magneto or coil ignition. All the machines have

A NEW DOUBLE-ACTING BAND BRAKE on the rear hub. An 8 h.p. twin-cylinder racing machine with V belt drive is a special feature. The frames of the machines shown strike one as being unusually strong, especially the front forks, which are of the duplex type. Several spring forks are shown. The magneto is most ingeniously concealed in a compartment of the tank, and drives by a vertical shaft and bevel gear from the two-to-one gear-box.

The Werner Company show their new fore-car with a two-cylinder engine of 4 h.p. The front axle is suspended on elliptical springs, and the frame strikes one as an original piece of work. The engine is mounted with its shaft at right angles to the frame, and gears direct to a countershaft having a two-speed gear of the double-clutch variety, thence the drive is by chains to sprockets on each side of the rear hub. The clutches are pedal-operated. The engine is arranged

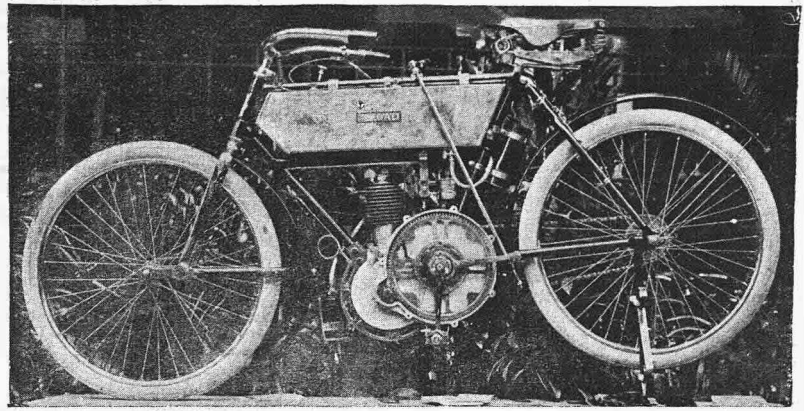


The Hurdle Bruneau Light-weight.

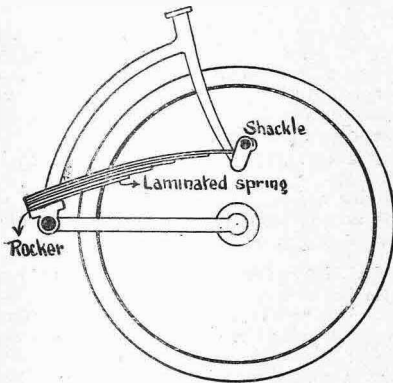
**Motorcycles -
Contd.**

to be started by a strap. Handle-bar steering is fitted. The fore-carriage is coach-built with brass edging giving it a smart appearance.

The Peugeot Company have an interesting display. In the centre of the stand is a 12 h.p. path racer scaling 100 lb. or so, and which has made some famous records, having touched 70 miles per hour. It is geared as high as 2 to 1. Very light path racing tyres are fitted, and a miniature torpedo-shaped tank on the top tube carries petrol. The standard mounts comprise a moderate weight 4 h.p. twin-cylinder and 3 and 4 h.p.



The Magali machine with combined gear and chain drive. This machine has accomplished some fine speed performances in France, and is described on page 529.



Spring suspension on La Francaise machines.

single cylinders. A neat magneto ignition drive arrangement is shown on one machine, consisting of an enclosed shaft and bevels. Special features are the small number of radiating fins on the engine, a curious bottle-shaped silencer, tanks of very large capacity, and the Truffault suspension spring forks. The finish on these machines is much better than the average on French-built mounts.

A light-weight mount with 1½ h.p. engine is shown by A. Brossard. The engine is placed inside the frame, being clamped between the main down tube and an extra tube running parallel to it. In the angle formed between the top tube and diagonal a triangular-shaped petrol tank is fitted. The transmission is by a chain to a compact two-speed gear arranged on the pedal shaft bracket. The gears are put into action by pawls engaging with a ratchet worked from the top tube. From the gear shaft a chain runs to the usual rear sprocket.

The Hurdle and Bruneau feather-weight machine is practically the same as the one exhibited at the Stanley Show. It has a very small 1 h.p. engine driving by V belt. The frame and general equipment is practically the same as on an ordinary bicycle. This machine scales 55 lb. and is intended for light work and pedal assistance on steep hills.

The Rochet standard touring mount is certainly one of the best constructed mounts in the Show. It has a 3½ h.p. engine with high-tension magneto ignition gear driven. The transmission is by V belt. A special feature of the machine

consists in the construction of the belt rim, this being separately spoked to extra flanges on the wheel hub. The brakes are of a new type, two acting on the rear wheel, one of which is a powerful double-acting band brake, and the other a belt rim brake with rubber blocks pressing in the belt groove, both being actuated by Bowden wires. Spring forks are fitted. A notable contrast with other machines is the large number of radiating fins on the engine cylinder and head. Both valves are mechanically operated.

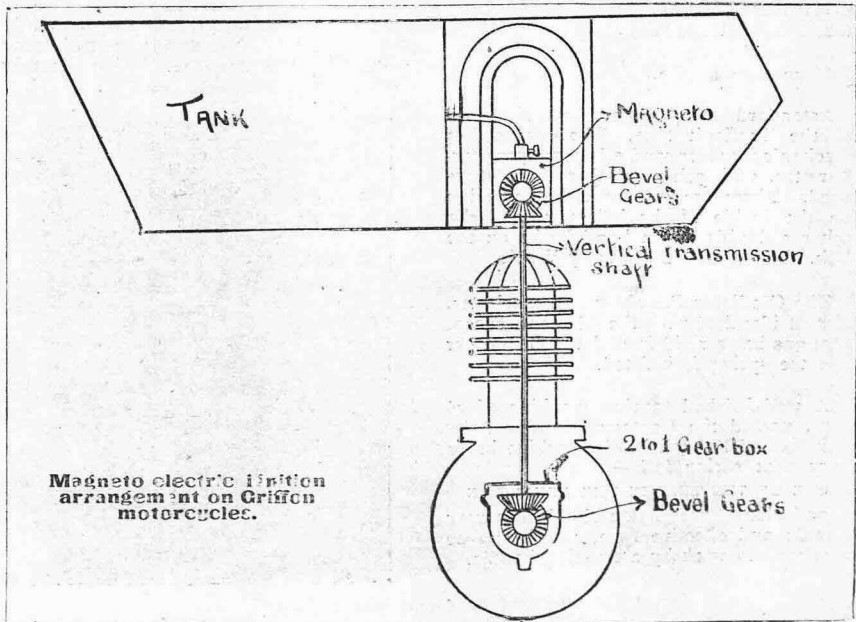
A neat-looking mount with a 4½ h.p. water-cooled engine is shown by L. Baillet, Levallois. The cooling tank and radiators are in the fore-part of the frame. The tank has two parts, the top and bottom section being joined by a large number of thin square copper tubes so arranged that the air can freely circulate. A novelty on the engine is a combined inlet and exhaust valve. Two ignitions are provided, viz., magneto and coil. Transmission is by belt.

The machines shown on the Georges Richard stand are practically identical

with those on the Rochet stand, which has just been described.

A notable feature of the La Française stand is a 6 h.p. twin-cylinder machine with V belt drive. The tank is a very capacious one, holding nearly three gallons petrol. The front forks have a spring suspension of a novel type. The wheel is carried at the ends of horizontal forks, the other ends being pivoted on a bar supported by two curved tubes running from the fork crown. A flat laminated spring connects the curved tubes and main fork. One end of the spring is rigidly fixed to the horizontal forks so that when the wheel is pushed upwards by an obstacle it tensions the spring, which thus takes up the shock. It seems a very effective device.

Some fore-carriages are shown by Chauvin and Co., 47, Rue Richard Lenoir, Paris. These are of the detachable order, the only special feature being the strong construction of the frame. The front axle has a tube of large diameter running from the centre, curving upwards, and fixed by a clamp to the head tube.



Motorcycles
—Contd.

Motocyclettes Stimula show a range of machines with spring suspension for front and rear wheels. The arrangement consists of plungers or pistons connected to the end of the forks and acting against springs fixed in tubes held by brackets. In other respects the machines follow the general practice, except that a new arrangement of belt rim brake is fitted. This is actuated by back pedalling. A fore-carriage with single-gear belt drive is shown.

Chielus and Co., 5, Place Pigale, Paris. The front axle is suspended on flat springs, and the frame is very rigid. The main support for the engine is made of channel steel, and is extended to the back fork, to which it is brazed. The fore-car is clamped on what is practically a separate frame bolted to the central main tube. The engine is a 4 h.p. Aster. A very capacious water tank is fitted behind the fore-car, and the radiators are placed below it.

Amongst the machines shown by Rene Gillet, 10, Villa Collet, Paris, is a fore-carriage having a very large clutch arranged on the rear wheel. The belt rim is spoked separately to a flanged drum,

wheel. The drive is by a pinion on engine shaft engaging with an internally toothed wheel. The inventor appears to have copied to some extent the old Singer principle. The frame is a hideous design, being a mass of tubes, connecting rods and levers.

J. Quentin, Levallois, shows a number of engines from 2½ to 6 h.p., some being water cooled. A well-finished racer, with 6 h.p. engine and V belt transmission, is a special feature. A very capacious tank for long distance work is used.

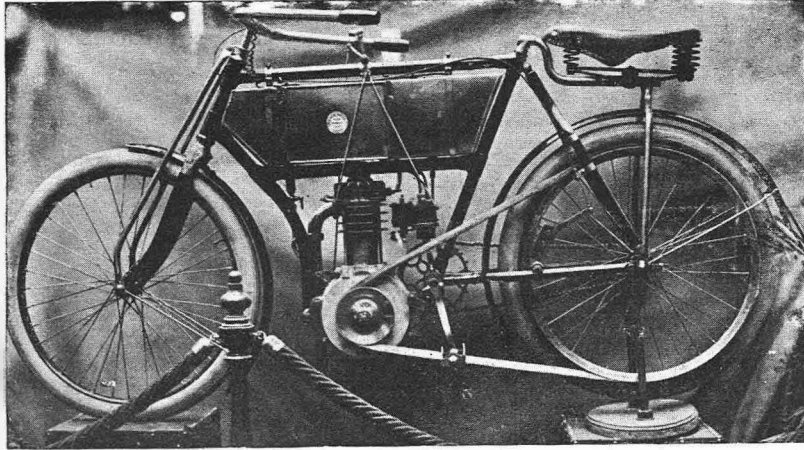
A. and G. Morelle, 12, Avenue Grand Armeé, Paris, have a special line in a 3 h.p. water-cooled machine. The tank and radiators are placed in the fore part of the frame. The rest of the equipment is on usual lines. A 6 h.p. air-cooled engine machine, with twin cylinders, looks a very speedy mount.

A racing mount is shown by Lurquin and Coudert. This is an 8 h.p. twin-cylinder machine, very compactly arranged, and scaling about 100lb. The transmission is by V belt. There are no silencers fitted, but

THE EXHAUST PORTS ARE UNUSUALLY LARGE

to give a free passage to the gases. The cylinder is also drilled at the end of the stroke to give a freer exhaust.

La Motosacoche or "motor set in a case" is shown by La Touricyclette Co., 22, Avenue Grand Armeé, Paris. This is a popular arrangement on the Continent for converting an ordinary cycle into a motorcycle in a short time. The whole equipment is compactly fitted up in a metal case which can be readily clamped inside a diamond frame. The engine is 1½ h.p., and is mounted on the slant. The radiators, however, are horizontal, so as to catch the draught through an opening in the case. A neat spray carburetter is used, and the coil and accumulator are compactly fixed in the angles of the case. The control is effected by a Bowden wire moving the contact breaker. This set only weighs about 35lb., so that the machine complete should not exceed 65lb. The belt rim and clips are supplied with the set. Several excellent performances have been done on this machine.



Lemaudiere Motor-bicycle.

The N.S.U. Co. have a fine exhibit, the machines shown being identical with those fully described in our Stanley Show report. The fore-carriages on this stand are about

THE BEST DESIGNED IN THE SHOW.

A light pattern racing machine is, however, a new feature. This has the Eisenmann magneto ignition.

Clement and Co., Levallois, show a motor-bicycle, with 3 h.p. engine, built on standard lines, but with a spring fork of the Truffault type. The engine has mechanical valves, and a Longuemare carburetter, with self-regulating air inlet, is used. There are two brakes, one acting on the inside of the belt rim, and the other a double-action band brake on the hub. The transmission is by V belt.

The Gladiator Co. show two machines, almost identical with the Clement, except that one has a rigid front fork. The other has the spring fork fitted.

A well-finished touring machine of 3½ h.p., named the Centaure, is shown by Illinois and Bonnel. This machine has a very neat spring fork—

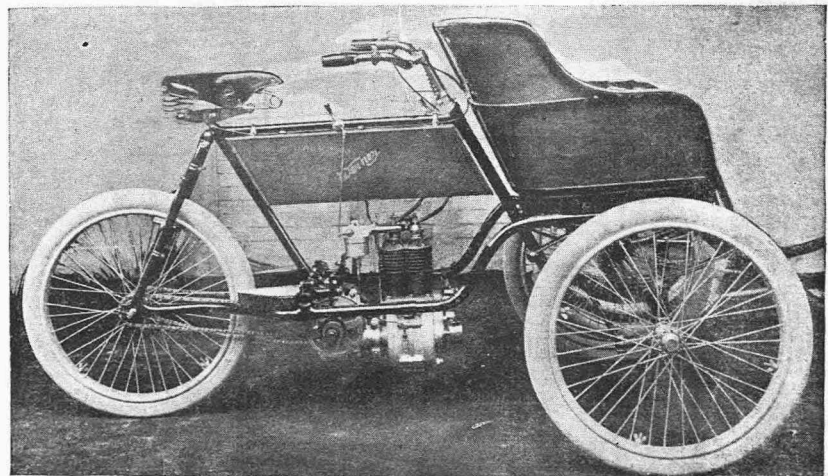
ONE OF THE BEST IN THE EXHIBITION

—and also a free engine clutch of a very simple and effective type, which can be arranged to work by a twisting handle.

One of the best-constructed fore-carriages in the Exhibition is that of E

which can be made to engage with a cone connected to the wheel flanges. Amongst the bicycles the novel features are an improved band brake and a tank of very large capacity, obtained by modifying the frame design. The diagonal tube is carried much further back than usual.

A weird-looking freak in motorcycles is shown on a nameless stand situated in the annexe. The motor, petrol tank and carburetter are fixed inside the rear



The Werner Tri-car. One of the very few tri-cars in the Show.

TENDENCIES IN BIG CARS.

It would not be at all correct to say that the present Salon exhibits any decided tendency in any new direction. There are no great changes, and there are not even any great experiments, the keynote all through being merely the one which has been struck every year—greater perfection in methods and details. One might almost say of big, high-powered, and luxurious cars that the novelty lies in the number of new makers, some of them being drawn from the ranks of well-known engineering concerns. In a few cases, of course, ordinary methods are simply copied slavishly by them; but, on the other hand, where extended engineering experience is brought to bear (as in the case of the new Belleville car), the result is exceedingly fine. One of the complaints that has been made in the past has been that motor designers were seldom engineers, and whilst this is obviously untrue, yet we cannot help wondering what the weight of the motorcar would have been had it been developed on engineering lines. No engineer, for instance, would ever have dreamed of using such small pinions for the transmission of power as are generally employed for motorcar work.

Very noticeable is the absence of the three-cylindered engine from the stands of the Big makers, whilst the six-cylindered car has not yet materialised at all in Paris. Many will learn with regret that Panhards are discarding their triple-cylindered model because it gave an even turning moment on the least possible number of cylinders, and when so important a firm drops anything, the lead is considered good enough for others.

THE EIGHT-CYLINDERED CAR

has also gone, so that the reign of the four-cylindered engine is not imperilled in the slightest.

Cylinders are being cast separately in more instances than before, whilst the T-headed engine (with a pocket for the inlet valve on one side and one for the exhaust valve on the other) is regarded as offering sufficient advantages to make up for the waste of energy entailed in the extra surface of the combustion space. Efforts are being made also to so shape the inlet and exhaust pipes that the valve stems and springs shall be as accessible as possible.

Many visitors had been led to expect, or had anticipated, some decided novelties in the way of metal-to-metal clutches, but the cone clutch still holds sway, although it has undergone its changes in the way of increased diameter and wider faces. In the Renault clutch a layer of rubber is placed between the leather and the face of the male member, in order to cushion the engagement of the clutch. The new clutch which is used on all the De Dion cars of 8 h.p. and upwards is one of the new metal-to-metal type, and besides creating a good impression upon the mind when studied theoretically, it is said to have also proved satisfactory in practice.

Panhards are now generally employing the multi-plate clutch used in their racing cars of the season just closed. This clutch runs in an oil bath, and its application can be so gradual that a car can start from a standstill on its high gear. Internal expanding clutches are only to be found on a small number of cars.

The De Dion-Bouton development to-

wards the big car has been particularly slow and cautious, yet in every other branch of the motor industry this company has shown wonderful enterprise, as is proved by the fact that it has about six exhibits all of an entirely different nature at the Salon. The four-cylinder De Dion is a very fine piece of work, and a vehicle that will gain many patrons. Amongst the many detail improvements which set in like a wave is the use of ball-bearings throughout a car, the crank shaft of the engine being usually the only part running on plain bearings. A new car bearing has been introduced by a German house, in which separators are used between the balls. The separator consists of a spiral of copper wire, enclosing oil-saturated felt, and thus, whilst face friction between the balls is eliminated, lubrication is being constantly effected.

THE HONEYCOMB RADIATOR

still holds its ground, many detail improvements showing among the various exhibits. One firm of radiator manufacturers, who have made a great success of the gilled tubes, have replaced the gills with a honeycomb nest, through which small copper tubes pass. The efficiency of forced draught was shown by a number of engines in the machinery section which were driving dynamos, the draught through the radiators being induced by fan. These engines were constantly in motion, and the cooling seemed to be ample, although the air in Paris was even mild at the time.

Some very fine examples of frame pressing were to be seen in the Show, the whole of the frame (side and cross members) and the bed plate for the engine and gear box being pressed out of a single sheet of metal. Complete screening of the machinery from dust and dirt is now an essential part of the design, and is not left to the supplier of accessories. Internal expanding brakes continue to grow in popularity, and simple methods of adjusting the brakes are provided in a few cases, notably on the De Dion cars, where a turn of a fly-nut will adjust a brake in a second or two. M. Charley has devised a pneumatic system where the engine keeps a reservoir charged with air at about 22lb. pressure to the square inch. By means of a small lever on the steering column this

air can be used to actuate expanding brakes on all four road wheels, the power being capable of perfect graduation, and the first movement of the lever disengaging the clutch.

THE CONTROL OF THE ENGINE,

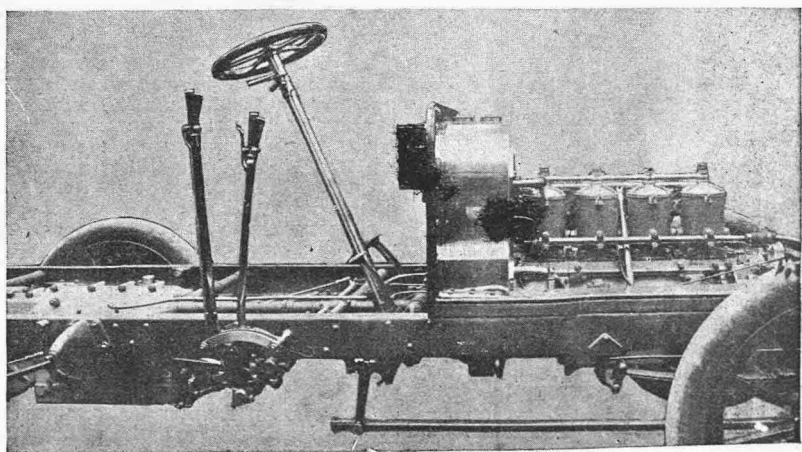
following Mercedes lines, is being brought to the top of the steering wheel, but we notice that the accelerator pedal is regaining favour, and is being used in conjunction with hand control. Moreover, there are many instances where the depression of the clutch or brake pedal either retards the ignition or throttles the gas supply. Devices are being added to the starting handle gear which give half compression, fully retard the ignition, or cut down the supply of gas so as to render the act of starting easier and safer. M. Charley uses his compressed air to start his engine when it has been standing so long that it will not start on the switch.

It will be seen that 1905 will witness no startling changes, but it will be possible to record that the forthcoming year was one of improvement and refinement in a multitude of details.

J. Garreau, Paris, shows a 4 h.p. motor-bicycle with spring forks. The arrangement consists of a double-rocking lever supporting the wheel and pivoted on the main forks. Pistons are connected to the ends of the lever, and these act against springs fixed in tubes clipped to the main forks. The silencer on this machine is a curious one, consisting of a flat box with a series of baffle plates inside. It looks neat, but it is questionable whether it would prove very effective, owing to the room for expansion of the gases being so small.

Amongst the many distinguished visitors to the Paris Salon on Saturday last we noticed M. Santos Dumont, the intrepid Brazilian aeronaut. He appeared to be greatly interested in the exhibits.

One of the attractions on the Continent next spring will be the automobile festival at Copenhagen. This will last a week, and will include races for cars and motor-cycles over the roads of Denmark. The exhibition part of the festival opens on March 15th.



Chassis of the 15 h.p. De Dion showing large water tank behind engine.



"Tri-cars at a Glance."

An interesting and useful pocket booklet.

Now in course of preparation. It will be sent free to applicants who enclose stamped and addressed envelopes.

Sir Hiram Maxim contributes an interesting article to the December "London Magazine" on "The Growth of Speed."

Messrs. Humber, Ltd., of Beeston, have placed their contract for the supply of accumulators for the ensuing year with the Prested Battery Company.

A Manchester correspondent writes as follows:—I have just received your book "Light Cars at a Glance," for which I thank you. It is most useful and interesting, and very handy to any motorist.

Those of our readers who have received a copy of the booklet "Light Cars at a Glance," are asked to note that on page 63 the following corrections should be made in respect to the 6 h.p. Wolseley car:—Frame, pressed steel instead of steel tubing. Wheel base, 5ft. 6in. instead of 6ft. 10in.

The catering arrangements at the Society of Motor Manufacturers and Traders' Exhibition at Olympia in February next will be carried out by Messrs. Lyons, who will supply luncheons, dinners, and teas in best style at popular prices. There will also be a grill room, popular room, etc., so that all requirements in this very important respect will be amply met.

Manchester M.C. Social Evening.

On Thursday evening of last week the above club held their second smoking concert and "social." One of the chief features of the evening was the presentation of prizes and certificates to the successful competitors in the 100 miles non-stop reliability trial and the hill-climbing competition. Nearly 100 members and friends turned up. A. R. Albert, Esq., the Quadrant Co.'s Manchester manager, occupied the chair. The prize-winners in the 100 miles trials were:—G. Brown, 1st (club special design gold medal); F. Bullock, 2nd (club silver medal); J. W. Leach, 3rd (club bronze medal). The following members also received neat special certificates for finishing the course inside six hours:—A. Wilkinson, R. Raines, J. T. Ward, J. Hall (fore-car), W. Smeddle, S. Howard, W. Andrews, D. J. Maitland, H. Tippins, J. Rees, J. Varden, A. Cliffe (fore-car), H. Brady, T. Kilfoy, F. Boden, and P. Withecombe. In the hill-climbing competition the prize-winners were:—W. Andrews, 1st (club gold medal, Lucas acetylene lamp, and silver vase presented to the club by Messrs. Humber, Ltd.); T. Kilfoy, 2nd (club silver medal); J. Fraser, 3rd (club bronze medal). The chairman has made an offer of a gold medal for the 1905 season for the member attending most club runs, which was greatly appreciated.

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The Development of Motor Traffic.

On Thursday, the 8th inst., the Hon. C. S. Rolls, M.A., delivered a most interesting lecture, illustrated by a number of lantern slides, to the members of the London Institution. The development of the motorcar was traced from the early efforts of the nameless inventor of 1649, who devised a clockwork vehicle, having its springs wound up by manual labour, and onwards to the machines devised by Sir Isaac Newton in 1680, Gusnot in 1771, Symington in 1786, Trevithick in 1801, and the early steam omnibuses of Gurney and Hancock, which were successfully used for passenger traffic in London and the country in 1830. Every phase of the subject with regard to modern traffic problems was touched upon in turn by the lecturer. As to light cars, he said, "The time was well nigh ripe when the public would be able to purchase a small, simple, reliable car for £100 to £150 that would carry three persons and travel at the rate of 20 or 25 miles an hour."

"Light Cars at a Glance."

We can still send copies of this booklet to applicants who enclose stamped and addressed envelopes.

The business lately carried on by the Regent Street Garage at 151a, Regent Street, has now been acquired by S. F. Edge, Ltd.

We would remind our South Coast readers that a meeting in furtherance of the organisation of a Sussex County Automobile Club will be held at the Ship Hotel, Brighton, on Jan. 28th, at 3 p.m.

A correspondent comments on the "Strong Man v. Car" turn at the Hippodrome as follows:—Judging from the illustration you gave in a recent issue I should say the secret lies in the way the man is attached to the car. Why does not he pull level with the car? Because the car would at once pull him over. What he does is to lift the hind wheels off the floor and so lessen their adhesion as much as he likes. Were it not so, would the tyres not be burnt in a few moments?

MOTOR CYCLING CLUB DINNER.

Most automobile dinners and banquets are dreary and unsociable affairs, and there seems a spirit of enthusiasm wanting. This we opine is because the industry is yet young in Britain, and those who foregather are not sufficiently intimate with each other. The third annual dinner of the Motor Cycling Club, held at Frascati's on Saturday last, was an exception and an improvement on this state of affairs. The very popular President, Mr. S. F. Edge, was in the chair; J. A. Jackson (captain), Ernest Perman (vice-president and chairman of committee), and C. W. Brown were in the vice-chairs, and round them were gathered

SOME 80 MEMBERS

and visitors, the latter including the Coventry M.C.C. (six or seven of whose members had journeyed to town specially), the Southern M.C., and the Auto-Cycle Club. Numbers of men prominent in the sport and industry of motoring were present, and everything went with a swing and éclat from start to finish. Mr. A. J. Wilson proposed the toast of the Club in a thoughtful speech, with touches of humour here and there. He classed the London to Edinburgh run in May last as the event of the motorcycling year. Mr. Edge replied, and was delightfully reminiscent. He reviewed the Club's achievements during the season, and said he thought members should only be encouraged to use motorcycles in the Club events, either two or three wheels, and that tri-cars were approaching ordinary cars. He suggested the consideration of club rooms, and then touched on the topic of the hour, the affiliation imbroglio. He was anxious to see the Club repre-

sented in the eliminating trials for the International motorcycle race. Music was interposed between the speeches during the evening. The toast of the officers and committee was proposed by Mr. E. J. O'Reilly. His remarks were a series of humorous quips and cranks aimed at motorcyclists. He mentioned that the hon. sec., Mr. Reeves, was going to resign at the close of the year. Mr. Jackson responded for his fellow officers, and announced that Mr. Albert Brown had expressed his desire to present another cup to the club next year. Afterwards a whole lot of prizes and certificates were presented to the successful competitors, the Coventry Club, winners of the inter-club trophy, receiving a cordial reception. Mr. S. H. Fry, in his usual happy style, gave "The Visitors and Other Clubs," and Mr. R. Todd replied in a weighty and useful speech respecting the position of the A.C.C. and its real intentions. The toast of "The President" was, perhaps, received in the most hearty manner of any. It was proposed by Ernest Perman, and drunk with musical honours. Mr. Edge, in reply, dismissed the past and talked of the future. He would be delighted to give £50 to be disposed of by the committee in the best manner possible in helping a club member to compete successfully in the trial for the international cup. He expressed himself very

KEEN ON AN ENGLISHMAN WINNING

aces abroad. Mr. J. W. Stocks later offered a cup to be awarded to the member who had done the most good in any way for the club during the season, the winner to be determined by the vote of all the members. So ended a most enthusiastic and enjoyable fixture.

NEWS.

The 4,000 Miles Official Trial.

The severe trial of the 16 h.p. Martini car, which has extended over three weeks, came to a conclusion on Wednesday last. It is only necessary to recall what the weather has been like during the time to show that the description of the trial as "severe" is more than warranted. During the past three weeks almost every possible variety of weather—snow, fog, frost, thaw, rain, and wind—has visited our islands, and yet the car, officially observed throughout, has surmounted all obstacles, and at last the long strain is over, and the trial stands out as a lasting proof of the reliability of the motor-car. The task of driving has been shared alternately by Capt. Deasy and Mr. E. G. Williams, and Mr. Basil Joy and Mr. Leonard Spong have been official observers, the latter covering 3,000 miles. The Oxford, Holyhead, Great North, Birmingham, Bath, and Exeter roads were selected for the runs, and 200 miles were covered each day. Sunrising Hill was ascended on two occasions. The official record shows that in 4,002 miles there were nine involuntary stops, most of these only being of a few minutes' duration. New pinions to the differential gear had to be fitted at Stratford-on-Avon owing to a side-slip in London having caused the car to strike the kerb, the shock breaking the pinions. The Dunlop tyres were in wonderfully good condition at the finish of the run, and despite the trying conditions of the roads, there was only one puncture, and a burst, caused by running over a broken bottle. We congratulate Capt. Deasy on the result of the trial.



The climbing of Eagle Rock Hill on Thanksgiving Day. One of the touring cars going up the hill.

Hill Climbing in America.

The New Jersey (U.S.A.) Automobile Club's fourth annual hill climb, held on Thanksgiving Day, attracted an enormous crowd of spectators, who, in consequence of an insufficient police cordon, interfered somewhat with the sport, and in one instance (where an elderly man crossed the road in front of W. K. Vanderbilt, jun.) robbed a competitor of his chance of victory. The climb came off, as usual, on Eagle Rock Hill, a gradient varying from 1 in 33 to just under 1 in 5; three sharp turns are included, one of them being one of the steepest pitches of the hill. A flying downhill start of 200 yards was given, so that cars were enabled to cross the starting line at racing speed. The fastest performance of the day was done by M. G. Bernin in a 60 h.p. Renault belonging to W. Gould Brokaw—1 min. 20 secs.; but it is probable that,

had W. K. Vanderbilt not been interfered with, as mentioned above, he would have got inside these figures, his actual time being only three-fifths of a second worse than Bernin's. Seven other cars got inside Vanderbilt's old record of 1 min. 36½ secs.

Motor-bicycles are doing good work on the road in South Africa. Even the natives are taking to them, a "nigger" having recently been seen out on a 3 h.p. Rover.

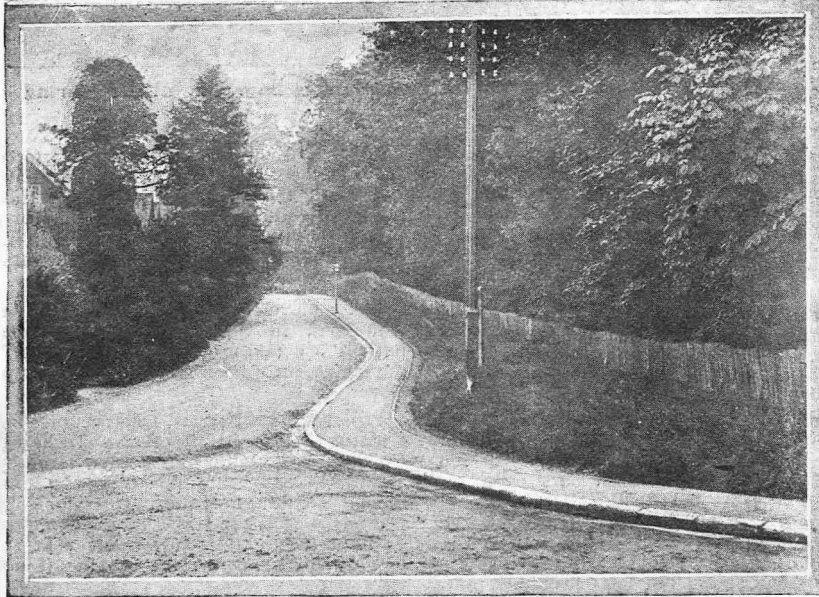
Professor von Borries, who occupies the "motor" chair at the Berlin Technical College, has begun the winter term by setting his students the following problem: To design a touring car for four persons, which can travel at 30 kilometres an hour over good roads rising 1 in 15. The Berlin institution is nothing if not up-to-date!



The Dinner of the Southern Motor Club, which was reported in our last issue.

NEWS.

The motor mail-van which runs nightly from the G.P.O. to Redhill caught fire last Tuesday and was destroyed. The van passes through Streatham about midnight, and it was here that, owing to some spilt petrol, it took fire. Luckily, the Streatham Fire Station was close at hand, and owing to the energetic efforts of the firemen all the letters and parcels were saved.



View of Grove Hill, Harrow, which the County Council want to close to motor traffic.

The Law and the Motor Trade.

We have received the following letter from Messrs. R. Reynold Jackson and Co., motor factors and engineers, of Brunswick House, High Street, Notting Hill Gate, W.—

"Without any warning whatsoever, and to our great astonishment, we were served recently with nine summonses for using cars with our trade registered numbers for the purpose of testing, also for initialing the driver in our record book instead of entering in his full name, and for entering our address as 'High Street, Notting Hill Gate,' instead of '11 and 13, High Street, Notting Hill Gate.' We were fined £19 7s., and were informed by the magistrate that a car, after completion, may not be again used for testing purposes. We have some thirty cars now completed, and before they are all sold it will, of course, be necessary to again run them in order to safely rely upon a satisfactory trial to a prospective purchaser. We would ask any man, blessed with common sense, if he thinks the law was intended to prohibit the manufacturer giving his cars a preliminary test before a trial? If a car has been standing a few weeks it naturally requires running to safely depend on its developing best results; and to do business at all it seems that the trade will be compelled to defy the law. Again, referring to our record book (which, as we thought, was kept in com-

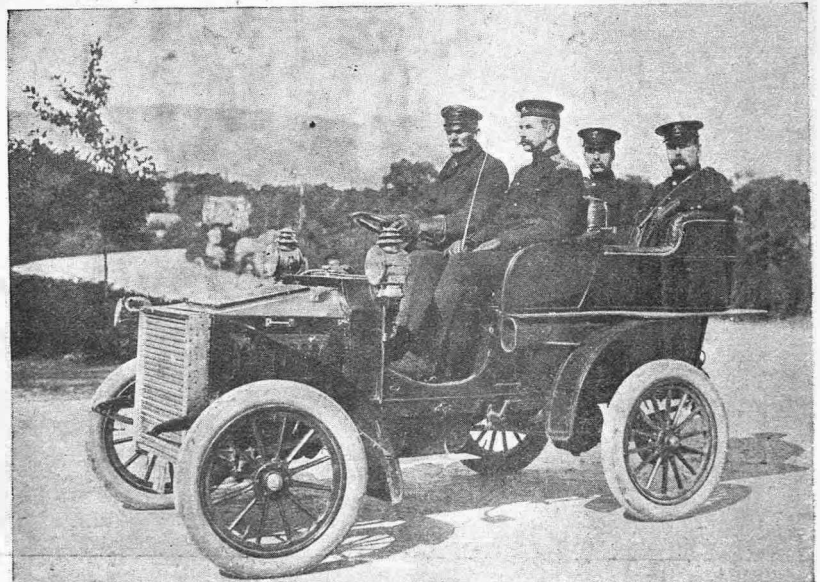
pliance with the regulations), we venture to say that if it was an offence it was the slightest technical offence, and we hope that our experience will put others on their guard for the meantime, until some steps are taken to remedy matters. If the Automobile Club or the Society of Motor Manufacturers and Traders make no attempt towards getting this state of things altered, we shall be only too glad to offer our support in any combination to negotiate an appeal to the House of Lords. We may add, in conclusion, that our licenses were endorsed nine times."

Long Island, New York, is to have a motor racing track. Several rich New Yorkers have combined to produce the necessary funds, and a track has already been planned. It will be 40 miles long and 80ft. wide, and will be on private property throughout.

Polar Excursions by Motor.

There have not been wanting ingenious individuals who have prophesied great things for the motor of the future, but it is probable that few have ever thought of applying motor traction in the efforts to discover the Poles. Engineer Lieut. Skelton, R.N., of the "Discovery," while lecturing at the London Camera Club on the 5th inst., gave it as his opinion that motor traction would be the power of the future, as a means of hauling sleds. By far the most important work in connection with polar expeditions is done by the sledging parties, and bearing this in mind, Lieut. Skelton argued that it became imperative to study the question of the most economical and efficient means of haulage. A man, or a dog, regarded as a sled-drawing unit, was, in fact, a piece of machinery, and it was patent that such machinery could only be kept going at enormous cost compared with the distance and work accomplished. The lecturer gave it as his opinion that there was really no insurmountable difficulty in the way of utilising motor power for hauling the sleds, although, of course, the matter would have to be carefully gone into, and exhaustive tests made before anything practicable could be arrived at. The advantages, he thought, were constancy of power and economy. A man or a dog soon becomes tired and worn by the strenuous exertion involved in hauling a loaded sled over rugged or precipitous ice and snow, and consequently their working efficiency becomes proportionately decreased, rendering progress slow and uncertain. There can be little doubt that the future will see some effort made in the direction indicated, and, although sentimental folk may revolt at the idea of doing away with the picturesque man-drawn or dog-drawn sled, the sanity of the adoption cannot be doubted.

The South-East Essex A.C. held their first annual dinner on December 1st at the Alexandra Hotel, Southend. The chair was occupied by Dr. Silva Jones, a pioneer motorist of the district.



Some members of the Hon. Artillery Co. of London motoring during their visit to Boston, U.S.A.

NEWS.

The editor of the "Automobile Club Journal" invites suggestions, not exceeding 25 lines, on the skidding question. But why allow even 25 lines: it is the "lines" which are responsible for the skidding trouble more than anything else.

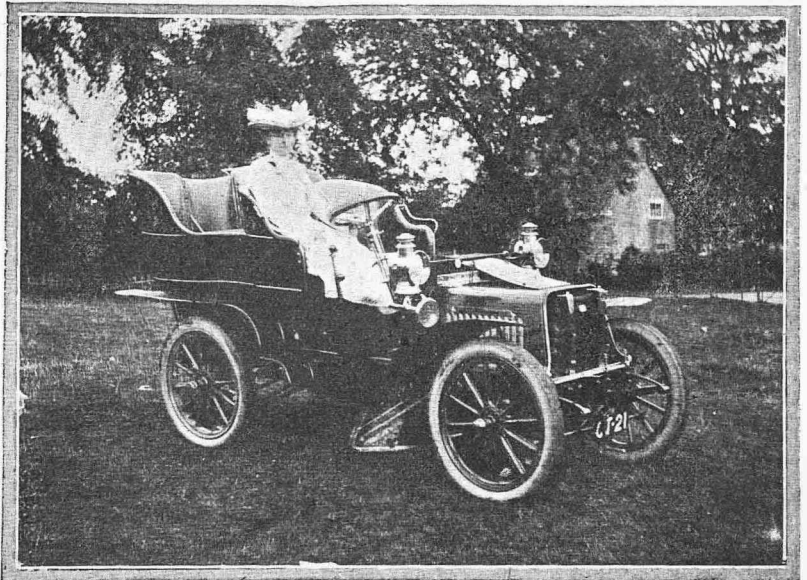
Messrs. F. Darton and Co., Clerkenwell Optical Works, 142, St. John Street, London, E.C., have just brought out a new illustrated list of electrical accessories for ignition purposes. They have special lines in coils, accumulators, voltmeters, lamps, charging dynamos, etc., well worth consideration, as the prices are very reasonable and the quality first class.

Rex Belt Guard.

This little fitting should be found exceedingly useful for protecting the belt of a motor-bicycle from mud and dirt. It can be attached to practically any machine on the market, and is manufactured by Rex Patents, Ltd., 3, The Exchange, Clapham High Street, S.W., who offer it at a reasonable price.

An Expert Lady Motorist.

The Hon. Mrs. Maurice Gifford, whose photograph we publish to-day, is one of the best known lady automobilists in Lincolnshire. For the past two seasons she has driven a 10 h.p. Sunbeam, and is very expert at the steering wheel. As an illustration of this, it may be mentioned that on the occasion of a driving contest in Lord Ancaster's park, at Grimsthorpe, during the past summer, she was a competitor, and steered her car to victory. Both she and her husband are strong supporters of automobilism. Once this season they organised some automobile sports at Boothby Hall, their place near Grantham, and invited the members of the Lincolnshire club to witness them. Mrs. Gifford is also an ardent disciple of other sports and pastimes. She is especially fond of hunting, and is invariably seen out with the Belvoir hounds. She is a graceful rider across country, and has seen many a good gallop with the pack. Her husband, the Hon. Maurice Gifford, has had the misfortune to lose his right arm, and that is probably one of the reasons why Mrs. Gifford is always seen at the steering wheel when she and her husband are riding together in their car.



The Hon. Mrs. Maurice Gifford, an expert lady motorist.

The Speedwell Light Cars: New Models.

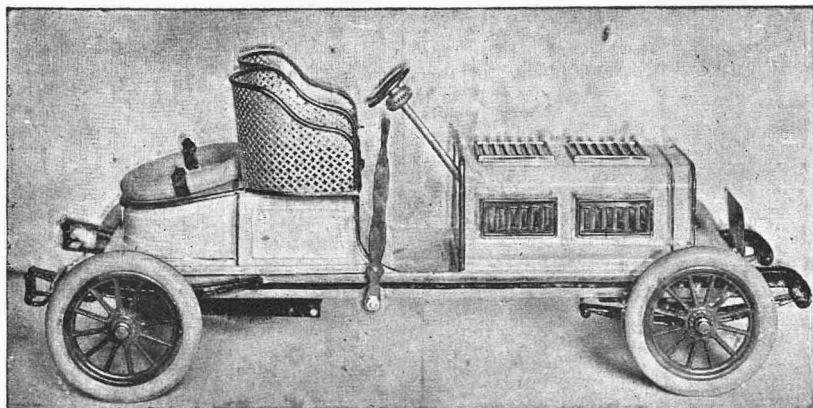
The Speedwell programme for 1905 is particularly promising, and as it is based upon the experience of the company (the Speedwell Motor and Engineering Co., Ltd., of 151, Knightsbridge, London, S.W.), with light cars during the past two seasons, it is a proof of the soundness of our advocacy of the popular motor vehicle. The whole of the Speedwell series of cars have been entirely remodelled, and are being specially built so that it will no longer be possible for anything like the Speedwell to be purchased elsewhere, the designs and some of the patent appliances being exclusive to these cars. The 6 h.p. light Speedwell, at 125 guineas, will be driven by the smallest of the new Speedwell motors, with mechanical valves and automatic carburetter, and rotary commutator placed high up for easy inspection and adjustment. The engine will be governed, will have a gear-driven pump, and will be covered by a folding bonnet. The radiator is an entirely new design, and as it is used throughout the range of Speedwell models it will soon become as noted as the Mercedes honeycomb radiator. It consists of gilled tubing, arranged

diamond fashion, so that there will be a large body of water in the four tanks which surround the radiator. This car will have two speeds and a reverse. The 9 h.p. light Speedwell, at £160, will be a larger reproduction of the 6 h.p.; whilst, with three speeds and a tonneau body, its price will be £210. The 10 h.p. light Speedwell, at £260, will have a two-cylinder engine, three speeds, control brought to the top of the steering wheel, push pedals, external springs to the rear axle, and a tonneau body. The touring models are the 12 h.p., two-cylinder, with long chassis, at £325; the 18 h.p., four-cylinder, at £500; and the 25 h.p. at £590. The first-named will have a wood and steel frame, and the others stamped steel frames: they will also have a special patent axle, which embodies all the advantages of the live and dead axles. Their gears also run on balls. Large tyres are fitted, and in all cases special bodies by one of the best makers are fitted. We fully expect that, with such a wide range of models, and with such improved qualities in the cars, the Speedwells will gain a splendid name in 1905.

Messrs. Webster and Co., of the County Motor Works, St. Albans, have acquired the premises recently occupied by the Ormonde Cycle and Motor Co., in Wells Street, Oxford Street, London. These premises contain storage room for over 100 cars, and will make a very capacious garage. The St. Albans business in secondhand cars, repairs, etc., will be carried on as usual.

The Government of Motorcycling.

The Motor Cycling Club has addressed a circular to all the motorcycling clubs of which the address could be obtained on the question of an association which shall be a representative governing body of motorcycling. The M.C.C. circular points out that it is fully in accord with the scheme of a governing body, but thinks that such body should be paramount, and not subordinate to the A.C.G.B.I., as is proposed in the Auto-Cycle Club's scheme. The M.C.C. deprecates any spirit of antagonism to the A.C.C., and expresses its willingness to co-operate in the formation of a truly representative governing body.



A CLEVER MOTORCAR MODEL.

This is an excellently made clockwork model stocked by Hope Brothers, Ludgate Hill; it would make a splendid Christmas present for a boy.

NEWS.

In Dahomey the motor-bicycle is called "the bicycle which goes by itself and fires guns all the time."

The German colours will again be defended by Baron de Caters in the forthcoming Gordon-Bennett race. At the Daimler works a car of 130-140 h.p., capable of travelling at 180 kilometres an hour, is being built for him.

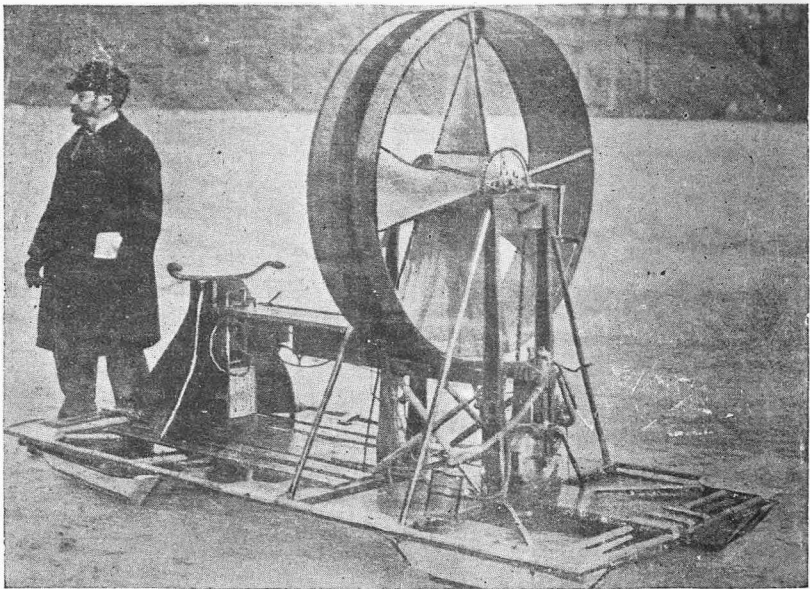
Lanfranchi, the crack motorcyclist who holds the standing start world's mile motorcycle record at 57½ secs., and the flying kilometre at 29½ secs., is still confined to his bed at the Boucaut hospital, but is making very satisfactory progress. It will be remembered that he fell while travelling at the rate of 60 miles an hour in a race at the Velodrome d'Hiver on November 6th.

Henri Cissac, the present holder of the world's hour motorcycle record at 54 miles 1,058 yards, will, before the end of the season, endeavour to ride 100 kilometres (62 miles 246½ yards) in the hour on the Parc des Princes track. This is indeed a big order, and means beating a mile a minute all the way. He has had a special machine built for the purpose, and in a recent trial reeled off mile after mile inside 60 seconds. Cissac paced Darragon in his recent world's hour motor-paced cycle record.

South Wales Gossip.

The new premises of the South Wales and Moonmouth Auto Club are in every way more convenient and advantageous than their old headquarters. Beside the excellent club-rooms, there is a garage with space for about 40 cars. Members of clubs all over the country will have the free use of this garage providing they reciprocate this privilege. Motor volunteers can also make use of it. Sir W. T. Lewis, Bart., is the latest member enrolled.

There has been a lot of talk lately about forming a motorcycle club in Cardiff. These rumours have at last been verified, and a meeting of the organisers was held at the Rumner Hotel, Cardiff, to start the ball rolling.



The Aeropinion attached to sledge.

The Aeropinion: A New American Idea.

A new appliance for motor vehicles has been brought to our notice in the shape of the Aeropinion, an invention which hails from Brooklyn, New York. It consists of a large fan of special shape and design, capable of being rotated by the usual motor. It is claimed that by the aid of the Aeropinion a vehicle may be elevated vertically through the air, or may be propelled at enormous velocities along the road, across ice, or over any surface, solid or liquid, loose or firm. Briefly put, the principle of the Aeropinion is that it converts an air current into power, so that (theoretically) the faster it goes the more power it develops. By fitting two or more of the fans power is proportionately increased. The inventor claims that it will perform the threefold functions of automobile, launch, and ice boat, excelling in versatility of purpose all other vehicles combined. Some of the results already achieved are given, as follows:—The first car run on the road weighed 1,250lb., and covered 16 m.p.h. with only 5 h.p.; and the first car run over ice weighed 850lb., and covered 20 m.p.h. with only 2½ h.p.

A car for navigation of the air, furnished with a 10 by 5 ft. elevating, and 52 by 10 in. propelling Aeropinions, together with frame, shafting, motor etc., weighing 1,056lb., may be elevated vertically through the air 1,000 ft. in 16 minutes, and maintained at such altitude or propelled in any direction desired without kite, balloon, wing, aeroplane, rudder, or any other contrivance, by the use of 20 h.p. of a 30 h.p. gasoline motor. Our illustrations show the device attached to car and sledge.

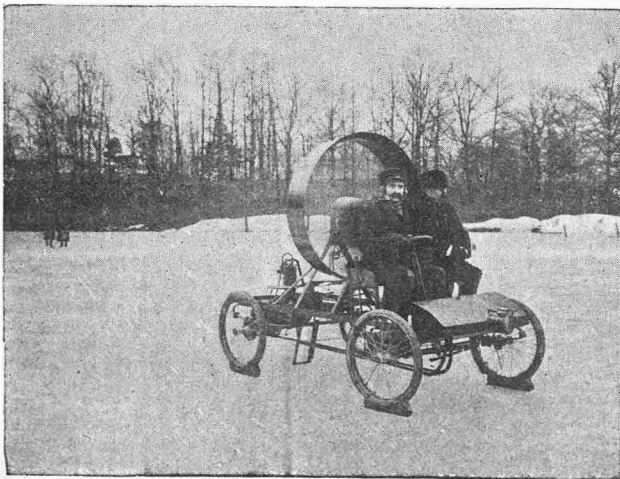
The 20 h.p. car on which General Kurapatkin inspects his 25-miles line of soldiers is regarded with superstitious horror by the Chinese, who have not yet accustomed themselves to this phase of the "foreign devil."

At the last sitting of the Austrian Touring Club's committee it was decided to create a special class of members against payment of a low subscription, which should be devoted solely to the improvement of roads. Further, the committee resolved to open a public subscription for the same purpose. Old cycling roads need betterment, and new ones wanted.

One of the Hagley Road (Birmingham) motor buses ran away last week down a steep hill, and before being brought up by the wall of a church had collided with a cart and a cab. The driver of the cart was seriously injured. An examination of the bus proved that the three brakes and other mechanism were in excellent order, and that one of them was alone sufficient to stop the bus.

Walthamstow Town Cycling and Moting Club.

The above club carried out their first winter motorcycle paper-chase recently, six competing, despite the bad condition of the roads for single trackers. The cyclists laid the trail. A series of four chases for the motor section, and a similar number for the cyclists is arranged to take place during the "off" season. The result of this event was: Master F. A. Applebee, 1st; W. H. Applebee, 2nd; E. Lee, 3rd; R. J. Lester, 4th; F. W. Applebee, 5th; all riding Rex motorcycles; and W. G. Lises 6th, on an M.M.C. After the hare was caught, near Epping, an adjournment was made to the New Inn, Waltham Abbey, where 13 in all sat down to a good repast, which was supplied at a moment's notice, and a very pleasant musical evening was spent, Host Bradshaw making himself very agreeable by supporting the impromptu programme. The next chases are, for cycle, January 7th; for motor, January 21st, 1905; starting from headquarters 3.30 p.m.



The Aeropinion attached to car.

NEWS.

Messrs. BROWN BROS.' annual dinner last Thursday week at the Cecil was a big success as usual. Pleasure and business were happily combined, and plenty of evidence of the energy of this firm was forthcoming.

Motorcyclists and those interested are joining the Auto-Cycle Club in large numbers, nearly 40 new names having been proposed at the last two meetings. Rather a pleasant feature of the applications is the fact that a large proportion emanate from independent gentlemen and professional men.

As an indication of the character of the work that is undertaken by the Auto-Cycle Club of England, it is worth noting that during the past few weeks it has been in correspondence with the Automobile Club de France, the Motor Cycle Club de France, the Deutscher Motor Radfahrer Vereinigung, the Club Automobilisti d'Italia, the Dansk Automobilklub, the Dansk Motor Cycle Club, and the Automobile Club de Suisse.

The La Force Spark-plug.

The General Electric Co., Queen Victoria Street, London, have introduced an entirely new plug. The insulator is of porcelain, and the central conductor is supported in a deeply-recessed insulator which renders it proof against short circuits from fouling. The spark points are solid nickel. A patent clip is fixed to the terminal which holds the cable securely by the insulation, and relieves the stranded wires of strain. The price is 4s. complete.

Celebrated Chauffeurs' Opinions on Speed.

In reply to the question, "What are your impressions of speed when travelling over 100 kilometres per hour?" put by our contemporary "L'Auto," the following replies have been received from the most experienced Continental chauffeurs of the day. F. Charron says, "Speed driving is all right and very delightful for a couple of hours, but not at present day rates. After two hours I found it very disagreeable, fatigue setting in. My reason for retiring was the increase of speed, as even the most experienced driver is now at the mercy of a terrible accident should any person or animal cross his path." Maurice Farman replied, "Yes; I have had one or two experiences of driving all out under the worst conditions, and my opinion is that the faster one travels the calmer become the nerves, the one aim being to keep on the road. My most dangerous ride was down a very steep hill, going at full speed: when nearing a turn at the bottom I beheld several wagonettes zig-zagging their way up the hill. No time to think; grip the wheel and take your chance!" Henry Fournier, winner of the Paris-Bordeaux and Paris-Berlin in 1901, thinks that the amateurs could give more impressions. "We professionals have no time for conjuring up ideas. Our object is to get to the control first, and to get all the speed out of the car, the eye being under the severest strain throughout a race." M. de la Toulloubre says, "Speed driving, like drinking wine, becomes a habit." F. Dufaux, the Swiss champion, says, "I have but two ideas when driving—one to go faster, and the other to evade obstacles on the road."

Professor Callender, a vice-president of the Auto-Cycle Club, has offered to give a paper at one of the monthly dinners of the Club, on the subject of a new two-speed gear.

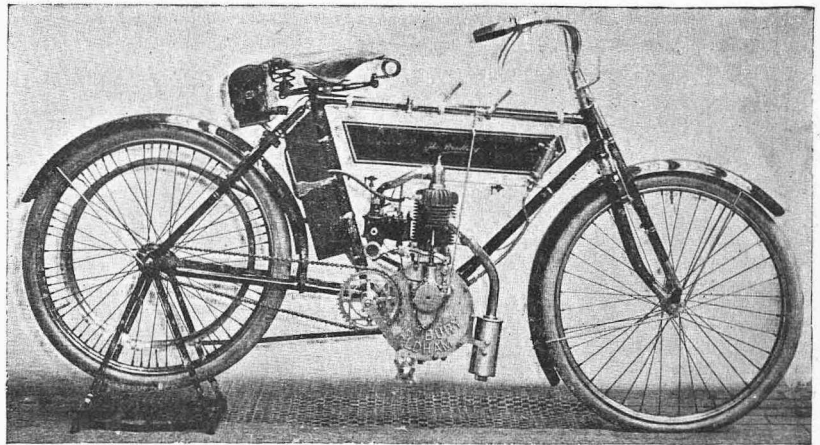
Graphite for Lubrication.

The addition of a small quantity of finely-ground graphite to the usual lubricating oil has been recognised for many years in the United States as tending to longer life for the bearings and wearing surfaces of general machinery, and a great preventative of friction. The firm which has identified itself particularly with the application of graphite for lubrication purposes, Messrs. The Joseph Dixon Crucible Company, of New Jersey, has proved conclusively that an addition of 2 per cent. to 5 per cent. (by weight) of the proper sort of graphite to the cylinder oil will greatly increase the efficiency of the engine; the gear-box bearings, differential, etc., etc., will be found to have a longer life if graphite is used. Their London office at 20, Victoria Street, S.W., will send a most interesting booklet on the subject to enquirers.

Frederico Momo, the ex-champion cyclist of Italy, second in the Grand Prix de Paris, 1900, commences his career as a racing chauffeur next season. He has been engaged to drive the Florentia, a very high-powered car, and makes his debut in the Mont Cenis hill-climb or the Coupe Florio.

Tommy Hall as a Motorist.

The ex-holder of the world's hour record has purchased a 12 h.p. Gladiator car, and, thanks to a week's tuition under that expert driver, Reimers, the little Poly. boy can now thread his way through the busy traffic of the Champs-Élysées like an old hand. Following in the footsteps of the one-time famous sprinter, Ed. Jacquelin, "Tommy" (encased in a large fur) drives down to the Velodrome, puts in some hard training, and then takes life easy motor-ing in the Bois, accompanied by his wife and English manager. After finishing his cycling career, it is his intention to enter the automobile industry, and so he is now entering on the first stage, viz., perfecting himself as a driver.



The New 3 h.p. Bradbury Motor-bicycle.

To Discover the Nail-strewers.

In connection with the recent race for motorcycles in France for the International Auto-Cycle Cup, the Auto-Cycle Club of England suggested that a fund should be established to provide a reward for the discovery and conviction of the miscreants who placed the nails on the roads, and offered to give a sum of 250 francs to the fund. The Automobile Club of France has, through its President, Baron de Zuylen, communicated with the Auto-Cycle Club agreeing with the proposal, itself giving 500 francs and undertaking to set machinery at work in order to discover the delinquents.

Reckless Driving in the Midlands.

Bertram Neville Coles, a Birmingham chauffeur, formerly in the service of the Marquis of Anglesey, has been fined £10 and costs (or two months' imprisonment) for reckless driving at Wrottesley. Defendant ran into a trap driven by a hawk, and the hawk's wife was seriously injured in the smash up. It was alleged that although plaintiff pulled his horse on to the footpath he was unable to avoid being run into from behind. Defendant pleaded that the trap had no lights, and that he himself was only travelling at eight miles an hour; but plaintiff swore that his trap carried two lights.

Motor Ambulances Wanted.

In view of the antiquated ambulance service with which London is equipped, the "Daily Express" made the following suggestion in a recent editorial:—"Whether the horsed ambulance is really at the present time the best mode of rapid transit for wounded or injured persons is open to doubt. We believe that, in so far as paved thoroughfares are concerned, a motor ambulance would be a vast improvement on a horse-drawn vehicle. Motor companies are, as a rule, very enterprising, and we throw out the suggestion whether it would not be well worth their while, as a matter of private enterprise, to put a really first-class ambulance on the market, placing it at the disposal of the London County Council at the outset in order that its efficacy may be thoroughly tested. We do not suppose that any objection would be raised to this step by the authorities concerned, and we may be certain that, if a thoroughly serviceable conveyance was designed at a reasonable price, it would be quickly adopted by urban authorities all over the country. Doctors would strongly recommend it, for they understand the supreme importance of an injured person receiving skilled attention as promptly as possible and without any undue jarring of the nervous system."

OTHER PEOPLE'S 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.

Alteration to Drive of De Dion Tricycle.

Sir,—In reply to "Trikest," I should be pleased to show him how I converted my 2½ h.p. De Dion tricycle with gear drive to two-speeds and free engine. If he is unable to call and see the machine I should be pleased to send him details.—Yours faithfully,
J. DARLINGTON.
Ordway, 65, Haven Lane, Ealing, W.

Twin-Cylinder Engines.

Sir,—"Sunny Jim's" letter re twin-cylinder engines is to the point. As a man of very moderate means, I am looking out for a car as he describes, and I will not buy until I find it, or something very near it. I am looking out for the coming Shows, when, if manufacturers are alive to their own interests, we should see some of this description. At the Stanley Show I was offered a 9-horse single-cylinder engine on a light car. At present I am driving a 6 h.p., and I shudder when I fancy myself with a "9."—Yours faithfully,
SURREYVITS.

Engine Gaining Speed on Exhaust Valve being Fitted.

Sir,—I am obliged to you for the explanation of the fact that my engine went better on slightly lifting the exhaust valve, or rather on lifting the lever. For I discovered after writing to you that the hole in the small crank connected with the exhaust valve lifter, by which the crank was connected by a split pin to the Bowden wire terminal, was much worn, being twice as long as wide, so that the first movement really closed the valve and further pressure lifted it. I have no doubt that the cam, or lifting pin, or both, are also worn, and that this is often the real explanation of this phenomenon.—Yours faithfully,
X.

The Rulax Two-speed Gear.

Sir,—I have read with interest the remarks of Mr. Wilson concerning the Rulax gear, and it must be plain to everyone with only a slight knowledge of engineering that the fault must be entirely the driver's. Apparently, Mr. Wilson must be using the clutches for the entire control of his tri-car instead of the usual methods of retarding or using his exhaust valve lifter. I have had a Rulax gear in use some seven months, and must say that with ordinary care there is no appreciable wear on the clutches. It is very clear that if a driver chooses to play on the clutch of any car persistently it would very soon wear. I should be very pleased any time to let Mr. Wilson see my tri-car and have a run on same. I should advise Mr. Wilson to have his clutches faced with copper, which would certainly obviate the trouble he is complaining of.—Yours faithfully,
W. RISCHE.
Windermere, Essex Road, Leyton.

Rubber Driving Belts.

Sir,—I noticed a remark in your most interesting paper, just to hand, that "motorcyclists will await with interest practical tests of the new rubber belt brought out by the Continental Caoutchouc Co." As you say, the belt is V-shaped. I had this kind of belt on my N.S.U. motorbicycle for many months, and after riding over 3,000 miles the belt seems to be fit for another 2,000 miles. The cost of this belt on the Continent is something like 10s., and it is certainly the best belt I have ever seen. Slipping seems impossible. It does not stretch at all and has never torn, although I always trail a passenger. And it must be remembered that rubber deteriorates most rapidly in a tropical climate.—Yours faithfully,
C. A. LIENARD.
Batticaloa, Ceylon.

Gudgeon Screws: A Hint.

Sir,—Recently the set screws of my M.M.C. engine dropped out bodily, though still fast to the wire by which they are encircled, evidently having jumped their threads by the complex vibrations set up by the piston, etc. I had a new pin turned, a taper reamer run through the piston, and the pin fitted a driving fit, then a small pin inserted so as to be half in gudgeon and half in piston: to prevent turning this was riveted over. This method was brought to my notice by an excellent mechanic employed by the local man, who improved on Hunter's method, as in their engines there is a screw in place of the pin: the disadvantage of this is the impossibility of getting the threads right on inserting a new gudgeon pin, as they have to coincide with those already in the boss of piston.—Yours faithfully,
W. ADYE.

Air Vent in Motor Shaft.

Sir,—With regard to the Quadrant Cycle Co.'s letter in a recent issue, I was quite unaware the air vent in the shaft was a patent of theirs, and have also noticed that R. and P.'s motors are fitted thus also. Am I to understand that the above company license R. and P.'s to do this? If so, I thank the Quadrant Cycle Co. for bringing it to my notice. I also note in the same issue W. Pretty and Co. are "surprised" that I advise using a blow-lamp to unsolder the bridge connection on an accumulator. I should have mentioned, however, that it is advisable to cover the case with asbestos millboard, as they suggest, to prevent the celluloid igniting. I have repeatedly unsoldered bridges and fixed terminals with a small blow-lamp, and without any covering on the top of the cells, without any harm resulting. It is merely a question of practice and care.—Yours faithfully,
L. WALLACE.

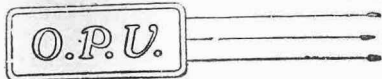
The Corydon Two-cylinder Motor-bicycle.

Sir,—Would any reader who has had experience with the 4 h.p. Corydon two-cylinder motor-bicycle be good enough to tell me the average petrol consumption and minimum speed the machine can be driven at? Any other information about this machine would be appreciated.—Yours faithfully,
WZZ6.

A Simple Electric Governor for Small Cars.

Sir,—In reply to several queries re the above, I send the following explanations. The action of the governor is not simply to retard the spark. The latter can be accomplished by the ordinary sparking lever, but it is impossible with this alone to make the engine run at a slow, steady speed for any length of time. The governor does retard the spark slightly, but, in addition to this, it causes only a feeble spark at the plug, and consequently a feeble explosion which has very little power. This alone keeps the engine going at a slow, even pace; but should it gather speed it will misfire, because the armature has not time to make contact before the wiper is off the contact on the ignition cam of the engine. This can be shown by advancing the spark when the governor is in action. That a feeble spark will retard an engine can be shown by inserting some fine iron wire in the primary circuit. Take a piece of fine iron wire (such as is used for binding flowers) about 2ft. long, and having cut the primary wire, or disconnected it from one of the battery terminals, fasten one end of the cut wire to the fine iron wire, and hold the other two ends between the finger and thumb. If the engine is started with only about a quarter of an inch of the fine wire in the circuit, and this is gradually lengthened, the engine will gradually slow up until it stops altogether. My first governor was made on this principle; but I found that the actual length of fine wire, or resistance, required was not constant, and varied according to the condition of the batteries, etc., so that it was not to be relied on. I also made a rheostat to fit on the steering pillar; but this could not be immediately put in action, whereas the governor can with a flick of the finger. With regard to the suggestion of only having an explosion every four revolutions, the result of this would be to fill the exhaust box with unexploded gases for three revolutions, and get a violent explosion the fourth. I quite agree with you regarding platinum contacts. The old make and break, with non-trembler coil, would never have gone out of fashion if platinum had been as cheap as silver.—Yours faithfully,
GEO. A. E. ROBERTS.

[This letter answers several correspondents whose letters have not appeared.—Ed. "MOTOR."]



Air v. Water Cooling for Tri-cars.

Sir,—The article in your issue of the 13th September on the above subject opens up a question of great interest to the "Man of Moderate Means." The efficient cooling of a water-cooled engine when running on a low gear needs (as is well known) a sufficiently large radiating surface to the radiators in order to disperse the heat, the circulating water serving more as a medium for conveying the heat from the cylinder walls to the radiator surfaces than for actual cooling purposes. This being so, could not a suitable radiator be attached direct to the cylinder and obviate the necessity for the circulating pipes, pump, tanks, and water, with their inevitable weight and troubles? Could not this idea be carried out in practice by extending the cooling ribs on an ordinary air-cooled cylinder? Or, if it is not practicable to do this to a sufficient extent, to form a combined cylinder and radiator by fitting long horizontal sheet metal ribs over a cylinder with plain walls in a somewhat similar manner to that adopted in radiator construction. In the latter case care could be taken to select metals which are good conductors to attach direct to the cylinders for the conveyance of the heat, and to connect these with other metals which are also good radiators of heat. This idea would not, of course, be practicable on the convertible tri-car on account of the limited space when used as a motor-bicycle, but in the non-convertible tri-car the whole width of the vehicle would usually be available to take the suggested extended radiator ribs. In most makes of tri-cars I am acquainted with (fore-carriage types), the engine itself is invariably more or less sheltered behind

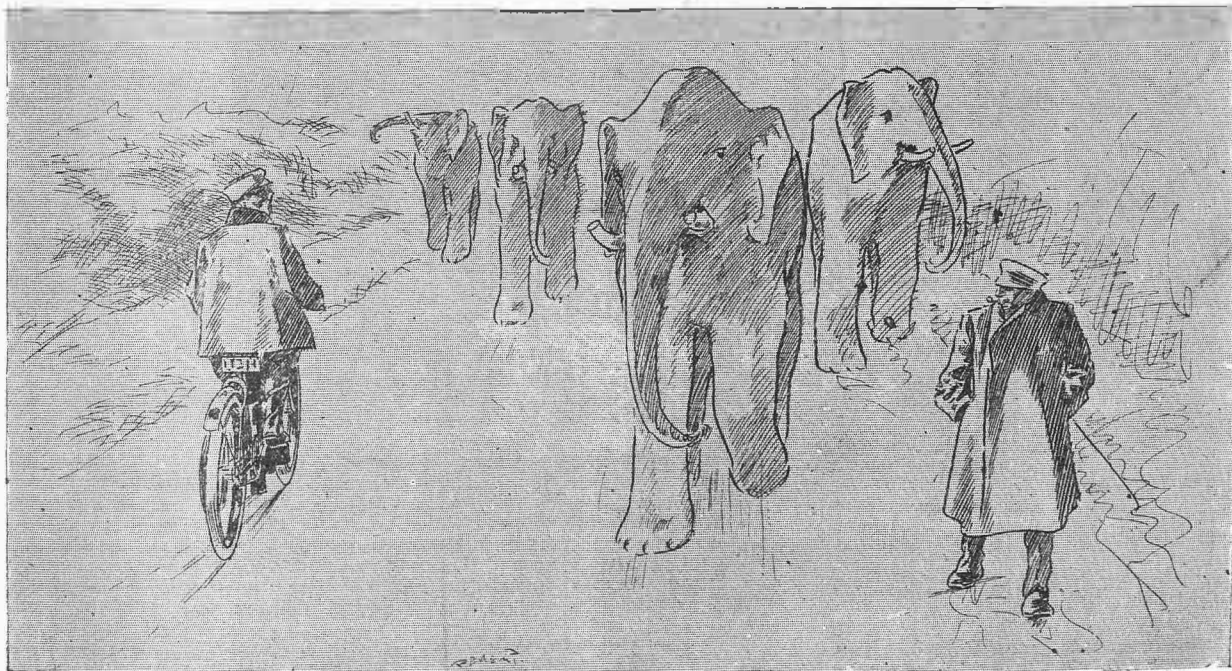
the fore-carriage, and thus the cooling effect due to the passage of the vehicle through the air is largely lost, particularly on the low gear, when it is most wanted. Here, of course, is where fan-cooling comes in. But this, again, although considerably less objectionable than water-cooling on the score of weight and complication, is still an arrangement which it would be desirable to avoid if possible, and extreme simplicity is desired. Given a tri-car so designed as to have no fore-carriage to screen the engine, and with the latter placed well forward, and having as large a radiating surface as that to the radiators of a water-cooled engine of equal power, would not the necessity of even a fan be obviated? A double-seated three-wheel vehicle, with a single foremost steering wheel and two rear-driving wheels, somewhat on the lines of the Avon tri-mobile, is what I have in my mind as the ideal tri-car for the man of moderate means, but with the engine placed well forward, and having very large radiating surfaces as above suggested. The few inches of extra width over the non-convertible tri-car that would be required for the double-seating would not be of great moment, as the latter has already become too wide for ordinary doorways, and also too bulky to keep in the average modest hall of the man of moderate means, special housing being already required for it. In any case, this objection is more than offset by the advantages of the double-seated vehicle, such as the sociable seating, well-sprung frame, less vibration, easier steering, more luggage space, less wear on tyres, and less loss of power through slip, on account of the double drive. A discussion in your "O.P.V." columns as to the practicability of this combined engine and radiator idea would doubtless be appreciated by others, who, like myself, have hopes of the early and more complete development of the tri-car.

Apart from this question of air v. water-cooling, there will be no difficulty in producing the double-seated tri-car frame and body having the advantages outlined above, and that without exceeding the 3 cwt. limit, even with water-cooling. I have recently protected a design on these lines, but do not feel at liberty to disclose particulars at present.—Yours faithfully,
MELITA.

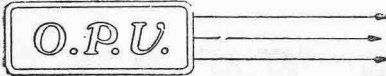
Handle-bar Control.

Sir,—In a recent issue (October 25th) J. Kennedy is scarcely fair in his remarks on this subject. The great advantage of handle-bar control is that in case of sudden danger there need be no grabbing for even the single lever Mr. Kennedy speaks of. If a machine is fitted as mine is, a twist with either or both hands stops the machine. The principle is as follows:—Left handle twist switch, with Bowden brake lever underneath and square with exhaust lift. Right handle twist Bowden throttle and Bowden lever underneath brake to back wheel. To stop: twist either or both handles or press either or both levers. On the top tube I have advance handle and exhaust or silencer cut-out. I never need take my hands off the handle to regulate speed, as I can do it by both throttle and exhaust lift. When a bit of extra speed is required I can give a touch to the advance spark, or in hill-climbing can retard the spark; but these occasions occur deliberately and quietly, so taking a hand off does not matter then. I have used the above arrangement since June 1st, 1901, when I had the identical gear I am now using on my first machine (fitted with a Minerva 1 h.p. engine), which I built myself. The twist-handle throttle I made myself long before the Bowden people brought out theirs; but I used their handles and wires, which I got from old brake sets.—Yours faithfully,

CHAS. D. FITZ-GERALD.



OTHER ROAD USERS
Met on the Erighton road recently one foggy morning. The elephants (and camels also) caused obstruction later in the Blackwall Tunnel.



A Light-weight Motor-bicycle for a Lady.

Sir,—I have read Mrs. Kennard's description of her ideal machine in a recent issue of "THE MOTOR," and should be pleased to build her one to the specification she gives. I suggest the following as a good combination:—Chater Lea motor fittings, J.A.P. 2½ h.p. engine, Castle or Simms-Bosch magneto, Garrard two-speed gear and free engine, Watawata belt, Gripwell brake or Eadie combination hub, Crabbe front brake, 26in. wheels with 1½in. Palmer or Clincher tandem tyres, light pedal gear, and large petrol and oil tanks. I estimate weight to be between 80 and 90lb.—Yours faithfully,
H. W. GRAY.

533, Holloway Road, London, N.

Canted Steering Pivots.

Sir,—We are very much surprised to see in your issue of Nov. 15th an article by "Veeatch," in which he says that Tenting, of Paris, was the first to use inclined steering centres, and asserting that Duryea's claim to this form of steering cannot be justified. We should be interested if Mr. "Veeatch" would give us some enlightenment as to where information concerning this machine of Tenting's can be obtained, because this is the first we have heard of it. Mr. Charles E. Duryea patented this system in 1895, and his claim was allowed not only by the British and Continental patent offices, but also by that of America. We scarcely see, therefore, how Mr. "Veeatch" can say that Mr. Duryea's claim is "without any claim which can be justified." Apart from this, however, the system we are using to-day is a subsequent patent, as we do not now use the steering centres directly coincident with the wheel centres, but give them a less angle of incidence, the result being a slight lifting action when the wheels are deflected from the straight, with, as a consequence, the self-centring action in the steering. We may add that although we are not using to-day the original of 1896, that patent is still in force. Although the Chicago Waikagan Duryea of 1895 was not fitted with these inclined steering centres, the Duryea of 1896, which, on November 14th of that year—the day that motorcars were first allowed to be used in this country—made a non-stop run to Brighton, and defeated the victorious Panhard's of the previous Paris-Bordeaux race of that year by over an hour, thus winning the first motorcar contest ever held in this country, was fitted with these sloped steering centres which, either in their original or in their improved form, we have been continuously using ever since. We are pleased to note that your correspondent admits that this inclination of the steering centres makes "an enormous improvement."—Yours faithfully,

THE DURYEA COMPANY, LTD.
(Henry Sturmev, Managing Director.)

[Our contributor informs us that the canted steering pivots (referred to in Mr. Sturmev's letter) were used by Tenting, of Paris, in 1892, upon a car which he built and engine, the engine being a two-cylinder horizontal, with the cylinders one above the other. Illus-

trations of Tenting's car, and more particularly of the steering mechanism, appeared in a work published in Paris in 1896, entitled "Automobiles sur la Route," the author being Louis Lockett.—Ed. "THE MOTOR."]

Touring in North Wales.

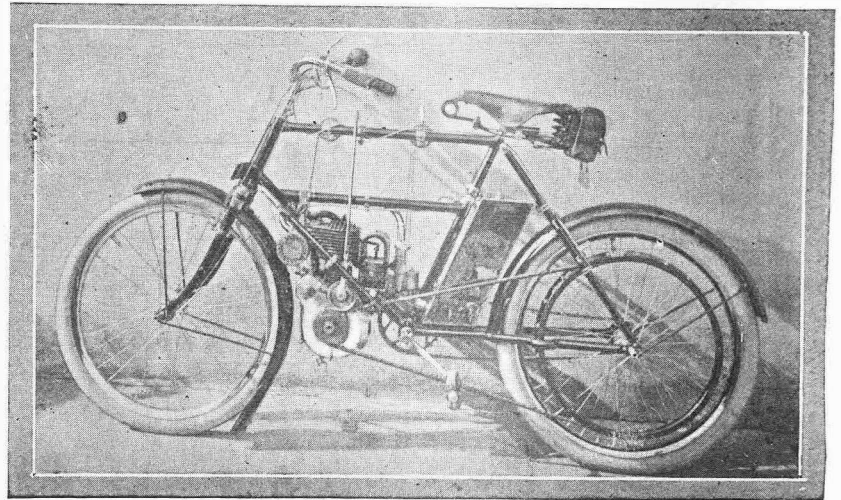
Sir, Replying to Mr. A. V. Baxter respecting my tour through North Wales on a F.N. I have pleasure to acquiesce in his request to enlighten him on the points he naturally raises. Regarding his query respecting the hill between Abergele and Old Colwyn. This hill was negotiated by shedding the trailer passenger and gently pedalling to assist the engine—certainly no "task." The fact that we did not go round the coast and through Conway answers his queries respecting the hill between Penmaenmawr and Llanfairfechan and also the Nantfrancoon Pass. The pass between Bettws and Pentre Voclas was taken in stages, the rider slowly pedalling the machine (where necessary) while the "passenger" strolled on behind enjoying the scene, which is not to be despised by any means, thus from Bettws up to Ceiriog took us about 1½ hours. When once at the top

Fitting Tread to Outer Cover.

Sir,—I have a Triette, which I have now driven some 2,000 miles. I find that the back cover is wearing through, and I should like to have a tread fitted. Can any of your readers inform me of a suitable one for the purpose, and also state their experiences of it?—Yours faithfully,
Wm. G. CLARK.

A V Belt Shifter.

Sir,—I have been interested in reading the article by your correspondent "Magucto" in a recent issue on "Two-Speed Gears for Motorcycles." I was particularly interested in his remarks regarding the moving of a V belt from one set of pulley grooves to another. After having pronounced this method to be the simplest arrangement possible he goes on to say:—"The only difficulty with this arrangement is the practical impossibility of devising any satisfactory method of quickly moving the belt from one set of grooves to the other, especially if a V or round-section belt is used." He may be interested to know that I have devised a very simple and satisfactory method of striking a V or round-section belt instantaneously from one groove to another on a pulley. My



Illustrating letter from A. C. L. Back.

our labours—if such they may be called—ceased altogether, and this 11 hours certainly did not spoil the enjoyment of six days in North Wales. So far from my objecting to Mr. Baxter's queries, I welcome them, showing that the article in question has not proved uninteresting. As to my methods. I can only say that I had:—(1) A good engine in particularly good condition; (2) a transmission that left little or nothing to be desired; (3) good petrol, regular oiling, and careful driving; (4) low gear—viz., 7 to 1, with 26in. wheels. To my sorrow I have not at present got this machine, having exchanged it for another, but when I had the F.N. there were very few machines on the road under 2½ h.p. that could compete with it; and I had quite as much difficulty in convincing my friends that it was only supposed to be 1½ h.p. as I have had to convince incredulous friends that on an ordinary cycle I have ridden up most of the steepest hills in North London—backwards.—Yours faithfully,

FRED REVILLE POTTS.

object, however, has not been to give a two-speed gear, though this can easily be arranged. I have arranged a fast and loose pulley with a special striking gear, whereby I obtain a free engine. The engine can be started quite gradually and without any shock to the belt or machinery. The belt can be instantly struck back on the loose pulley for coasting or pedalling. The V belt is more easily struck than the round belt: with the latter there is some rolling action. I enclose a photograph of the cycle fitted. The cycle has been ridden by myself some 800 miles and not once has the striking arrangement failed to act perfectly. All experimenting was done on the stand in the shops. It is a free engine drive that cannot, I claim, go wrong!—Yours faithfully,
A. C. L. BACK.

All motorists interested in the development of motor boats should read "The Motor Boat." It is issued every Thursday at one penny.

OUR INFORMATION BUREAU



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.

E. W. Estridge.—Yes, a good strong machine, and quite powerful enough for trailer.

Nemo.—Write Hewetson's, Ltd., Tottenham Court Road, London, for the particulars you specify.

Johannesburg.—The idea is ingenious, but the back pressure would be excessive. It would not pay to develop the idea.

F.C.B. (Swanage) wants to know the best way to keep a canvas V-section belt in order.—We should say that brushing the grit thoroughly from the surface and a light dressing of castor oil is all the treatment required.

Simplex (London, N.E.).—(1) The easiest way to safeguard against the terminals shaking off the coil and accumulator with the vibration of the machine is to slightly burr up the last thread on the terminal shank. (2) The silencer you refer to is doubtless an American type. It consists simply of a long steel tube blocked at one end. Numerous small holes are drilled all over the surface, and then copper wire is closely wound over the whole area. The gases sift themselves through.

Tri-car Query.

C. A. Cox (Bordon).—(1) It will be quite satisfactory to solder up the leak in the radiator of your tri-car. Get this done by a practical man, unless you have had some experience in soldering. (2) No danger whatever, unless you bring a naked light near the petrol tank. A hot soldering iron would not fire it. (3) If you keep the throttle open, and let the car drive the engine when running down hill, it will help to cool the cylinder at the expense of a little petrol. (4) The water boiling away indicates either defective circulation or the engine is not in as good order as regards compression, etc., as it might be.

DN115.—You would do much better by investing in a small car by a standard maker. If we knew what figure you could go up to we could advise you further as to suitable makes.

Gear.—A fair machine of its particular type, but we should fancy a small four-wheeled car would give you more satisfaction in the long run. Have a look at some of the 11 h.p. advertised in our pages.

A. Hislop (Brisbane).—(1) The make you enquire about is a fair grade. There are many better. (2) The 3½ h.p. Minerva would be the best by far. (3) If in good order, the Auto-Bi should give 2½ h.p. (4) As a rule the quality of spirit has little to do with economy. The carburettor and engine are at fault. (5) No, the freezing should not occur, the carburettor should have a warming jacket fitted.

W. Partridge (Blackheath) writes:—Can you give me any information with reference to the Hitchon Gear and Auto Co.'s 9 h.p. light car? I should value your opinion of the car, and any details that you can give me.—We have no personal knowledge of the working under road conditions of the Hitchon Gear Co.'s car. We have received many enquiries as to this, and would be glad to publish the opinions of any owners who have the gear (and car, if of the Hitchon Co.'s manufacture) fitted to their cars.

Non-skids on Car Wheels.

Non-Skiddor (Eccles) writes:—I intend having non-skids on the wheels of my 10 h.p. car, but some friends tell me that if one of the rear wheels has a non-skid fitted it is quite sufficient. I thought of having them on all four wheels, but if one wheel so fitted is ample security, I would not go to the expense of having the four done. What is your opinion?—A non-skid on one driving wheel keeps the car tolerably steady on greasy roads; but it is safer to have the two rear wheels fitted. They would both be puncture proof, as well as non-skidding.

INDISPENSABLE!

"The Motor Strip Maps."

A most interesting series of strip maps of handy size for motorists are now ready. The following are obtainable at once:—London to Bath and Bristol; London to Birmingham, Liverpool and Manchester; London to York, Leeds and Havrogate; London to Exeter and Teignmouth; London to Southampton, New Forest and Bournemouth; London to Brighton and Portsmouth.

Post Free 1s. 1d.

Non-skids do not act well on the front wheels, as they interfere with the steering, besides slowing the car considerably.

In Doubt (Slough).—If you will enquire at the local town hall or police office they will tell you where the Council headquarters are situated. It does not always follow that they are to be found in the county towns.

W. Wilson (St. Andrews).—As the result of calculations we find that by the No. 1 test of your engine the brake horsepower was 1.09; and by the No. 2, 1.2; so that you could safely reckon the engine as a full horse-power on the brake.

R.S.P. (Ilford).—We cannot suggest any reason for the accumulator losing charge other than that the plates have slightly sulphated, and thus have no capacity. The Simms arc light magneto is very satisfactory, and can be fitted to almost any make of engine.

Securing the Piston Rings.

Piston Rings (London, W.) writes:—(1) I am troubled with the piston ring slots of my motor continually getting into line, although when the slots are spaced out the compression is all that could be desired. (2) In putting away an acid accumulator (P. and R.) after washing out, is it advisable to leave it dry or fill it up with water?—(1) The usual reason why the piston ring slots move out of position is that they fit the grooves too loosely. You could either get a new set or have the old ones pinned in position. You would have to get small steel pegs screwed or forced into each groove and a corresponding recess drilled on the inner side of the ring. The recess should not go right through. (2) The best plan is to fill the cases up with water.

Faulty Carburettor Probably.

E.G. (Salisbury) writes: I am in difficulties with my Rex 1903 motor-bicycle. There is a mysterious loss of compression somewhere. The valves are perfect: cylinder and piston rings to all appearance sound; but though assisted by an experienced mechanic I have been unable to put matters right. I find that, in spite of loss of compression, the machine will travel at a fair speed on the level so long as the spark is advanced to the utmost; but directly I retard the spark, the machine seems to lose power. I have noticed also that it will sometimes give a sudden spurt, especially after travelling over an obstruction, as if something displaced had been shaken into its place. Can you suggest a cause?—If you cannot trace a compression leak anywhere, the cause of the trouble is nearly certain to be in the surface carburettor. The fact of the engine picking up speed after the machine has run over some rough ground points to this. It may be a flooded carburettor, or dense petrol: you would find it worth while to fit a good spray.

BUREAU.

A6132.—The power of your engine would not exceed 2½ h.p., and it would only reach this if well designed.

H. G. (Moberley).—The Ducasble solid tyre made by the North British Rubber Co. has a steel clamping band for securing to the rim. This should meet your requirements.

T. Luker (Stonehouse).—For the type of vehicle you require you might write the Wolsley Co.; Humbers, Ltd.; M.M.C., Coventry; Albion Motor Co., South Street, Scotstoun, Glasgow.

H. Love (Lyminge).—(1) The gear you have is much too high. Change the engine pulley for one 3½ inches diameter (outside). (2) It will make a difference of about four miles per hour on the level. (3) The makers of the engine would doubtless give you an estimate. It is not possible for us to do so.

J. B. G. (Milford).—(1) We should recommend machine A in your list. The engine is a good 3 h.p. (2) High tension, with accumulators. If you fancy magneto electric, or have difficulty in getting accumulators charged, have machine C, 3½ h.p., V belt transmission: this is a very reliable mount, though the finish is not quite up to that of machine A, but then the price is lower.

Trailer Tax.

F. W. F. writes:—I live next door to an Inland Revenue tax collector! I have a motor-bicycle and trailer. I have paid a carriage tax of 15s., and am now called upon to pay another carriage tax, 15s. The collector tells me the law looks upon a motor-bicycle and a trailer as two carriages. I shall be glad to know whether I must pay this second sum of 15s.—The tax collector is right: a trailer is liable to the same tax as the bicycle. With a side-car or fore-carriage, however, one 15s. tax covers it.

Broken Piston Ring in Car Engine.

8 h.p. (London, N.W.) writes:—Could you or any reader suggest a reason for the following experience? My car has not been pulling so well of late, and I attributed this to a loss of compression somewhere. I could not effect any improvement at the valves, so I decided that the fault must be in the piston rings. I had the cylinder off, and on examining the rings found two out of the three broken right across. This was evidently the cause of the leakage, as obviously the rings could not fit the cylinders properly. But I am puzzled to know why the rings broke. The car has done over 1,000 miles, so presumably the rings were sound enough till recently. I have been wondering if the metal of which the rings were made was too brittle or had a flaw in it.—It is not an easy matter to account for piston rings breaking. Want of proper lubrication might do it, or the ring may have been opened up too much in springing it on the piston, and thus got strained. A small flaw or hard place in the casting from which the rings were turned is a possible reason. It is not by any means common nowadays to hear of broken rings, as most makers of repute take special care to select good rings and fit them accurately.

A. H. (Wickham Market).—(1) The connections of your auxiliary ignition seem all right. If the accumulators are well charged up it should work well. It is probable you have a bad contact somewhere on the circuit, and consequently a feeble spark at the make and break spark-plug. (2) The swaying of the belt you observe when starting the charging dynamo is simply due to there being no load on the machine till it begins to excite: you could easily fix up a simple fork arrangement to prevent the belt jumping off the pulley.

Car Query.

Light Wolsley (Lydford) writes:—I have a 6 h.p. Wolsley light car. (1) What position should the crank be in when explosion takes place? (2) What position should the crank be in when the exhaust valve begins to open? (3) How much free play should there be between the adjustable screw on the lever and the exhaust valve spindle?—(1) With the spark lever about midway the crank should just be passing the dead centre when ignition takes place. With spark advanced or retarded the crank will be some distance from the dead centre, or past it. (2) It is usual to allow the exhaust to have a slight lead, which means that the valve would open when the piston had completed about 7ths of its stroke. (3) Not more than 3/32nd inch, or just enough to allow for any slight expansion of the valve spindle taking place through the heating.

Fitting a New Carburetter.

H. K. P. (Ben Rhydding) writes:—I am having some difficulty with a Longuemare carburetter (Model H). The appliance seems in perfect order, and the needle valve is quite tight at slow speed on good roads; but, owing perhaps to the position in which it is fixed, it floods badly when running fast, on account of the vibration which shakes the valve in its seat. It is therefore impossible to insure a good and reliable mixture, and after running well for a time the engine will begin to misfire badly, although the spark is good and the plug is clean and sound, and the waste of petrol is, of course, large. It will not be easy from the construction of the car to make much improvement in the fixing of the carburetter, and I should like your advice as to whether a Cremorne carburetter, under these conditions, would be likely to prove more satisfactory, as this has no float or loose parts except the inlet valve. The Longuemare carburetter has at present an 11-slit cone, but it seems doubtful if it gives gas enough for the 4 h.p. Automotor engine. The next smaller cone certainly does not. As I enquired some time ago for a suitable gear box for a Kyma car, and expressed doubts as to the suitability of that recommended by the New Kyma Co., it is only fair to say that after discussing the matter with them I decided to fit the one they advised, of the "sun and planet" type, and that I find it answers well, and with a little practice is very easy to drive.—We have heard good accounts of the Cremorne carburetter, and from what we know of its construction it should answer your purpose well, as it is simple and has a positive petrol feed, and can be used with crude petrol or paraffin. You can get it from the United Motor Industries, 45, Great Marlborough Street, London, W. With regard to the Longuemare carburetter, you could easily widen the slits.

G. R. C. (Boston) would be obliged to any reader who could tell him who are the makers of an accumulator bearing the trade mark "Bridge"?

Oil Difficulty.

J. E. T. (Leicester) writes:—(1) I have a 3½ h.p. motorcycle and can only find one fault with it at present; that is, the amount of oil which is thrown out of the engine at back of pulley and which has literally soaked the belt and made a hash of my boots and leggings. Can you suggest a remedy for same? (2) I give the engine half a pumful of oil about every 20 miles. How often should this be run out of waste tap, and how much should be run out at a time?—(1) There does not appear to be an effective vacuum valve in the crank-case. It is important to have one fitted. If you look up back issues you will find various methods of minimising the ejection of oil, such as fitting a leather washer between pulley and crank-case, drilling a small hole right through centre of main shaft, etc. (2) Not necessary to run oil out as a rule, except every 300 miles or so: you could clear out the crank-case with some paraffin and relubricate, but even this treatment is not absolutely necessary, but some riders aver it improves the running.

ANSWERS BY POST.

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

Thursday, December 1st.—T. C. Trott (Sydenham), R. Ford (Sevenoaks), Menzies Bros. (Dunblane), W. O. Purnell (Clifton), H. Kenway (Barnungham), J. G. Durant (N. Tawton), H. A. Clements (London), H. Barber (Northampton).

Friday, December 2nd.—J. A. Randall (Market Drayton), Evans and Sons (Stone), H. McCarthy (Dublin), V. Stebbings (Attenborough), Yandle and Sons (Westminster), H. Richmond (Manchester), W. Hopkins (Exeter), G. G. Black (Belfast), G. J. Mason (Swadham), H. Grainger (Forest Row), H. Howarth (Padiham), E. Riby (Keighley).

Saturday, December 3rd.—J. E. Newing (Walthamstow), W. Paul (Colchester), H. Heath (Andover), H. Pile (Hereford), A. T. Stone (London, N.), R. W. Anderson (York), A. J. Trace (London), A. L. Harrison (Galway), F. T. Turpin (Preston), R. J. Mostyn (Bedford).

Monday, December 5th.—E. Barnett (Swansea), W. S. Clark (Hull), J. Bowers (Birmingham), H. Murphy (Leeds), W. R. Woods (Sydney), B. Gibson (Bourne), A. E. Atcheson (Manchester), G. Crist (Hawthurst), J. Watson (Dunbar), F. Kynaston (London), R. Hannaford (Plymouth), R. Morley (Halifax), G. Hutchings (Paddington), A. W. Ellis (Sidmouth), S. Burrow (Exmouth), J. G. Durant (N. Tawton).

[Correspondents are requested to keep their queries as brief and concise as possible. The great and quite unnecessary length of many of the communications sent in precludes the possibility of them being dealt with promptly.]