

Motor Cycling

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& Motoring

PROBLEMS OF MOTORCYCLE CONSTRUCTION.

By "TEUF-TEUF."

In this article the writer expounds his views on various problems of motor-bicycle design, and deals with such interesting subjects as the questions of power, water cooling, position, driving and ignition. He is of opinion that although the motor-bicycle even now has got a long way on the road to perfection, there is no reason why even greater efficiency should not be attained by making a closer study of scientific principles.

In the early days of the old ordinary, and hence of cycling itself, so little interest was taken in the pastime by the public at large that there is no record as to what the enthusiasts of a bygone era foresaw as the future of their well-beloved mount. No doubt, could some of the "old-timers," happily still with us, but recall to mind the cycling prophecies of the seventies, they would tell us that spring framed ordinaries, higher gears with smaller driving wheels, safe brakes, better and more durable tyres, and the possibility of riding twenty full miles in the hour were the most venturesome forecasts of the more optimistic amongst them. Never did any of them in their wildest flights of imagination conceive of a mechanically-propelled low-framed bicycle which could take them o'er hill and dale at a constant speed far in excess of their best sprints on the track. Therefore, no more dare we of this present-day venture to prophesy by what means man will flit about at his own discretion thirty years hence. At the very utmost we can but falteringly suggest what few obvious detail improvements the public may demand, and consequently the manufacturers will adopt, as the motorcycle movement advances.

As it is too early yet to predict the individual flying-machine which may some day take the place of all existing forms of locomotion, we will turn to that triumph of light engineering work, the motor-bicycle, and endeavour to trace the direction detail improvements are likely to take, and also solve problems, still unsolved by that capable writer, Mr. Westlake, and equally worthy friend Magneto.

The Question of Power.

Power, more or less, being by far the most important attribute of the motor-cycle, it is most essential that this should be quite adequate for the purpose for which it is required, whilst it is equally important that it should not be a bit more than is necessary to propel the particular rider for whom the machine is constructed at the top speed that he will ever wish to attain. Excess of power naturally entails increased weight, a larger cylinder which does not keep cool so easily as the small cylinder, and wider bearings to take the extra load, which render difficult the fitting of the motor to a bicycle. The assertion that if one has a high-powered engine it is not necessary to make use of its full power is quite a misstatement, for it is often by no means easy, when using very fresh petrol, even though working the motor on "short commons" of gas, to keep the speed

down to safe limits amongst traffic, and yet prevent the engine from stopping altogether or from overheating. Putting it roughly, a motor of not more than $1\frac{3}{4}$ advertised horse-power (makers do not as a rule under-estimate the powers of their motors), is quite powerful enough for the rider, who, were he choosing a safety, would never think of selecting a light road-racer; those accustomed to ride road-racing machines, and think little of a fifteen-mile-per-hour gait, would, of course, be best suited with a motor somewhere between $1\frac{3}{4}$ h.p. and $2\frac{1}{2}$ h.p., whilst the higher-powered motors should be left to the scorching fraternity and the racing men. Unfortunately, it is just when the power is most required that it diminishes: when mounting hills the extra load slackens the speed of the engine, which loses power accordingly, this being the great difference between a gas engine, in which the pressure is generated inside the cylinder, and a steam or compressed air engine, in which the working gas is supplied under a constant pressure from a reservoir in which it is generated.

It is by no means impossible that a means may be found for exploding the gas and air mixture of the petrol engine independently in a generator and supplying it at the great pressure thus attained, to an ordinary slide-valve or rotary engine running at a maximum speed of, say, six hundred revolutions per minute. The generator referred to would be after the form of the iron cylinder in which oxygen and hydrogen are carried about for various purposes. Such a motor, having an elastic medium supplied to it at a constant pressure, would have all the many advantages of the steam engine as well as a great range of power, and as a minor advantage the working parts, while running at half the pace, would not be subjected to the great heat that they are in the present motor. Until such time, however, as the above-described motor comes along the hill question will probably be settled by the variable power motor and the two-speed water-cooled motor.

Variable Compression.

Though it would appear to be very simple to make a motor with a variable compression by means of having the cylinder head in the form of a large piston, which could be intruded into the cylinder or withdrawn therefrom to any required degree, such a contrivance would unfortunately be almost impossible to operate in practice, as it would

necessitate filling up the combustion chamber with the movable head against the full force of the explosions taking place in the cylinder, or else stopping the firing of the mixture altogether, whilst the compression was being altered to the required extent, at a time when the power of the motor was most required, and the restarting of the motor with an increased compression would be no small matter, the high compression alone being very likely to stop the impetus of the spinning fly-wheels, and cause the belt to slip the moment that the compression tap or exhaust valve was closed; of course, the exhaust lift or the compression tap could be automatically opened and closed whilst the alteration in the compression was being effected. The chief reason that the present motor has not a very high compression is that a high working pressure would bring such a severe strain on the valves and all working parts that these would very soon wear out, unless made much heavier than at present. The fly wheels would also have to be much larger.

Another obvious way of varying the compression would be by means of an auxiliary exhaust tap, which could be opened to the required degree: this would produce the effect which any rider may try for himself by opening the compression tap in a varying degree; but such a device may be ruled out of court at once as being far too wasteful of petrol, when one considers that the normal condition for running the engine would be with this tap open; on the other hand, where it is desirable to have a ready means of lessening one's power without interfering with the throttle, such as when moving amongst traffic, an arrangement of this sort might not be altogether useless if its exhaust were properly deadened, and if it were fitted with a non-return valve to obviate any air being drawn into the cylinder through the tap, and so weakening the mixture.

Water Cooling.

That a simple water-cooled head will shortly be introduced for bicycle motors is not unlikely, as such a one would cost but little more to manufacture than does the present air-cooled cylinder. It would not be necessary to enclose the valves in the water-cooled system, as they are not subject to any great sliding friction like the piston, and will, therefore, work under almost any condition of heat less than the red-hot stage. It is, however, most important that they should not be super-imposed or in close proximity, as they are in many of the present engines (the manufacturers asserting that the exhaust is cooled by the inrush of gas from the inlet valve placed immediately above), as the gas mixture is partly rarified and decomposed by the heat of the exhaust valve before it fairly reaches the interior of the cylinder, which, in its turn, being, by comparison with the exhaust valve chamber, more or less cool, causes the mixture to shrink very considerably in volume. This is one of the most fruitful causes of what is known as the engine getting "tired," when subjected to adverse conditions of cooling such as hill-climbing with a two-speed gear, or running the engine for trial with the machine stationary or indoors. A word of caution to novices may not be amiss. Never run your engine stationary or free (if you have a free engine machine such as the Derby or Shaw, and several others, always switch off the electric current before freeing the

engine when riding), unless the advance lever is as far back as it will go, so as to retard the spark as much as possible, and then never run the engine, even under these modified conditions, for more than two or three minutes, or you will most assuredly find that the overheating and excessive speed have started some trouble, which will hold you up sooner or later with a defect that even "MOTOR CYCLING'S" useful list of "possibles" will not help you to discover, such as timing-gear pinions having become loose and slewed round, irrespective of the position of crank, causing the exhaust valve to open on the downward stroke and the spark to occur when the piston is at its lowest point; or else the fly-wheels may come loose on the crank shaft. The writer speaks from experience (the best school of all), both accidents having happened to him, on each occasion when miles from anywhere, causing a good half-hour's entertainment testing and cogitating, and finally an hour's hard work opening up the crank case, a roadside job that is not easily forgotten, before the damage was finally discovered and a temporary repair effected.

(To be concluded)



Illustrating the well-known axiom, "A little knowledge is a dangerous thing."

Sad plight of Jones (who is just having a try on his friend's motor)—"Great heavens! Did he say 'Throttle the sparking coil, retard the contact breaker'? No! 'Advance the combustion chamber'! Oh lor! Which tap can it be? I daren't touch them! Oh for something soft to run into!"

INVENTION.

The latest improvements in motors, motorcycles, and accessories.

Improved Head Clip.

We have particulars to hand of an improved head clip for motor-bicycles. The idea is a very simple one, and allows of a more accurate adjustment than usual. The originator of the idea is E. W. Glasscock, Engineer, Dane Street, Bishops Stortford.

The Clement-Garrard Accumulator.

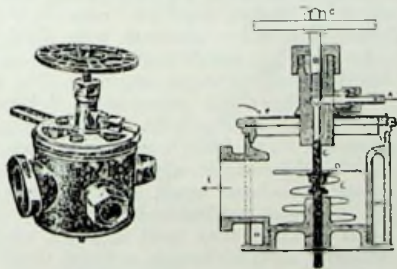
The battery supplied with the latest pattern Garrard motor sets is one of the neatest and most efficient, for its size, we have seen. It is of the seven plate, semi-dry type, in a celluloid case, and has about 11 ampere hours capacity; no spilling of the acid can get on to the leather containing case, to rot it, owing to the celluloid case being extended well above the cover of the battery. A good type of screw terminal is fitted, ensuring perfect contact.

The Raleigh Front Driver.

The Raleigh Co. have on view at their depot, on Holborn Viaduct, a sample of their front driver type of motor-bicycle. It is no exaggeration to say that the workmanship is superb. The motor is $1\frac{3}{4}$ h.p., and a surface carburetter is provided and extra petrol capacity in the tank. The driving belt is of the V pattern, and can be tightened by the eccentric adjustment on front wheel axle.

A New Carburetter.

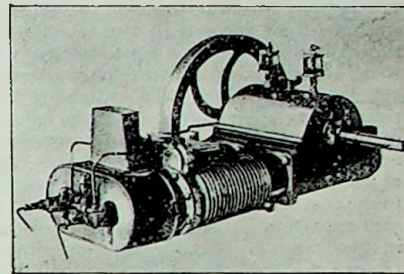
The accompanying illustration shows two views of the carburetter invented by M. A. Guevey, 119, Rue de Montreuil, Paris. The construction and working is as follows:—Petrol enters at A, the quantity being regulated by the needle valve G. Inside the chamber there is another needle valve kept closed by the spring E. A baffle plate is fixed at D, and air enters through openings at P, these being adjustable. The inlet valve pipe is connected up to I and warm air circulates through the jacket H H. The suction stroke of the motor causes the needle valve G to open and admit petrol into the chamber; at the same time air is drawn in through the adjustable openings and becomes thoroughly mixed with the petrol before it enters the motor. It is claimed for this type of carburetter that it is remarkably economical and uniform in its action in all weathers.



A Combination Petrol and Hot Air Motor.

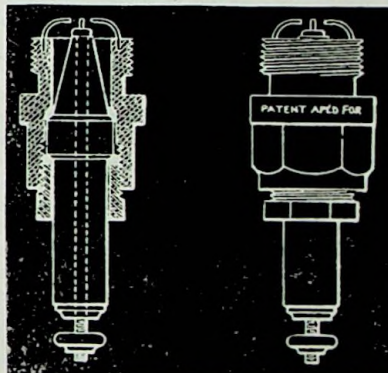
The Chicago Moto-Cycle Co., 107, Madison Street, Chicago, Ill., are making an engine which can be used as an oil engine or a hot air engine. Either paraffin or petrol can be used as a fuel. This is an internal combustion engine without any carburetter or vapouriser, no water cooling and no electrical apparatus for igniting the charge. The makers claim that it cannot overheat, and that the charge cannot ignite too early or too late. Working as a hot air engine, heat is applied to the bottoms of the cylinders, air is taken in and compressed in the cool upper end of the cylinder and then transferred through a separate passage to the heated end, where it expands and forces piston outwards. When used as a petrol engine the torch which heats the cylinder end also serves to heat the

coil through which the petrol passes. An impulse is obtained at every revolution, the spent gas being forced out completely upon the return stroke of the piston. The charge explodes, not against a tight-fitting ring packed piston, but against a sliding displacement block which is loose and will not bind if it becomes heated. Each cylinder is 2 by $4\frac{1}{4}$ inches, and the engine and fly wheel weigh 280 pounds. It will develop 5 b.h.p. at 500 r.p.m. The Caloric engine is a radical departure in internal combustion motors and bids fair to become an important factor in motor building.



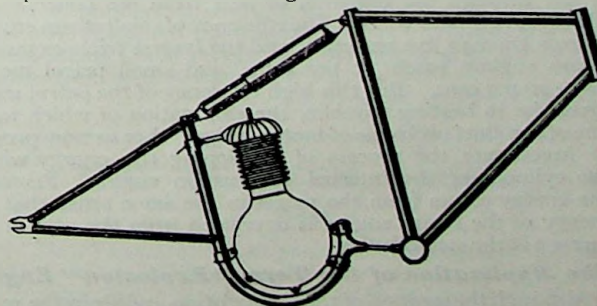
An Improved Form of Sparking-plug.

The Shaum Automobile and Motor Manufacturing Co., 892, Park Avenue, Baltimore, claim that their improved sparking-plug reduces the chances of misfiring to a minimum. The chief departures in the construction is the provision of two points for the spark to jump across to from the insulated conductor, and also the shape of the insulating core is conical, leaving a space between it and the shell of the plug and thus preventing the deposition of carbon and consequent short circuiting. The points are made of a platinum alloy. The illustrations show a section and general view of the plug:



A Cushion Frame for Motor-Bicycles.

The illustration shows the principle of an American invention of the adoption of a spring frame for a motor-bicycle. The rear part of the frame is hinged at the bottom bracket and



a spring or pneumatic cushion is interposed between the main diagonal and a rear diagonal which forms a loop for carrying the motor in. This arrangement, of course, entails a long wheelbase being used, but this, it is claimed, also tends to lessen vibration and reduce side-slip.

THE INTERNAL COMBUSTION MOTOR IN THEORY AND PRACTICE.

In the series of articles which we are about to commence on this subject it will be our aim to deal with all the highly interesting theories involved in the construction and working of the petrol motor in such a way that they cannot but be of service to all interested in motorcycles, whether they be constructors, repairers, or riders. To riders of the motorcycle it is particularly to their own interest to learn the why and wherefore of the many phenomena they may have noticed in the riding and manipulation of their machines, and for which they may be at a loss to account. A more accurate knowledge of motor principles is a "sine qua non" for designers, constructors, and repairers, as tending to the production of efficient work in the way of design by applying true mechanical principles. So that the series may be advantageous to all sections of our readers, as far as possible plain and untechnical language will be adopted.

Why the Petrol Motor is Termed an Internal Combustion Engine.

We can regard the petrol engine and the steam engine as both being, strictly speaking, heat engines, but they differ in the respect that the energy for the steam engine is developed exterior to the motor by the burning of coal in the furnace of the steam boiler, and the production of steam pressure, which it is convenient to assume as a gas. Now, in the petrol motor the generation of pressure is actually or primarily developed in the cylinder of the motor itself by the combustion of petroleum spirit vapour and air.

Features in Common between the Steam and Petrol Motor.

The fundamental parts of the steam engine are the cylinders, valves, piston, connecting rod, crank, fly wheels, and in the petrol motor we have the same fundamental parts, but we have also distinctive features in the petrol motor which are absent in the steam engine. Take, as instances, the ignition apparatus and the radiators or cooling device, and here is an essential difference between the two types of motors. Whereas to attain the highest efficiency from a steam engine it is important to keep the heat from dissipating itself from the cylinder by surrounding the cylinder with a jacket of heat-retaining or *non-conducting* material. The cylinder of the petrol engine is surrounded with a jacket of highly conducting material, so as to dissipate the heat as much as possible; but, as will be explained later, it is by no means desirable to get rid of all the heat.

The Petrol Motor more Efficient than the Steam Engine.

There is undoubtedly a very much larger proportion of energy delivered to the crank of the petrol motor than in the case of the steam engine. For instance, considerable power is lost through the radiation of heat from the boiler, steam pipes, and cylinder walls. The efficiency of small steam engines is from three to five per cent., and the largest triple expansion steam engines reach 12 per cent., and small petrol motors 18 to 20 per cent. But this high efficiency of the petrol motor gives rise to heating troubles, the elimination of which forms one of the chief problems of motor design. Let us now proceed to investigate the process of developing the energy within the cylinder of the internal combustion engine. Primarily the energy comes from the petrol in the same sense that the energy of the steam engine is developed from the coal in the furnace of the steam boiler.

The Application of the Term "Explosion" Engine.

Although the ignition of the charge of gas and air in the motor cylinder is often termed an explosion, this is not correct in the sense that one speaks of an explosion of gun-cotton or dynamite. The ignition of the mixture takes an appreciable time to reach the greatest pressure, and, again, instead of the gases

resulting from the ignition occupying an immensely greater volume than before it, as is the case when gun-cotton is exploded—when cool the gases occupy less space than they did before ignition:

The Pressure of the Gases due to Ignition.

The energy imparted to the piston results from the pressure of the gases raised to a great heat. The more complete the combustion the greater the temperature attained, and hence, as before explained, there is an advantage in raising the temperature of the mixture initially by the heat retained by the cylinder, one being that a hot charge will fire quicker than a cold one. But unless we have a certain method of dissipating a fixed quantity of heat, the cylinder would speedily be raised to a red heat. The object of fitting the radiators or water-cooling jacket is to keep the cylinder at a working temperature. Apart from the fact of the working parts of the motor becoming heated, an overheated cylinder will not allow a full charge of gas to enter, because part of the incoming charge at once expands.

The Four-stroke Cycle of Operations.

The four-stroke "cycle" of operations of the petrol motor is pretty generally understood, but it will be just as well to run through them again. (1) The mixture of petrol vapour and air is drawn into the cylinder on the downward or suction stroke. (2) On the return stroke the piston compresses the charge. (3) The charge is ignited just before the piston concludes the compression stroke, and then the piston is driven down by the energy of the explosion, and imparts an impulse to the crank and fly wheels. (4) On the next up stroke the burnt charge is swept out of the cylinder.

The Ignition of the Charge.

There are several means by which the firing of the charge can be accomplished. Thus it may be performed with a red-hot platinum tube, an electric spark, great compression, or a method known as "catalytic" action. The first is the now practically obsolete tube ignition system, obsolete, at any rate, for small high speed motors, but still the system used for ordinary gas engines. The third system is the Deisel motor—described recently in "MOTOR CYCLING"—but this cannot be successfully applied to small motors for certain reasons. The fourth method consists in the application of a chemical principle, viz., the power which certain metals—like platinum—have when they are in a very finely divided state of becoming red hot in the presence of gases rich in hydrogen. This method was used in some of the earlier types of gas engines, and although a great deal was expected of it in its possible application to the high speed motor, it does not seem to have emerged from the experimental stage yet. So far the electric system has held its own, and is likely to continue to do so; and this because by adopting it we are enabled to advance or retard the time of firing, which gives considerable elasticity in the range of speed and power obtainable from the motor.

The Theory of Advancement or Retardation of the Ignition.

An important factor in the obtaining of the highest possible efficiency from small high speed petrol motors is the rapidity with which the charge is ignited. The pressure of the explosion takes an appreciable time to reach its highest point, and it is necessary that the piston should just be commencing its down impulse stroke when the greatest pressure is attained. Now we are enabled by moving the contact breaker through a short distance around the half-speed shaft to so time the spark that it can take place at any position from half to full compression stroke. If the mixture of petrol vapour and air is well proportioned and the compression is high, then it will as a rule be found that ignition will take place with maximum rapidity, and that $\frac{1}{4}$ stroke is the earliest possible time to ignite.

(To be continued.)



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OPINION.

Medical Men and the Motor-Bicycle.

That there is a growing demand for high-grade motor-bicycles from members of the medical profession there cannot be the slightest doubt. The ever-increasing amount of correspondence we receive from doctors seeking advice as to the selection of suitable machines goes to prove that they see in the motor-bicycle an almost ideal machine that will meet their requirements. Its handiness and simplicity of management are merits that medical men have not been slow to perceive, and in cases where a large country practice has to be dealt with it should form a much more convenient means of getting about than a horse and trap. Then, on the score of economy, the motor-bicycle occupies an infinitely more favourable position than the doctor's carriage. In several of the letters we have received from medical men they state that since becoming perfectly familiar with their motor-bicycles they have used them very largely in their practice, and have been able to get through a much greater amount of work than formerly, and at a minimum of expense.

Several inquiries are from doctors whose practice is located in rough and hilly country, and who find it entails much hard work on the horse, and progress with the work is necessarily slow. They would be glad to dispense with the horse and trap altogether if they could get a thoroughly reliable and easily-managed motor-bicycle to replace them.

For average country roads we can say that any of the standard makes of $1\frac{1}{2}$ or $1\frac{3}{4}$ horse power would meet their requirements, but there seems to us to be an opening for a special type of motor tricycle fitted with a $2\frac{1}{2}$ horse power motor for riding in very hilly districts. One good point in its favour would be its increased luggage-carrying capacity, and another its stability on bad roads.

At the same time, a fair number of the higher-powered motor-bicycles, 2 to $2\frac{1}{2}$ horse power, are being supplied to medical men who do not object to the manipulation of a heavy two-wheeler. There is practically no hill too steep for these machines to get up unaided, but then it would seem that as the weight is not much below that of a tricycle it would be better, in some instances, to invest in a tricycle, unless the saving of storage room were a consideration.

A distinct revival of the motor-tricycle has set in, and no doubt manufacturers will have something new to show in this line shortly:

EXPERIENCE.

A Doctor's Experiences with a Beeston-Humber Motor-bicycle.

As stated below the motor-bicycle is creating a large amount of interest amongst members of the medical profession, and the following account, written by a medical practitioner of standing, should prove valuable to others who are contemplating the adoption of the motor-bicycle.—ED.

Many medical practitioners are now using motorcycles, instead of driving to their visits. I, as one who has been the possessor of several motorcycles, may perhaps be allowed to relate my experiences with the Beeston-Humber, chain driven. This is the make I have decided to adopt, because I find it highly satisfactory in all respects.

My present Beeston-Humber I have driven over 400 miles. On two occasions I went a distance of 50 miles without a single dismount. This fact is valuable testimony to the all-round efficiency of the machine. Then with regard to detail: it is a capital hill-climber, devoid of that side-slip sometimes met with in other motorcycles; it is a steady and consistent runner, and the vibration, by a skilful distribution of parts, has been reduced to a minimum.

The carburation never gives the slightest trouble. The timing gear is one of the most notable indications of careful design, and the electric ignition has never failed in its working. This arises from the fact that no oil is allowed to leak on to the contact breaker.

Another good feature of the machine is the ease and rapidity with which the free engine can be stopped. This is especially convenient for those who have many calls to make, and who only travel short distances. It also obviates the danger which arises from frightened horses. Only one sharp pressure on the pedal is necessary to start again, and the motor responds immediately. With a little practice it becomes quite easy to connect and disconnect the engine from the pedal—in fact after a few outings the rider when required uses this means almost, as it were, unconsciously.

There was one fault with the machine, but this was cleverly remedied by the local agent. The wire which was originally carried to the frame and fixed to the front of the brake has been substituted by a connection on the handlebar, which, by lifting the lever, breaks the contact and keeps away the mud and dirt, the accumulation of which formerly caused so much irritation.

This is so palpable and necessary an improvement that I feel sure that the makers will adopt it in the future. Then they will have, in my opinion, a perfect motorcycle—and with the present keen competition, that is asserting a good deal.

For speed, simplicity, and smart appearance the Beeston-Humber will take a lot of beating. The rider can even free-wheel down most of the hills, and the cycle not only glides gracefully—a delightful sensation—but the process allows the engine to get cool.

I merely bring these striking facts to the notice of those about to purchase a motorcycle. There are so many makes that a novice is naturally perplexed. I learned in the school of experience; and others, who are gifted with discernment, are welcome to the benefit of it.

MEDICAL PRACTITIONER.

THE WELBECK RACES.

These races, which take place on Thursday next, will be described and fully illustrated in "Motor Cycling" next Tuesday, and, as usual, we shall be the first motor paper out with a detailed illustrated report of the trials. We are sending a photographer and a special artist to Welbeck, and shall devote a considerable amount of space in our next issue to this important event.

THE "CIRCUIT DES ARDENNES."

A Novel Motor Road-Race won by an Englishman, Mr. C. Jarrott, in wonderful time.

As was generally anticipated the motor road race which came off on Thursday last on Belgian territory was a great success, for which the "Automobile Club de Belgique" may well be proud.

The idea, which was entirely a new one, quite caught on, and there is not the slightest doubt that the innovation

Will be Repeated

as often as a proper course can be selected, as it does away with all the bother of "neutralised sections," and, as a result, calculations in which everyone, promoters and competitors alike, gets lost.

The idea was as follows: A good, quiet stretch of road was selected in the shape of a "circuit," starting from a town named Bastogne and coming round there again; said circuit being 85 kilometres (53 miles) in length. The race comprised six times round, or 318 miles in all without a stop.

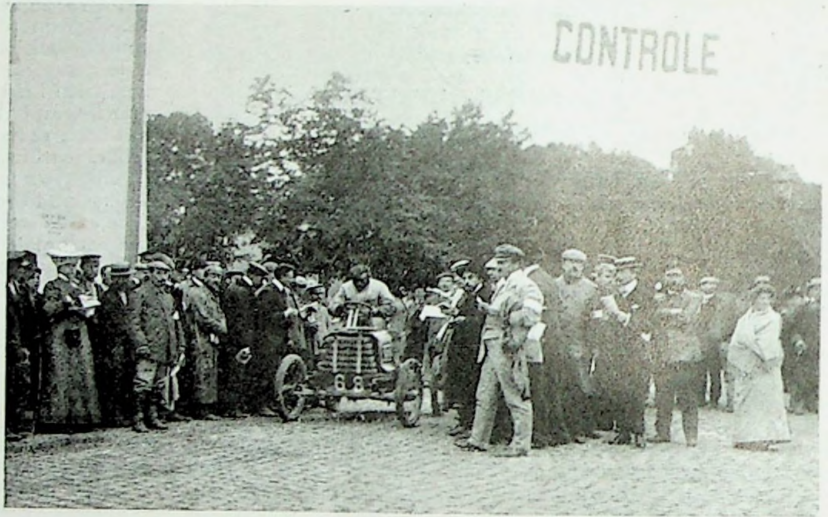
The success of the idea is shown by the fact that the event attracted 76 entries, out of which

There were 56 Starters

including all the best Belgian and French chauffeurs, also several English and German motorists.

At the completion of one "lap" a Belgian competitor, M. Pierre de Crawhez, who had started one of the first, was leading, and he was going so well that it looked odds on him winning, but accidents.

Unfortunately, however, the accident happened, for just after having finished the second circuit the leader came into violent collision with another competitor. His car was badly smashed, but he



Scene at the Start of the Circuit des Ardennes.



Start of the Motor-Bicycles in the Circuit des Ardennes.

Luckily Escaped Unhurt.

The struggle lay afterwards between a Frenchman named Gabriel, on a Mors car, and the well known English expert Jarrott, on a Panhard, and it was, so to speak, a neck-and-neck race until the last time round, when Jarrott drew ahead, ultimately

Winning with Nine Minutes'

lead on Gabriel.

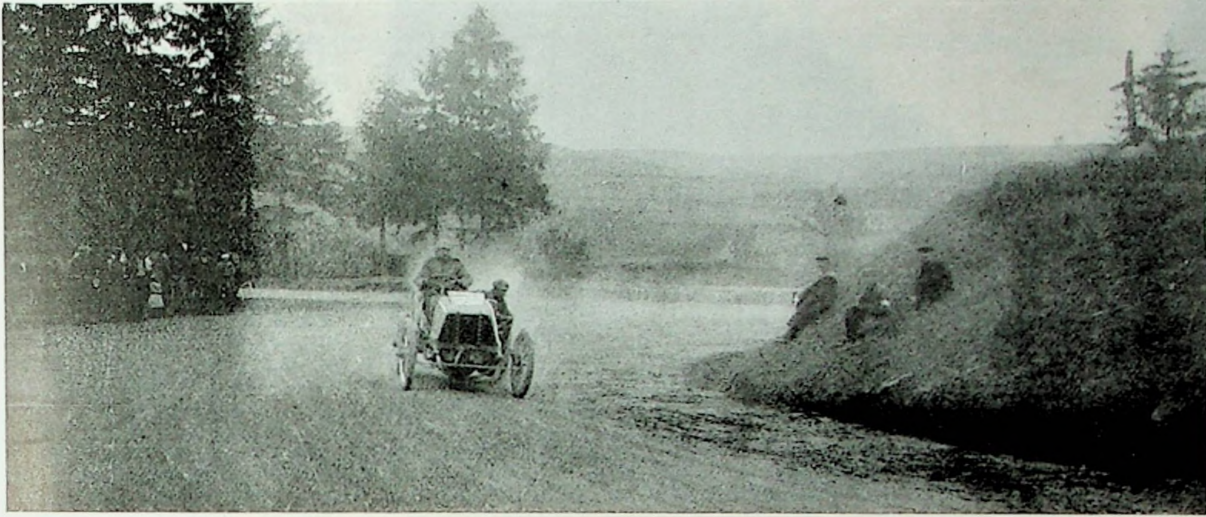
In the afternoon, after the heavy vehicle contest, a race (twice round) was held between motor-tricycles and bicycles, resulting in an easy win for Osmont, in the first category, and Deryn in the second.

List of Placings.

Appended is a complete list of the official placings in this interesting event:—

I.—HEAVY CARS (6 Laps).

1, Jarrott (Panhard Lavassor), 5h. 53m. 39s.; 2, Gabriel (Mors), 6h. 2m. 45 1-5s.; 3, Vanderbilt (Mors), 6h. 22m. 11s.; 4, Zborowski (Mercedès), 6h. 46m.



A FINE TURN ON THE ROAD.
Showing one of the corners of the route of the Circuit des Ardennes.

4s.; 5, Girardot (C. G. V.), 6h. 55m. 55 2-5s.; 6, Heath (Panhard-Levassor), 6h. 57m. 3 3-5s.; 7, Augières (Mors), 7h. 43m. 50s.; 8, Barrow (Dietrich), 8h. 8m. 3 2-5s.; 9, Stead (de Dietrich), 8h. 18m. 26s.; 10, Coppée (Germain), 8h. 32m. 35s.; 11, Wattecamps (Germain), 9h. 15m.

II.—LIGHT CARS.

1, Rigolly (Gobron-Brillie), 6h. 42m. 16 4-5s.; 2, Guders (Panhard-Levassor), 7h. 1m. 48 1-5s.; 3, Edmond (Darracq), 7h. 4m. 3 3-5s.; 4, Berteaux (Panhard-Levassor), 7h. 26m. 47s.; 5, Uhlmann (Decauville), 7h. 35m. 53s.; 6, de la Touloubre (Decauville), 7h. 36m. 38s.; 7, Colin (Darracq), 7h. 44m. 20s.; 8, Durand (Durand), 7h. 48m. 53s.; 9,

Tart (Clément), 7h. 50m. 15s.; 10, Barbaroux (Clément), 7h. 59m. 6s.; 11, Delangery (Delahaye), 8h. 3m. 37s.; 12, Dernier (Gobron-Nagant), 8h. 38m.; 13, Hautvast (Pieper), 9h. 11m.; 14, Page (Decauville), 9h. 26m.

III.—"VOITURETTES."

1, Corre (Corre), 9h. 39m.

IV.—MOTOR-TRICYCLES (2 Laps).

1, Osmont (Dion-Bouton), 2h. 53m. 18s.; 2, Joostens (Korn), 3h. 8m. 45s.

V.—MOTORCYCLES (2 Laps).

1, Dery (Clément), 3h. 0m. 47s.; 2, Arnott (Werner), 3h. 36m. 57s.; 3, Masson (Clément), 3h. 43m. 52s.

ECHOES OF THE CIRCUIT DES ARDENNES.

Charron had to give up during the first tour. He was well ahead, going 90 kilometres (56 miles) per hour, when he broke down. He took a second voiturette and again broke down. No accident, however, happened to the driver or his assistant.

Déchamps had also to give up during the first tour, one of the cylinders failing to act.

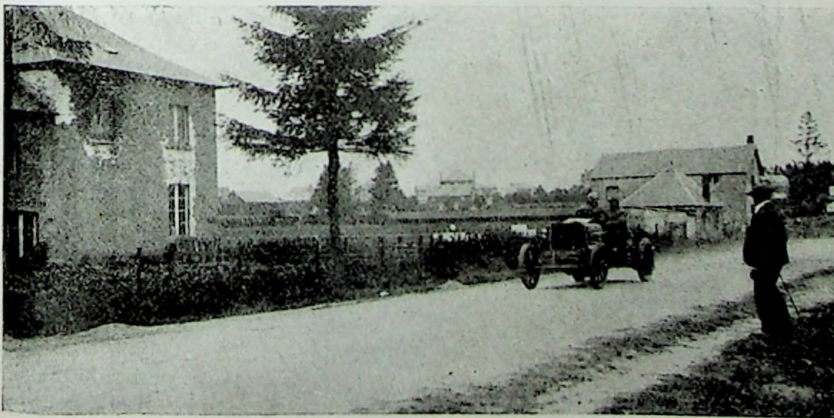
Pierre de Crawhez went for an hour at a pace of about 100 kilometres (about 62 miles), and won the de Raczynski Cup. Afterwards he collided with the voiturette of F. Coppée, and seriously damaged his Panhard, necessitating the driver to abandon the journey. The two front wheels of the heavy car were smashed to pieces. The de Raczynski Cup was given for the best time for the first 100 kilometres, which were covered in 1h. 2m. 25 3-10s.

Jarrott covered the 500 kilometres in 5h. 45m. 54 3-10s.

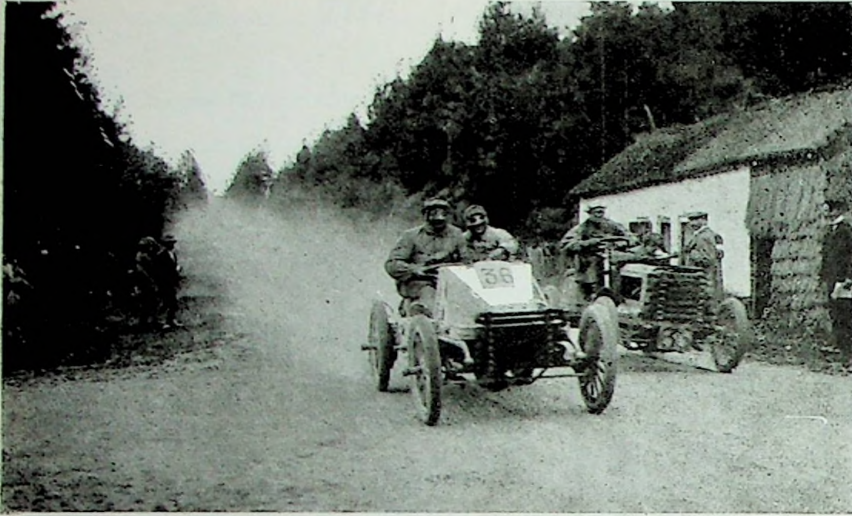
Rigolly made a brilliant winner for the second class (light cars), easily defeating Guders on his Panhard, and Edmond on his Darracq, both of whom were confident of winning.

A large number of sportsmen who had taken part in the Ardennes races went afterwards to the Chateau Royal in the Ardennes, where they intend to stay for a few days' rest after the exertions of the race.

The finish between Zborowsky and Girardot was splendid, but a few miles from the finishing post the latter had to stop, giving his adversary an excellent chance.



Jarrott Winning the Circuit des Ardennes.



(THE CIRCUIT DES ARDENNES. An exciting incident during the race.

Dust on the roads was not excessive, as there had been some rain during the night before the race.

Jarrott on a Panhard-Levassor made an average of 54 miles per hour.

Vanderbilt, the millionaire, at first proved a keen opponent to Jarrott, but in the latter stages of the race Gabriel stuck to the latter, and the issue was undecided for a long time, as Jarrott only gained 12 seconds at the fourth circuit, and one minute at the fifth circuit. At the last circuit Gabriel was put out of the race by a damaged chain, thus letting Jarrott pass and win by nine minutes.

Jenatzy had an accident whilst running at nearly 70 miles per hour. A front wheel of the car came off, and the car overturned. Jenatzy was hurt, though not seriously.

Roland and De Gaters gave up at Habay-le-veuve, as, riding behind Jarrott, they failed to see a wall, owing to the dust clouds, and dashed into it.

In the light cars, Rigolly (the Gobron-Brillié champion) triumphed. He rode a splendid race, admirable for its consistency, and also from a speed point of view. He beat Guders on a Panhard and Edmond on a Darracq.

The German cars were the successful ones in the tourist section. But it must be mentioned that there were no French cars competing.

The pneumatic tyres came out of the race with flying colours. Punctures were extremely rare, and praise was heard on all hands for the performances of the tyres.

We give on this page a photograph of Baron de Crawhez's car taken immediately after the collision. The condition of the car will give some idea of the terrific smash.

Our Paris correspondent, who sends us the foregoing report, places Arnott second, but we observe that "L'Auto Velo" places Elskamp (Minerva) second, in 3h. 26m. 39s. We have not time to verify this before going to press.

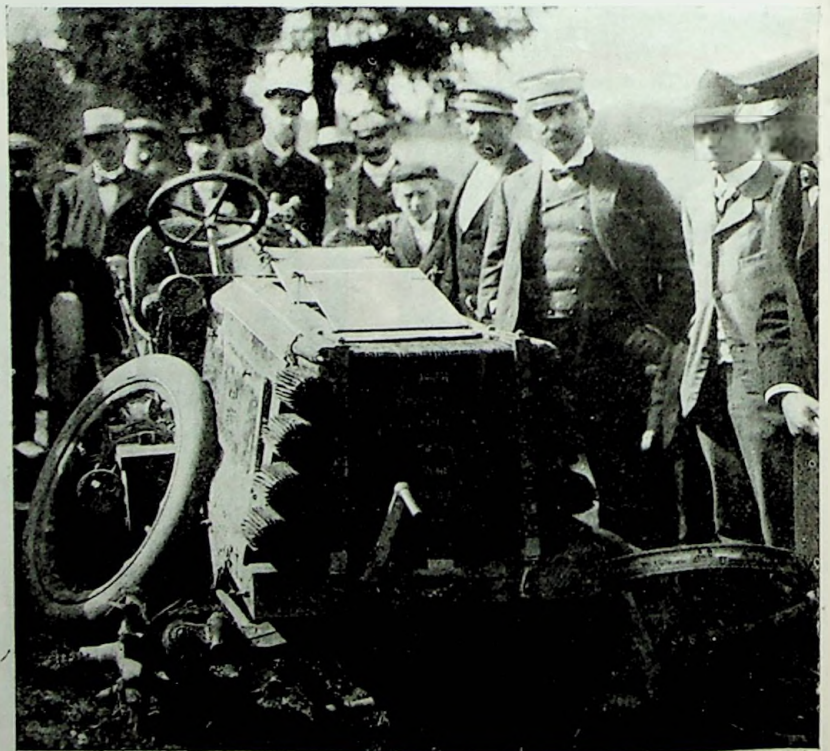
The circuit of the Ardennes race was termed in France "L'Autodrome Rationnel"—the rational motor race.

The French motor industry has certainly scored a triumph. The course was in certain parts rough, and it is considered highly satisfactory that such excellent times should have been made. There can be no question as to the accuracy of these times, as there was neither neutralisation nor difference in the timing to be taken into account.

An exciting contest took place between Vanderbilt, Zborowski, and Girardot, and Pierre de Crawhez also did a splendid ride, but did not quite finish. He made the first circuit in 54 minutes, the 200 kilometres in 1h. 2m. 35s. Whilst running at the rate of 120 kilometres to the hour he encountered Coppée, who, just at this moment, had to slow down to allow a pedestrian to cross. De Crawhez had the misfortune to get his right front in collision with the wheel guard of Coppée's machine, with the result that the wheel flew off, and the other wheel also came off its axle, and the car slid along for 200 metres, and pulled up alongside some trees, without the rider or his mechanic being hurt.

Special Facilities for Tourists.

The western railways in France will take tourists' cycles and motorcycles from Dieppe or Havre to Paris at an inclusive charge of sixpence. New machines sometimes are liable to duty on entering the country. This, however, is returned at any port on departure. Steamer charges for motor-bicycles are double those for ordinary cycles.



A TERRIFIC SMASH.

Baron de Crawhez's car after the collision in the Circuit des Ardennes.

NEWS.

Welbeck!

Next Thursday.

"Motor Cycling" will fully illustrate the meeting.

And will be the first motor paper out with an illustrated report.

There are some interesting photos of Holbein's swim in this week's "Cycling."

C. Jarrott will ride the new 8 h.p. De Dion motorcycle we have already illustrated.

"Cycling" this week contains some striking illustrations of "Looping the Loop" as performed at the Aquarium.

The Frankfurt-on-Main Automobile Club has arranged international races for August 31st. Motorcycles will have a class of their own.

The German Automobile Club have just held road trials for motor transport vehicles. The question of speed did not enter into the trials so much as that of fuel consumption, carrying-capacity, and hill climbing.

Many motorcars are now being fitted with a dust and wind screen, which consists of a celluloid window fixed upright on the front of the car. With this fitted, there seems no necessity for the occupants of the car to wear hideous face masks.

The current "Esercito Italiano" contains an excellent article from the pen of an officer of the Bersagliere regiment, strongly urging the military authorities to equip every regiment with a few motor cycles to facilitate communication between Camps in the field.

The Panhard-Levassor firm at Paris have acquired the rights to use the Lohner-Porsche patents for motors in France, Great Britain and Italy. The Lohner-Porsche system is gaining a large number of friends, and those who have tried the cars pronounce them very satisfactory.

As the new Customs tariff does not satisfy the motorcycle and cycle manufacturers of Germany, and as the Government will not do anything further to assist them, they have formed a society to rouse the patriotism of the purchasers, asking them to buy only German-made machines.

Cycling Upside Down.

The wonderful feat known as "Looping the Loop," which is being performed twice daily at the Royal Aquarium, is boldly illustrated on the centre pages of "Cycling" this week, and a full description also appears. The illustration is absolutely the first to be published which shows the whole of the track, from the start in the roof to finish on the stage. "Cycling" also contains all the week's news, reports and illustrations of the Bank Holiday racing, and an interesting description, with photographs of Holbein's attempt to swim the Channel.

Mr. C. Jarrott drove a 70 h.p. Panhard car in the Ardennes race.

The motorcycle entries for the Welbeck trials are very poor.

England is booming in the motor world. Jarrott has won the Ardennes race, as reported in another column.

The A.C. & Motorcycling Races.

There has been some misapprehension lately as to whether the Automobile Club controls motorcycle events. If pedals are used after starting, the competition will be under N.C.U. rules; but if, on the other hand, pedals are not to be used, then the competition must be held under Automobile Club rules, machines and drivers registered, and the competition rules of the Club in all respects complied with.

Another Cause of Misfiring.

On a recent run on one of our machines we noticed that the motor missed fire every time a rough bit of road was struck. Knowing that the accumulator and plug were all right, we came to the conclusion that there was a connection loose, and this broke the circuit with vibration. We ran over the battery, coil, and switch terminals, and finding all tight examined the contact breaker and, sure enough, the platinum tipped screw was quite loose owing to the clamp screw not being tight. The screwdriver soon put this right, and we had no further mis-firing. This would point to the necessity of not putting too much faith in the clamp screw always remaining tight, but should be examined occasionally.

South America is pointed out as an excellent market for motorcycles and small cars; both classes must be strong to enable long runs to be made, with no repairers and spare parts near at hand.

A considerable impetus has been given to the alcohol industry in France from the fact that out of 27 cars using it as a fuel 20 got through to Vienna, which works out at 74 per cent., as against 54 per cent. of the petrol cars. The Government is inclined to favour the production of alcohol as an important home industry.

What to do in the Event of One Cell of the Battery Getting Exhausted.

Cases have come to our notice in which one of the cells of a 4-volt ignition battery has run out completely, with the result that the motor cannot be sparked. By the aid of a voltmeter or test lamp, the cell that is exhausted can be found, and from an experiment we tried recently we have come to the conclusion that under certain conditions it is quite possible to run with only a single cell. Firstly, the points of the sparking-plug should be adjusted to $\frac{1}{16}$ inch or half millimetre, and then the contact breaker must be perfectly clean. It will next be necessary to disconnect the wire from the terminal of the exhausted cell and twist it round the bridge that connects the cells together, this first being scraped quite clean so that the wire makes good contact with the lead. At the first opportunity the defective cell should be examined by a good firm of battery makers.



The Meet of the Manchester Automobile Club at Ivyholme, Macclesfield, by invitation of Mr Gerald Higginbottom and Miss Clarke

Motors in the German Army.

The Motor Transport Company of the German Engineer Regiment sent a car to take part in the transport competition between Leipzig and Eisenach. The car carried a load of two-and-a-half tons and was in charge of an officer. This is the first time the military authorities have taken part in a motor competition.

Be Careful to Replace the Gauze.

There will generally be found two or three pieces of wire gauze in the box at the inlet valve and the purpose they serve is to prevent a back-fire into the carburetter, so care must be taken to see that they are replaced, if taken out for any purpose.

A Daring Drive.

A motorist has succeeded in driving up the round tower at Copenhagen, one of the most daring rides ever undertaken. The tower is 120 feet high and only accessible by a winding footpath 12 feet wide. Tradition says Peter the Great drove up with a team of four horses. The motorist covered the uphill journey in one minute, turned round when he had arrived and came slowly back.

Motor Vehicles' Import Duties Abroad.

Motorcars imported into France have to pay an import duty of £1 4s. per cwt. when under two and half cwt. total weight, and £3 per cwt. when above this limit. If the cars come from countries receiving the benefit of the most-favoured-nation clause, the duty is reduced to £1 and £2 8s. respectively. In all cases the full total weight is charged for. Electric accumulators are charged 8f. 5c. respectively, 6f. 10c. per cwt. Motorcycles are taxed much lighter. They have to pay a duty of £5 per cwt. in the ordinary way, and £4 8s. under the favoured-nation clause. Every rider of a motorcycle has to pay an annual cycle tax of 10s. for every seat on the machine, which rule includes all trailers, tandems, triplets, etc.

The Long Island Automobile Club, which was the first organisation in the States to hold an endurance test and mile straight-way record races, will run off a series of track events on the Brighton Beach track.

European Agents.

The Automobile Components, Ltd., 18 and 20, Church Street, Islington, have been appointed sole European agents for the French-manufactured "Sirius" motor bicycle. This machine is 2 h.p., and it is claimed that it has climbed a hill of one in six at an average speed of 22 miles per hour. A Roubeau spray carburetter is fitted, and the weight of complete machine is 75 lbs.

The Duke of Westminster in his motor car, at left of driver - at the gate of Eccleston Church at the wedding of Lady Lettice Grosvenor.



The Duke of Westminster waiting outside the Church while the Bride and Bridegroom enter their carriage after the ceremony.

Photos by F. Banks.

A Motorcycle Club for Liverpool.

It has been decided to form a motorcycle club in Liverpool, where there is plenty of scope for such a step. Local riders wishing to join should communicate with either Mr. W. J. Kirkland, 11, Lord Street, Liverpool, or Mr. Lancaster, manager for Alldays and Onions, Renshaw Street, Liverpool. It is the intention to form the club solely for motorcycle riders.

Trial of Strength between Horses and Motor.

An interesting contest to compare the strength of three powerful horses against a motor recently took place in Chicago. A wager had been laid by the proprietor of a large cartage company that a team of three of their best horses could do more work than one of the vehicles owned by the Chicago Motor Vehicle Co. It was arranged that the team were to be hitched to the bus, and at a given signal both the horses and the motor were to be started together. This was done, and the result was that the motor, after a little hesitation, pulled the horses backwards. Several trials were made, and in these the horses were allowed to get a good start. However, the driver of the motor had no difficulty in pulling up the horses and drawing them backwards each time.

In Belgium all motor vehicles pay 12 per cent. of the declared value, which value can be adjusted should the Custom officers think the declaration too low. In the latter case it is certain that an over taxation, against which there is no appeal, takes place. Tourists have to deposit 25 francs, which are returned when the car with its "plomb" leaves the country within a specified time.

Germany requires for all motor touring vehicles a deposit of £7 10s., returnable when the car is exported within one year at the same Custom Station, where the receipt and the "plombs" of the car must be produced.

Italy charges an import duty of £4 8s. for cars with four and less than four seats, and £13 4s. for all cars with more than four seats. For motorcycles a charge of £1 14s. per machine is made—in all cases returnable when exported within 12 months.

Spain's import duties are 7f. 5c. per cwt. for motor parts. Every carriage with four seats and under pays 1,000 pesetas, an omnibus of 15 seats and under, 312 pesetas, and when it has more than 15 seats, 750 pesetas. Motor cycles pay the same charges as motor parts, and the payments are refunded when touring cars leave the country.

Supply Castings.

The London Autocar Co., of 182, Grays Inn Road, E.C., are now supplying sets of castings for building a 1½ h.p. cycle motor. The cylinder has 2½ inch bore by 2½ inch stroke, and the bearings are of good width, and there are other good features of design about the set. Full-sized working drawings are supplied.

Avoid Dismantling the Motor.

Although every legitimate means is to be encouraged with a view to learning all the details of the construction of a motor-bicycle, it cannot be too strongly impressed upon the rider to avoid taking the crank case of the motor apart unless he has the necessary experience to replace the parts. It has recently come to our notice that a motor cyclist was so anxious to see the inside of the crank case that he took them apart although the machine was running perfectly. The result was that he found himself non-plussed how to set the timing gear correct and, after hours of worry, he had to give it up as a bad job and send the whole lot of parts back to the works to be reset. Of course, there are plenty of riders who can take the motor to pieces and reset the ignition, and the above remarks apply chiefly to beginners. At the same time, it might be mentioned that it is permissible to remove the cylinder from the crank case if necessary, say, to put on a new piston ring, as the timing gear is not disturbed in this instance.



"Archer Up" writes:—"If I 'get home on a winner' this season I intend ordering a motor on these lines: The whole paraphernalia is firmly fixed on a platform braced over the back wheel. What I expect to get is upright engine, no strain on front frame and forks, simpler wiring arrangements, unlimited width of bearings, and, furthermore, the whole platform and box of tricks will be removable if necessary with the undoing of some half-dozen bolts. I furthermore suggest a light gauze cover of the meat safe order of architecture."

Werner Motor-bicycles in Demand

Since Arnott demonstrated what the new Werner could do in the way of running long distances, thus proving its reliability, quite a little boom in these capital machines would appear to have set in. As showing the good work always put in the Werner engines, one often comes across machines of the old type that have been running three or four seasons and are not much the worse for wear.

Further Particulars of the Four-Cylinder Racer.

The four-cylinder Clement Garrard motor has created considerable interest, and we are able to give the following additional particulars:—The multiple cylinders, etc., of this machine are arranged as follows: There is one battery of accumulators, sometimes four, sometimes six volts, the positive wire is led to the sparking cam, and there would be four separate returns through four separate coils, these are energised in their turn and proper time, and of course induce the sparking in the four separate secondary circuits at the right instant. The connecting rods in the two-cylinder engine are connected on to the crank pin as follows: One connecting rod has a wide bearing the full length of the pin, the other rod end is divided and goes round outside No. 1. The only motion in the outside bearing is due to the angularity between the cylinders. In the four-cylinder motor we have a much longer crank pin and two No. 1 rods, and added to this the two No. 2 rods are fitted on the outside of the No. 1's.

We publish on another page two interesting photos of the Duke of Westminster in his car, at the wedding of Lady Lettice Grosvenor with Earl Beauchamp.

An Explanation.

An American reader of "MOTOR CYCLING" draws our attention to a paragraph in a recent issue to the effect that a national highway was about to be constructed across the United States and from which it would seem that the distance was only 850 miles from ocean to ocean. As a matter of fact, the distance is 2,500 miles, but what was meant was that the new route in itself would be 850 miles, and would connect up with other roads already made and thus form a continuous highway.

Various Spirits obtained from Petroleum Oil and their Densities.

Confusion often arises through the variety of names given to what in England is often termed petrol. In America paraffin oil is called kerosene and petrol gasolene. But there are also the names of benzine naphtha or rock oil naphtha given to an extract of petroleum closely allied to petrol, and quite suitable for running motors. Appended is a short list of petroleum spirits and their specific gravities.

	Gravity.	H.
	Specific	H.
Petroleum Ether	.69	
Cymogene	.625	.631
Rhgolene	.635	.668
Gasolene		
Do. Spirit C—		
Naphtha,		
Benzine Naphtha	.682	.703
B—Naphtha	.716	.720
A—Naphtha Benzine	.743	.747
Paraffin, American	.782	.800
" Russian	.822	.830

Silencer Cut Outs.

Silencer cut outs are popular with some motorcycle makers in the States, and we believe this idea may be adopted by one or two of our own makers for next season. A silencer necessarily reduces the efficiency of the motor slightly, and it is claimed that with small power motors especially it would be an advantage to be able to exhaust straight into the air and get the extra power for hill climbing when necessary, although the silencer would be employed when on average roads and passing through towns.

The Causes of no Compression.

Supposing it is found that the motor slows down and eventually stops, and on trying to start up again it is found that there is no resistance to the pedalling when the exhaust is closed, this shows at once that there is no compression, and either the exhaust or inlet valve will have gone wrong or a joint leaks at the cylinder head or exhaust cover. Examine the stem of the exhaust, and notice that it is not stuck fast in its guide, and also that it clears the lifter by $\frac{1}{16}$ inch. If this is all right just examine the exhaust valve and see whether a nut or cotter has not worked loose and rendered the valve spring inactive, which would not allow the valve to shut. If nothing is found wrong here, a leakage at the cover of cylinder must be looked for; the air can be felt rushing out round the joint and it will probably be found that the nuts on the cylinder cover want tightening. Another cause of lack of compression is a damaged sparking-plug, but this means misfiring as well.

Motor-Cycle Racing at Canning Town.

RECORDS BY F. W. CHASE.

A fine "gate" was attracted to the Memorial Grounds, Canning Town, on Monday, where the Thames Ironworks Co. and A.C. carried out an excellent programme including cycling and motor cycling races. In the five miles motor handicap F. W. Chase, on scratch, did a grand performance, covering the five miles in 6 min. 10 secs., which is record for standing start. In the course of the race he covered a



Chase adjusting his motorcycle preparatory to starting at Canning Town.

Gamage's Motor Department Busy.

The large cycle and motor emporium on the Viaduct is just now very brisk indeed. At times quite a line of cars and motorcycles are drawn up in front. The motorcycle accessory department is growing, and it is a business to get served sometimes with the crowd of purchasers at the counters.

A Steel Road for Motorcars.

The Steel Roads Committee of the Automobile Club of America is going ahead with its work, which is to put down steel tracks in the city and suburban roads of the States. Steel plates 12 inches wide will be laid on foundations of broken stone. Some difficulty was experienced in getting the special steel rolled. There is already one of these roads in use at Valencia, Spain. Mr. Schwab, the steel king, is furnishing the material for a mile of the proposed road.



Chase passes Martin at Canning Town.

mile in 1 min. 9 2-5ths secs. H. Martin, 30 yards, was second, a lap and a half in the rear; H. A. Collier, 1 min. 10 1-2. Chase afterwards did a five miles spin, flying start, in the world's record time of 5 mins. 50 3-5ths secs., which was 54 1-5th secs. less than his previous best of 6 mins. 44 4-5ths secs. In the five miles scratch, Chase was a non-starter, and the event fell to H. Martin, who won nicely from H. A. Collier, time 7 mins. 3 2-5ths secs. During the afternoon, A. A. Chase, paced by his brother on his motor-bicycle, broke his own record, covering the five miles, flying start, in 7 mins. 7 4-5ths secs.

To Accustom the Horse to the Motor.

A school for training horses to become accustomed to the motorcar has been established in Hempstead, Long Island, U.S.A. The Automobile Club of America has sent particulars round to all the large dealers in horses of the methods to be adopted in training horses. The idea is being well taken up.

Motor-bicycles for the Paris Police.

The energetic Chief of the Paris Police has provided the chief officer of the cyclist detachment with a motor-bicycle so that he may economise time in paying his visits to the various stations throughout the city. Those who have seen him riding the machine say that he evidently takes a very broad view of the speed regulations.

Accident to M. Deutsch.

We greatly regret to hear that M. Deutsch, the French sportsman and donor of the prize for aerial navigation won by Santos Dumont, has had a bad accident while driving his motorcar. It appears that while going at top speed the car toppled over and fell down a cutting. M. Deutsch now lies in the hotel at Meulan where he is receiving medical attention.



Chase in full flight, bending five miles record at Canning Town.



START FOR THE FIVE MILES MOTOR-BICYCLE SCRATCH RACE AT CANNING TOWN, ON BANK HOLIDAY.



OTHER PEOPLE'S VIEWS.

How to Prevent the Belt Slipping.

Sir,—I would recommend any one who is troubled with a slipping round belt to have the pulley turned out as enclosed sketch. This is the exact section I had mine turned to with the result that I can drive with a slacker belt and am never troubled with a slip. Would that it had always been so, for although I do not profess to be more unfortunate than my fellows, I have been unable to find anyone who has been so troubled with this defect as I have.—Yours faithfully,

"CLEOPETROL."

The Cause of Self-Firing in Motors.

Sir,—I note in this week's issue of "MOTOR CYCLING" (excellent paper) remarks relative to continued firing of a motor after the switch is off. A suggested explanation of this apparent mystery is that the points of the sparking-plug become red-hot and so fire the charge. This appears to be the generally accepted reason, but a little thought will prove that such a state of things is impossible. If the spark be advanced beyond a certain point it will fire too early; will cause back-firing and stop the motor. If, instead of a spark there were a continuous flame, the incoming charge would be fired and, possibly, also the carburettor through the open valve. Incandescent sparking points would have precisely the same effect, and immediately upon their becoming incandescent the motor would cease work. Well, then, what *does* cause the continued firing? Granted that the lead from the plug switch to handlebar is perfect, and not making intermittent or continued connection with the bar itself, and that the plug itself is not making metallic connection with the frame and so completing the circuit independently of the handle switch (I have known this occur). The mystery is caused by one of two things, or, rather, a combination of two. That is the heat of the cylinder combined with the heating of the charge by compression.

If a piece of tinder be placed in the cylinder of an air pump, and a smart blow given to the piston, the tinder becomes ignited.

When petrol vapour is subjected to the smart blow of the motor piston, heat is generated, but not sufficient to ignite the charge. The motor is kept running and the cylinder heats; greater heat is then generated by each succeeding blow of the piston until the exploding temperature is reached. Before this takes place, however, the charge is often exploded by the fine filaments of carbon in the combustion chamber which from black heat (similar to the wick of a lamp just extinguished which, when blown upon, glows red, or the above-mentioned tinder) become incandescent towards the end of the compression stroke, fire the charge and the usual ignition apparatus can be dispensed with, for a time; a motor will not run long under these conditions, which mean over-heating.

A motor has been built with no ignition whatever provided for beyond the compression,

but this was of necessity so great (in order to get the requisite heat) that great difficulty was encountered in starting. As a matter of fact, a belt was run from other power.—Yours faithfully,

JAS. L. NORTON.

Appreciation from Australia.

The following is an interesting letter from an Australian reader of "MOTOR CYCLING," and is worth reproducing as dealing with the motorcycle movement in the Colonies:—

Sir,—Just a few lines to let you know that "MOTOR CYCLING" is appreciated very highly in Australia, and I beg to offer my congratulations to you on account of the success attained up to the present time, and may "MOTOR CYCLING" grow, as, I feel sure, the motor industry is sure to do. Motor cycling is, indeed, a grand pastime, and must assert itself and become immensely popular, and with such a champion as your valued journal, it must forge ahead with great strides. Being particularly interested in motor bicycle matters I have noted the rapidity with which the motor bicycle has taken on, and it certainly promises even greater things in the future. I treasure every copy of "MOTOR CYCLING" I have and, with exception of No. 1, my numbers are complete, and if you have a copy kindly send it through your agents, Thompson and Co., or the above address. I intend binding the copies, as there is such an amount of valuable information in them which I would not care to part with. With regard to the motor industry here, I am pinning my faith to the bicycle, and believe that it will lead to the general introduction of other motor vehicles, and an easy means of motor education. The public here are getting very interested in motors, and every few days brings enquiries. The majority believe that the motor is just in its experimental stage, and it is a hard matter to make them think otherwise. I will take the liberty of expressing my views on motor bicycle construction.

I favour the vertical engine, believing it to be the best position from both a wearing and lubricating point, and, although the majority favour the belt, I like the chain best. The accumulator is my idea of a spark producer (especially in pairs) at present, but I think the future will bring us a perfect magneto-electric or dynamo system. The spray carburettor seems to me the most reliable and economical, although I have no knowledge of the wick vapourisers, the idea seems to me to possess excellent points. In frame construction, I feel they must be specially built with brazed reinforcements and one-piece forged ball-heads and forks fitted with outriggers or double-steering tubes, and instead of bending the back forks and stays I would insert forgings for the belt rim space. I particularly favour wood rims (especially aluminium lined) as they are not only stronger but do not bump out of shape. Kindly let me know if I am on the right track and if you can give me any points I would sincerely thank you.—Yours faithfully,

"AUSTRALIS."

Motors and Trailers.

Sir,—Referring to Mr. White's letter on the advantages of a machine capable of being used as a motor, or pedi-cycle, I would like to suggest that a motor on a trailer wheel behind any ordinary cycle would answer better the same purpose and involve less trouble in making the change.

The idea was suggested to me by a paragraph and diagram which appeared in "Cycling" last winter, and ever since I have been looking forward to some such contrivance being placed on the market. The Singer wheel ought to be easily arranged as a trailer. We should imagine that it would be much safer and easier to attach a "motrailer" to an unstrengthened bicycle than to fit a motor direct, with the advantages of simplicity of attachment and much greater absence of vibration and strain on the bicycle.—Yours faithfully,

"CORVUS."

Oil on Trembler.

Sir,—I have read the letter written by Mr. Van Hooydonk in this week's "MOTOR CYCLING," and must say that my own views and experiences agree with his. I have been riding a Winecycle fitted with a Minerva motor for some weeks now, and from the very first I noticed that, although my contact or trembler was covered with oil, it made no difference to the sparking. On the contrary, whenever I made contact by lifting the trembler up with my finger I found I got a nice strong spark.—Yours faithfully,

J. WILLIAMS.

Lowestoft.

Sir,—With reference to Mr. Hooydonk's letter on the above, his results, in my opinion, seem quite in accord with electrical theory. *Cæteris paribus*, the spark given by an induction coil will be greater the more sudden the break at the trembler. In air, no matter how quickly the spring leaves the fixed platinum point, an arc will follow the spring for a short distance till by the dying down of the self-induction of the coil and the increasing distance between the spring and point the current has gradually become too weak to maintain the arc, and the circuit is broken.

To avoid this in large coils such as are used for "X"-rays, etc., the trembler works under a liquid, alcohol, water, etc. To understand their action, look at the wire carrying the current to the sparking-plug. Here the rubber insulation on the wire may only be one-sixteenth of an inch thick, and yet even if the covering is touching the metal work of the bicycle the spark will prefer to jump three-eighths of an inch through air to forcing a path for itself through the rubber.

The insulating power of rubber is, in fact, many times that of air. And so it is with mineral oils, their insulating power is very high. So long as no particles of dirt are present the force of the contact cam is easily able to press the platinum points into good contact even though oil be present; then when they separate the oil, instead of air, rushes in between them and quenches the spark or arc, thus interrupting the current with great

suddenness, and producing a good spark at the plug. It is probable the best form of contact breaker would be one working in oil, only in this case it should be a rotating one.—Yours faithfully,

ALEX. HILL.

(Consulting Electrical Engineer.)

Pedalless Motors.

Sir,—In the earlier issues of your excellent little paper there appeared several articles and letters as to the future use of the pedals, and not a few laid claim to having invented cranks which could be used as foot rests in addition to their ordinary vocation, and that they hoped soon to place them on the market. But only one has appeared on the scene as yet, and that appeals to me as liable to soon be put out of action by mud and dust taking refuge in the slot which is quite open for its reception when the crank is in the foot rest position; so that when you come to use the pedals to put in the finishing touches in the last few yards of a long climb, I should imagine you would have to pedal after the manner in which the eccentric travels in relation to the crank of the steam engine, in which case it would be practically useless as the auxiliary power. No doubt a crank of this description is wanted to ride with comfort, and would be a boon, especially as most makers are now fitting higher powered motors which are capable of mounting most hills, consequently reducing pedalling to a minimum. But we must have one that is simple and efficient, also trouble proof. Others, I daresay, like myself, have been awaiting developments since we had intimations in this direction, and would like to know if there is an efficient pattern of such a crank on the market, or what are the intentions of the makers.—Yours faithfully,
Lincoln. "FENMAN."

Engine Power.

Sir,—In reply to your correspondent, I cannot do better than give my actual experience of variously powered cycles of which I have tested many catalogued as showing from $1\frac{1}{2}$ to $2\frac{1}{2}$ h.p. For this kind of country (Devon), and so far as I personally am concerned all kinds of country, I prefer the high powered machine. There are two $2\frac{1}{2}$ h.p. Excelsiors in this house, and I plump for them unreservedly. They are much better than $1\frac{1}{2}$ h.p. machines on hills, showing "life" where the weaker-engined bikes necessitate hard pedalling. Your correspondent cites me as saying that brisk pedalling is necessary even with the $2\frac{1}{2}$ h.p., but my reference in the article was, as stated, to a particularly formidable hill, which I have seen a $1\frac{1}{2}$ h.p. front driver, despite very hard work on the rider's part, fail to surmount. Assist the $2\frac{1}{2}$ h.p. and you romp up. Most hills are easily climbed on the $2\frac{1}{2}$ h.p. without pedalling at all. The $2\frac{1}{2}$ h.p. machine on the level seems to me quite 8 to 10 miles an hour faster than the $1\frac{1}{2}$ h.p., but, of course, no sane person who has any respect for the safety of the public rides for any long distance at full speed on ordinary roads. The $2\frac{1}{2}$ h.p. machine, if pressed, will leave the majority of cars standing. The $1\frac{1}{2}$ h.p. gives "25" and even more easily if of a good make. For towns the $1\frac{1}{2}$ h.p. is in every way to be preferred, the power being ample and the handiness superior. It is also safer to handle. Let me reiterate my advice to all users of belts to consider and test the Lincona. It is wonderfully effective, and I find that with moderate tension it never slips, or, if it does, I never am able to note it on the worst hills. Its wear, too, is surprisingly good. Some such efficient belt is necessary if a powerful engine is to be of any service. I am told that the wide, flat



A Handsome Car that a Lady can drive—
The $4\frac{1}{2}$ HP De Dion Voiturette with Landau body

belt is satisfactory, but have no personal experience of it.—Yours faithfully,

E. DOUGLAS FAWCETT.

An Unusual Breakdown.

Sir,—Being a constant reader of "MOTOR CYCLING," I was very much interested by seeing in No. 23, in the article on "Renewals and Detail Improvements," the directions for replacing the gear of the engine and the "timing" of the engine. A rather uncommon breakdown occurred to me three weeks ago—luckily (?) as I was passing through the outskirts of a town. I had ridden to stay with a friend for the week-end and returning on the Monday to London had proceeded about four miles at a pace "well up to the legal limit," at about 16 per hour, when the engine suddenly stopped, and I skidded for about four yards with the wheels locked. I had visions of a seized piston, but was puzzled, as the engine had shown no signs whatever, and was running splendidly up to the accident. As it was just about 6.30 a.m. I had to knock a man up out of bed to get permission to leave the tricycle with him. It is, by the way, a $2\frac{1}{2}$ Ariel, with water-cooled head. Upon subsequent investigation, having taken the engine off and opened it up, I discovered that the 2 to 1 gear wheel actuating the exhaust and spark had seized on its bearing: the rest of the engine was perfectly lubricated. I think that it was due to the

fact that there was not sufficient provision for the lubricant to run along the bearing. I had to take the part up to London and eventually to get a new gear wheel, using the old bearing after having faced it up.

On putting the engine together I followed the instructions in No. 23 of "MOTOR CYCLING," and timed it so that with the "spark lever advanced" to the fullest extent, the explosion took place just before the piston reached the top of the cylinder—I should say about three-eighths of an inch from top of stroke. When put together, and the tricycle in working order again, I found that with the "spark lever right back (in the usual position for starting) the engine would not work at all—only firing into the exhaust—until the lever was advanced right forward. There was nothing for it but to start again, take the whole machine to pieces, and re-time this time so that the explosion took place just before reaching the top of stroke (about $\frac{1}{4}$ inch) with spark lever right back. On again getting tricycle going, I found that it went much better than it had ever gone before. Hoping that this letter will not take up too much of your time, and that it may be of use to anyone in a similar fix.—Yours faithfully,

J. F. G.

In "Cycling" this week the sensational performance of "Looping the Loop" is boldly illustrated and described.

OUR INFORMATION BUREAU.

A large number of replies have been dealt with through the post. Information on all subjects pertaining to Motors, Motorcycles, and Motoring generally will be given to readers who seek such information or advice. Any reader who desires to ask a question with a view of ascertaining the views of other riders based upon actual experience should send his query, which will be inserted, and replies to such questions will duly appear if of general interest; if not, a reply will be sent by post; a stamp, therefore, must always be enclosed.

Advice on Exhaust Valves.

G.W. (Edinburgh) took the exhaust valve out of his motor to regrind it, and found that the stem was in a scaled and brittle condition and looked weakened at the head. He wishes to know if it is safe to run it much longer, or should he replace it with a new one? Doubtless the valve has seen considerable service, and we should say that if it has worn to less than 3-16ths inch at the neck, it is too weak and there is a chance of its breaking at an awkward time. A new valve should be fitted and, of course, carefully ground in on its seat.

Dry Batteries.

C.W. (Portsmouth) has an American-made motor-bicycle, which is fitted with dry batteries. These have worked well for the last three months, but now he finds they do not seem as strong as they used to be and the motor misses fire now and again. Would it be well to replace them with accumulators, and, if so, who would supply them? It is characteristic of dry cells to get weak after a time, and there is no really satisfactory way to recharge them. You should certainly fit a 4-volt accumulator, and Peto and Radford, Hatton Garden, London, would supply you with a good type.

R.T.S. (Pendleton) wants information on the following points: (1) Is there any likelihood of the Simms or Hewetson system of magneto electric ignition getting out of order? (2) If the magneto system is considered the best, why is it not universally adopted? (3) What advantage has an exhaust lifter over a compression tap, and is there any object in having both? (4) Is the standard pattern surface carburetter likely to be adopted in future? (5) Are the Reflex Clipper tyres vulcanised? (6) Has a 2 or more h.p. engine any disadvantage over a 1½ h.p.? (7) Do spray carburetters give trouble and what is a wick carburetter? The magneto system of ignition works very satisfactorily but requires, of course, a somewhat different design of motor details. An exhaust valve lifter makes starting much easier and enables speed to be regulated to a certain extent, and allows engine to be cooled down hill. The surface carburetter is likely to remain a fixed pattern. Reflex Clipper tyres are vulcanised. High powered engines entail extra weight and greater petrol consumption. Spray carburetters, with sensible handling, give no trouble. A wick carburetter is one in which the petrol is absorbed by a wick, and air is drawn along the surface and vapourises the petrol.

R.E. (Croydon) does not care for having a motor horn fitted and as his machine does not make much noise he would rather fit a good sized bell if there is no legal reason for not doing so. As long as "R.E." gives due warning of his approach there is no reason against his fitting a good loud bell, say Lucas-Challis, 3½ inch, if his machine is really a silent runner.

Puzzled about his Accumulator.

F.C. (Earlscolne) is puzzled how to account for his accumulators—which are Minerva pattern in vulcanite—getting full of gas and almost bursting the sides of the cases after they have been recharged, and also that the acid gets out of the battery with the vibration, and although he has filled them up again with water, he cannot get a strong current now. It seems to us that "F.C.'s" accumulator is defective, because it should not continue to "gas" for any length of time after charging. There may be a short circuit between the plates, causing the battery to run down. We might suggest for him to thoroughly wash out the battery and refill with a mixture of gelatine and dilute sulphuric acid, say, one part acid to five of water. If put into the cells when warm and liquid it will set when cold and prevent any acid splashing out. It will, of course, want recharging again.

Requires an Instruction Book.

T.E.D. (Weston-super-Mare) is about to invest in a motorcycle, but before doing so is anxious to learn something about their construction. Is there a book on the subject we could recommend? Our "Motor Cycling Manual," which will be ready shortly, should suit him exactly.

Wants More Power.

C.L. (Darlington) has had a 1½ h.p. engine built up locally, but he is not able to get as much power out of it as he should. The electrical part is perfect and he is of opinion that there is not a sufficient charge of gas enters on the suction stroke. Do we think the spring is likely to be too strong? He also finds that in screwing the cylinder into the crank case, the piston rings are liable to turn round and the slits come together causing loss of compression. He also wishes to know on which part of the crank case the air release valve should be fitted. We should advise "C.L." to first try adjusting the air inlet of his carburetter, and, if no improvement, then try weaker spring on inlet valve. If there is weak compression the suction will also be weak. When screwing on the cylinder have inside thoroughly lubricated, and see the slits of rings are set 120 degrees apart. It would be better to fit release valve on front of case. Thanks for compliments about "MOTOR CYCLING."



Snapped outside Chigwell.

E.E. (Treharris) asks for the address of the Boid Motor-bicycle Co. in England. The agent's address is 42, Copthall Avenue, London, E.C.

W.McC. (Devonport).—The address of Carless, Capel and Leonard, is Pharos Works, Hackney Wick, London, and of the Anglo-American Oil Co., Billiter Street, London.

A Firm who Reset Ignition Gear of Bicycle Motors.

C. H. Cathcart and Co., 3, Dorset Buildings, Salisbury Square, Fleet Street, London, inform us that they undertake the retiming of cycle motors, and they mention that incorrect timing is the most probable reason for a motor-bicycle slowing when ignition lever is pushed forward beyond a certain point.

The Holden.

A.J.Z. (London) is about to purchase a Holden motor-bicycle, and asks, Can we give him our opinion of this machine? We have no personal experience with the Holden, but we know the workmanship to be very good, and believe that there are a fair number in use about London. We noticed one in the West End recently drawing a double trailer at a good speed, so it seems a pretty powerful machine.

On Selecting a Motorcycle.

A.T. (Hartlepool) forwards us a congratulatory letter on the success of "MOTOR CYCLING," and asks our advice as to the selection of a suitable machine. The machine is wanted for both town and country work, and the roads are rather rough. He mentions five makes—all excellent machines—but he has a fancy for the Clement-Garrard, and asks if it would be equal to his weight, 13 stone. We have no doubt but that the Clement-Garrard would prove an excellent machine. He should write the Company, and get them to fit their set to a rather stronger frame than usual, and preferably 2 inch tyres.

Appreciation.

F. S. Massey (Freetown, Sierra Leone) writes as follows:—"Your paper, 'MOTOR CYCLING' (which has been published since I left home) is certainly a marked success, and a paper not published before it was needed. A friend of mine sends them to me. As I read them they remind me of the pleasant experiences I had at home while motor cycling; having made two motor-bicycles of my own. We have no roads here for motor cycling and, I am afraid, the climate and petrol would fall out with one another, but I am looking forward to the time when I come home, and I hope to have another motor. I have a bicycle with me."

For Cruising Purposes.

F.D.A. (Erith) intends purchasing a motor-bicycle for what he terms "general cruising purposes," speed being no real object, and he gives the names of three well-known machines and he wants advising as to the most suitable, and also which make of machine has a (1) free engine; (2) two-speed gear. Which firm makes a 1 or 1½ h.p. water-cooled motor for a boat. We recommend him to get the Quadrant. The Humber and Princeps chain drivers have free engines. There may be something good in two-speed gears announced in "MOTOR CYCLING" shortly. You will get addresses of people who make a speciality of launch motors in one or two recent issues of "MOTOR CYCLING."

Interest Aroused.

A.S.H. (Tufnell Park) says that he has become interested in motorcycles since he has taken in "MOTOR CYCLING," and would be glad to know if a good motor-bicycle can be obtained on the hire purchase system, and the names of firms who supply on this system. He might write any of the best firms, like the Quadrant, Excelsior, Humber; in fact, most firms advertising in "MOTOR CYCLING" would do business on these lines, we believe.

Petrol for Solution.

C.E.S. (Highgate) has noticed our hints on the use and management of petrol, and as he had a quantity of stale petrol, he decided to use it up in making rubber solution, which would be useful in his business. However, he found that a quantity of cuttings from old outer covers and air tubes would not dissolve, but simply swelled up in the petrol. This is quite likely, because only pure indiarubber will dissolve in petrol or naphtha, and air tubes, etc., are vulcanised rubber. The pure strip rubber used for electrical purposes is best.

General Queries.

E.P. (Bangor) asks our opinion as to the order of respective merit we would place a list of machines he gives us. The Singer, we think, would be the most suitable for him, as it goes well on hilly and rough roads. The others we place in the following order: 3, 2, 1, 5, 6. We might also class the Humber chain-driver with No. 3. He also asks is there much difference between the English and French Werners, as he can find very little in the respective specifications. The difference is in respect of the somewhat higher finish of the English built frame. The motors are in both cases French, and the machines run equally well.

Has an 1897 Werner.

H.E.B. (Manchester) recently purchased at a sale of cycles an old-fashioned tube ignition Werner motor-bicycle. He has managed to get it to run at 12 or 14 miles an hour on a good level road, but he understands that electric ignition could be fitted and this would improve its power very much. Could we give him instructions how to proceed; he has a lathe and plenty of tools. We regret that we could not spare the space to do this at present, but we should advise him to study pretty closely the way the ignition is fitted on an up-to-date motor, and he should be able to work the details out for himself.

Fancies a new Werner.

H.W.S. (Burnley) asks for our advice as to the selection of a motor-bicycle to suit rough Lancashire roads. He personally fancies a Werner. We have a good opinion of this machine, and its latest feat in beating the Land's End to John o' Groats record is ample proof of its reliability. The other machines he mentions in his letter are also excellent, but hardly powerful enough for rough and hilly roads.

Requires a Charging Set.

P.R.W. (Totnes, Devon) has recently bought an Excelsior motor-bicycle and wants to get a suitable charging apparatus for his accumulator. He mentions that he does not feel competent to make up the charging set described in a recent issue of "MOTOR CYCLING," and he wants to know the best firm to purchase a set from. We can recommend Peto and Radford, of Hatton Garden, London, to supply an efficient charging battery.

Explosions in the Exhaust Box.

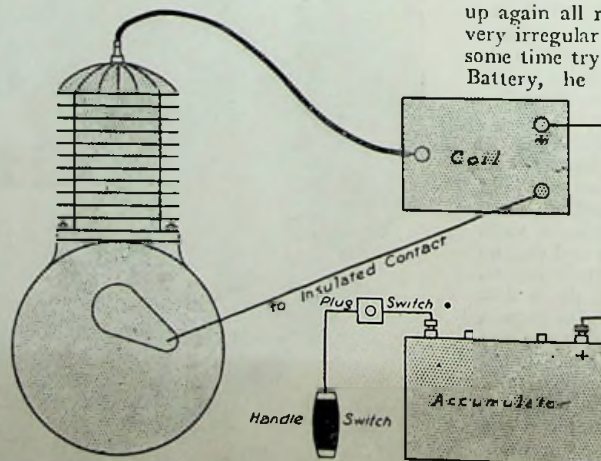
H.E.B. (Manchester) asks us the reason for a loud report taking place now and again in the silencer of his motor. It is only of late that this has taken place, and the machine still runs excellently. The cause of the explosion in silencer is, as a rule, due to a misfire, which allows an unexploded charge to get into the silencer, and this is fired with the flame of the next ignited charge. The contact breaker points should just be trimmed up, and this will doubtless prevent misfires.

Primary Batteries.

A.H. (Coves, I.W.) asks our opinion on the efficiency of primary batteries for charging accumulators. Whether they are as good as a dynamo and will they charge up to show 2.2 volts each cell. The Fuller Bichromate battery acts very efficiently, as several of our readers can testify, but we doubt whether batteries of the Leclanche type are as effective. They charge just as good as a dynamo and are not expensive, but require a little trouble in keeping in good order. This battery was described in No. 2, a number, by the way, that is valuable and difficult to get.

Has Starting Trouble.

J.R.W. (London, N.W.) has a front wheel belt-driven motorcycle, positive make and break, Basse and Michel trembler coil, P. and R. accumulator, and De Dion sparking-plug. This machine was running excellently till on a recent ride misfiring occurred, and he found that the petrol tank was empty; he re-filled it and expected the motor to start up again all right, but could only get some very irregular explosions, and after spending some time trying to adjust it, pedalled home. Battery, he found, was fully charged, and he cannot account for the trouble. Presuming that the carburation is all right, the trembler on coil, or the sparking-plug must be at fault. Clean up and readjust the platinum and points of plug, and examine this carefully to see that it is not cracked. Then try the spark from high tension wire to frame; if it is good and there is petrol in the tank and carburettor, the motor should start up. The wiring from coil you enquire about should be as per illustration.



WIRING FROM COIL, RELATING TO REPLY TO J.R.W.