

# Motor Cycling

Vol. 1, No. 6,

March 19th, 1902.

## & Motoring

### LUBRICATION OF THE MOTOR: IN THEORY AND PRACTICE.

The question of suitable lubrication is exercising the minds of a large number of readers, judging from the letters received, and the following article will answer many of the queries addressed to us.

This subject is of such vital importance as a part of the motorcyclist's education as to be worthy of careful study, inasmuch as it will help towards the more successful management of the motor. The problem of lubrication has been a difficult one to solve, especially as regards the selection of a suitable oil and the best means of applying it to the working parts of the motor. Let us first look at the conditions that obtain in the working of these small motors. These being of the internal combustion type depend for their efficiency upon the difference between the temperature of the explosive mixture at the moment of ignition and its temperature when it enters the atmosphere, hence we get the internal parts of the motor raised to a great heat on account of the impossibility of the heat being radiated sufficiently quickly in large motors to prevent this accumulation of heat. A jacket or cover surrounds the cylinder (or at any rate the combustion chamber) and through this jacket water continually circulates so that the temperature outside the cylinder does not rise above 212 degrees in the small motor design of say up to 2½ h.p. The heat is got rid of as far as possible by surrounding the cylinder and valves with fins or webs, so that a large surface of metal is exposed to the cooling effect of the air; these ribs are generally termed the radiators. From the foregoing it will be quite evident that the lubricant must firstly be capable of

#### WITHSTANDING THIS TEMPERATURE

and, secondly, what is termed the high piston speed of these small motors must be taken into account. Here we have the piston travelling through the cylinder at the rate of 450 feet per minute, so that the cylinder walls are raised to a considerable temperature through friction alone, and unless the surfaces are most efficiently lubricated the piston will quickly sweep the cylinder walls dry and binding and stoppage of the motor will result. Next in importance to lubrication of the cylinder are (1) the connecting rod bearings, (2) the two axle bearings, (3) the pinion wheels, (4) the valve lifter guide. In the De Dion system of lubrication (which is practically identical with that adopted for all makes of cycle motors) the fly wheels and crank pin rotate in an oil-tight metal case. A quantity of oil is run into the case and is picked up by the rims of the rapidly rotating fly wheels and thus thoroughly

splashed into and round about the bearings; this system is very effectual as regards the bearings themselves, but for the cylinder it is not so certain unless an oil channel is provided in the top of crank case for the end of the piston to dip into. This channel, or groove, accumulates a quantity of oil from the splashes, and as the edge of the piston dips into it at each revolution a very equal oiling of the cylinder is effected.

#### THE QUALITY OF OIL USED.

The main features of an oil suitable for an air-cooled motor are (1) a high viscosity or body, (2) a high flashing or firing point, (3) it must be capable of withstanding the temperature without decomposing. Ordinary lubricating oils of a vegetable or animal origin are of no value whatever for motor work. Most of the large manufacturers of oils are now preparing a special mineral oil of high specific gravity; this is refined at a high temperature and possesses a good "body"—very essential for the cylinder. It must also be borne in mind that ordinary gas engine or water-cooled motor oil is not suitable. The use of these inferior grade oils will quickly result in sparking plug troubles due to charring of the points and also binding of the piston. The correct quantity of oil to use is a matter that is best learnt by experience; a tolerably safe

allowance for a 1½ h.p. motor would be, say, a couple of ounces every 25 or 30 miles, but it would be well to remember that when the motor is new it is better to lubricate more frequently until such time that the bearings get into a good condition of surface.

The lubrication of the exhaust valve stem and compression tap is also a matter deserving some consideration. The temperature to which these details get raised is such that even the best motor oil will get burnt up; luckily we have in plumbago, or pure blacklead, a suitable lubricant that will easily stand the heat. A little of the finest powdered plumbago placed on the bearing or rubbing surfaces occasionally, will keep them in good condition.

#### SEMI-AUTOMATIC LUBRICATION.

This is distinctly one of the improvements of this year. Previously it has been necessary to dismount from the machine every 25 miles or so and refill a small oil cup screwed

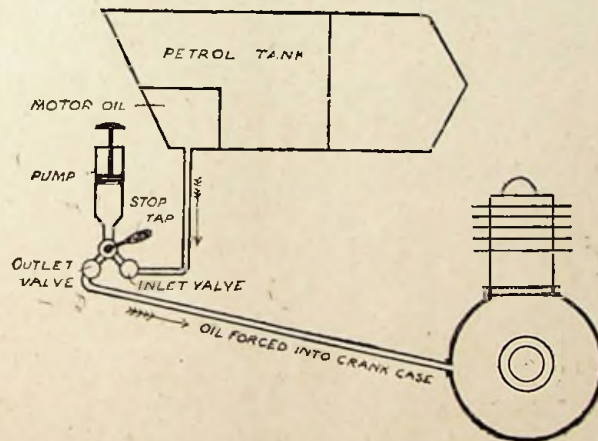


DIAGRAM ILLUSTRATING THE METHOD OF LUBRICATING THE MOTOR.

into the crank chamber; this operation proved rather inconvenient and messy at times, especially when a good non-stop run is desired. To remedy this a small hand pump and oil reservoir, with tube connections to the crank chamber, are provided on most of this year's machines. The oil reservoir forms a compartment in the carburetter tank, and is fixed by the diagonal tube, so as to be within easy reach of the small force pump. This contains two valves, one of which opens when the handle is drawn up and allows a quantity of lubricating oil to pass up into the barrel; on forcing the

handle down this valve shuts and the other one, which admits to the pipe leading to the crank chamber, opens and consequently the charge of oil is sent into the chamber; this operation, of course, is readily performed when the machine is running, and, as the charges are always equal in quantity, a systematic course of oiling can be attained.

The removal of waste oil occasionally is advisable, and for this purpose a special plug in the bottom of crank chamber is provided, and after a long run a thorough clean out with waste petrol before re-oiling can be recommended.



A pen picture by Frank Patterson of a typical Surrey inn. Wonersh is a straggling village about three miles south-east of Guildford. It boasts an old church, and the country around offers many inducements to motorist and cyclist.

The  
CIRANTLEY  
Wonersh  
GUILDFORD

# NEWS.

"Horse power" defined.

See the article on the subject elsewhere.

We hear on all sides that a brisk demand for motor-bicycles is now being experienced by the trade.

### Our Foreign Bill.

The Board of Trade returns for February show that the imports of motorcars and parts were valued at £52,682, and our exports at £5,594. We are paying a big sum yearly to foreign makers, although the total sum has not, so far, greatly increased over that of last year.

### Midland Meet at Whitsuntide.

We understand that a syndicate of Coventry tradesmen have booked the Coventry track for Whit-Monday, for the purpose of running a motorcycle race meeting, if properly organised, this should prove a big success. We shall furnish further particulars as soon as possible.

### The "Bradbury."

Recently we had the opportunity of inspecting one of the first motor-bicycles turned out of the Wellington Works, by Bradbury and Co. The machine was fitted with the new 1½ h.p. Minerva engine. Special attention had been given to the length of wheel base and other important features in connection with the frame.

### Optimistic!

We notice that a German trade paper publishes an article by a well-known engineer in which the opinion is advanced that a really serviceable motor-bicycle could be produced to sell at £20, if a factory were specially laid down to produce it in enormous numbers. In fact, he is pretty confident that, after a year or two, the price would be down to £12 or £15! Very creditable aspirations, of course, but somehow we are far from sanguine of their being achieved.

### Returning from the Hunt.

One of the most familiar objects in the Midlands is Lady Elcho's motorcar. This lady, with her little ones, attends the North Cotswold meets, pays her visits among her numerous friends around her beautiful home at Stanway, and is continually passing through Evesham in her motor, meeting the London trains. We reproduce on another page a snapshot of her and a party packing up after the recent meet at Broadway, when he motor followed the hounds throughout an enjoyable and exciting run.

### For Easter.

Reports from the various trade centres prove that already the pressure of orders on hand is sufficient to keep most of the best-known concerns going night and day until the holidays. This is a good sign for the trade, but a bad thing for the man who, while deciding upon his Easter tour, has overlooked the necessity of putting his new machine in hand. A motorcycle is a vastly different article to an ordinary bicycle, and so if you are still wavering between one or more makes we advise you to hurry up and place your order without delay.

### Continental Shows.

During the next few weeks quite a number of motor and motorcycle shows will be held on the Continent. France, Germany, Italy, Austria, and even Denmark, are promoting these exhibitions, and in connection with them all a series of races and test rides will be held. The result must inevitably be an increase in the number of motorcycle devotees.

### Motor-Bicycles on the Track.

Most of the French motor firms are at present hard at work building single motor-bicycles for racing purposes, as this style is likely to be the feature on French tracks this season. Among the best out, so far, one firm has been able to show a type whose total weight does not exceed 50 lbs., and which can attain a speed of over 50 miles an hour.

### Motor Racing at Aston Postponed.

There was quite an old-time rush down to the Aston track on Wednesday last, as the novelty of motor-bicycle racing was sufficient to interest even the somewhat jaded ex-racing man and tradesman with which Birmingham abounds. Unfortunately the clerk of the weather was not in a favourable mood, and rain fell in such a quantity shortly before two o'clock as to completely spoil the "gate" and to render the track absolutely dangerous for really fast work. The officials, therefore, decided to postpone the meeting until Wednesday next, when, as the whole of the proceeds go to the various charities in Birmingham, it is to be hoped that a fine day may be secured. Notwithstanding the state of the track, several enthusiastic motorists rode a few laps, the best time being 27 secs. for the quarter-mile track. One rider fell on one of the bends, but fortunately was not injured, nor was the machine damaged to any extent. There should be some exciting sport to-day (Wednesday).

### Position of the Engine.

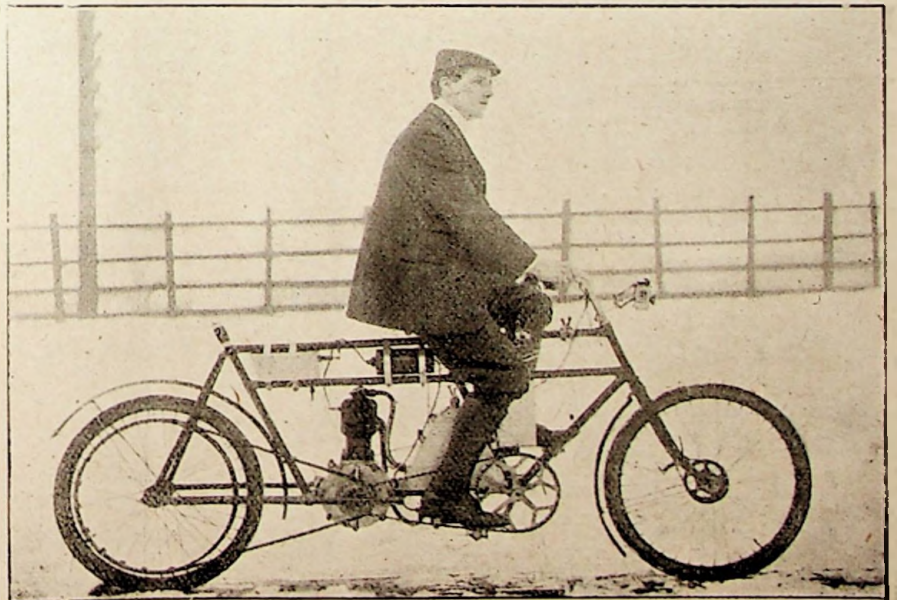
Propos of the now prevalent opinions as to the vertical position being the best for motor-bicycle engines, a correspondent asks us rather a pertinent question. He says:—"What is the special advantage of a vertical engine? Did anybody ever see a gas engine or locomotive engine working in a vertical manner?" This is a poser which we will leave to some of our technical readers.

### Fashions in Motor Wear.

Judging from the illustrations in the latest Parisian motor fashions, these are, if not exactly a "lady's dream," at least comfortable and elegant to a degree. The heavy fur coat has been discarded, and the oil-cloth, skins, and eather garments make room for softer and more seasonable materials. Motor-cyclists will be interested in a combination suit with cuffed sleeves, which looks suitable and business like.

### From Sheffield.

Rather interesting is the accompanying photograph of a motor-bicycle designed by Mr. T. W. Proctor, of Sheffield, for his own use in that very hilly district. He uses a somewhat high-powered engine, and has had it arranged in a machine of long wheel base—almost identical, in fact, with the frame of a tandem bicycle. The pedalling gear drives the engine through a clutch, and herein is perhaps the only fault, that in case of a breakdown, it does not seem possible to disconnect the engines so that the machine could be pedalled home. We should be interested, in view of the theory on side-slip recently advanced in our pages by "Cyclomot," to know what Mr. Proctor's experiences are in this matter, and also on that of vibration. The weight being rather far forward, we should imagine that vibration would be felt from the rear wheel, and that the latter was somewhat unstable on grease.



A LENGTHY MOTOR-BICYCLE.  
(See paragraph above.)

One of the participants in the Nice-Abbazia race next month will be Mr. C. Jarrott, on one of the new light cars of Panhard make.

"Kragt wagen" is the latest substitute for "automobile" amongst those Germans to whom the latter word is distasteful, on account of its Gallic origin.

The 30th and 31st May are the dates fixed by the American Automobile Club for their 100 miles race, and the attempts on the mile and kilometre records respectively.

The Copenhagen Motor and Cycle Show was opened on the 9th by Admiral Hansen. A number of French firms are exhibiting, as well as German, Belgian, American, and Danish manufacturers.

A motorcycle section of the Manchester Wheelers is being formed. Further particulars can be obtained by writing to T. W. H., care of Wheelers' Club-house, 4, Albert Square, Manchester.

A rider named Joseph Downey is credited with having covered a mile on a straight road near Norwood, America, on a six horse-power motor-bicycle, in 54 1-5th, only 2 2-5ths behind Fournier's record ride.

The St. John's C. and A.C. (Tunbridge Wells) are forming a motorcycle section in connection with their club. The club also propose to include a motorcycle race in their Whit-Monday Sports programme.

Baron de Zuylen, the President of the Automobile Club de France, has been in bad health for some time past, and is about to undergo an operation which, it is hoped, will be the means of restoring him to health.

#### To Would-be Motor Racers.

The general committee of the N.C.U. has announced that any rider who has competed at any time in a race on a motor-bicycle for money prizes in this or any other country must be reinstated as an amateur before he can apply for a license.

#### Opening their Season.

The Motor Cycling Club will open their season on April 12th with a run to Brighton, meeting at the Railway Hotel, Purley corner, at 4 o'clock p.m. This fixture is an open one, and motor cyclists wishing to join the party, and requiring tickets for dinner, should write to the Hon. Sec., Mr. A. Westlake, 20, Endell Street, W.C.

#### Special.

Being desirous of illustrating in a striking manner the fastest car in the world we succeeded a few days ago in arranging a special trial trip when some excellent photographs were obtained. The speed of the mammoth flyer is over eighty-five miles an hour. The little outing will be illustrated and described in our next.

#### The English Motor Club.

The English Motor Club will be making Worthing their headquarters at Easter, taking tours from that centre into the surrounding country. On April 12th they have a run to the "Swan" at Bedford, and on May 3rd to the "Mitre" at Oxford, where it is hoped that the Reading Club will be able to join them. On May 31st the contest in grounds of the Crystal Palace, open to everybody, will be repeated, but with several new and interesting features added, of which more anon; and on July 12th that other popular fixture, the hill-climb up Tilburstowe, will be repeated.

#### The Dublin Motor Cycling Club.

We welcome the club of this name which has been formed by some prominent men in the Irish capital. The inimitable J. C. Percy has been instrumental in bringing about this desired end, and thoroughly merited the vote of thanks accorded him at the meeting which was held at the Hotel Metropole, Dublin, on Friday week last. Mr. J. B. Dunlop was invited to take the chair, and he was supported by Messrs. R. J. McCreedy, F. Russell, W. A. Evans, J. C. Cooney, H. E. Wells, E. F. Walker, J. E. Littlewood, J. T. Gibson, W. G. Wilkinson, A. H. Huet, R. W. Stevens, F. A. Wallen, S. Millington, R. L. Jefferson and J. C. Percy. The chairman made an exceedingly interesting speech, in which he said that he believed the pastime of motorcycling had a very great future. He

had no doubt that the formation of the suggested club would be the precursor of many similar organisations. He dealt with the benefits to be derived from membership, and also with the advantages to be gained from motorcycling by those who wanted moderate exercise and who desired to see our beautiful country with a minimum of exertion. Mr. Dunlop then went on to give his opinion on certain technical matters, dealing at some length with the vexed question of side slip. He concluded his address and resumed his seat amidst a round of applause. Mr. McCreedy's proposal that the club be formed was adopted, and on the election of officer Mr. Dunlop was selected as president, Mr. McCreedy as captain, Mr. Wallen as treasurer, and Mr. J. C. Percy as secretary. Further posts will be filled at the next meeting, to be held on Friday, 21st inst.



#### THE HUMAN FORM DIVINE.

MOTIST: By St. Petrol and all that's puncturable, what must he look like when they're pumped up hard?

HUNTIST: Gwacious! What have we found? Paw beggah looks cold!

The Automobile Club are touring Cromer way at Easter.

Motors can be stored and petrol supplied at the Cinque Ports Cycle Works, High Street, Sandwich.

**An Enterprising Body.**

An automobile club has been formed at Guiza, Japan, on quaint lines. The membership is limited to 300, and all of the members will ride in the cars belonging to the club. We must give the rest in the actual words of the local paper, which reads thus —

"The club will dissolve itself at the end of one year after its establishment and then these automobiles will be given to the member by lottery. The company is also going to manufacture cheap automobiles that can be purchased by persons of limited resources."

**Two Suggestions to Clubs.**

Some first class cycling clubs would find little or no difficulty in acquiring a reputable car for the use of members. Many such have good balances at the bank, and are able, after placing good sums to reserve, to deal out considerable amounts for charitable purposes. Clubs with modest incomes would find it more convenient to purchase a motor bicycle, which would enable members to get a practical insight into the new pastime, and probably result in the inauguration of motor sections. Both suggestions are practicable to clubs who possess the means, and their practical realisation would create an entirely new interest in club riding. Will the club car or club motor bicycle ever come along, we wonder?

*We are always glad to receive from our readers contributions of a literary or artistic character. Incidents on the road, snap-shots of general interest to Motorists, and sketches may be submitted, and if approved of, will be used. If desired, these will be paid for at our usual rates.*

**A Club for Portsmouth.**

The movement to form an automobile club in Portsmouth has now taken definite shape, and at a well attended meeting, over which the Mayor (Major W. T. Dupree) presided, his Worship was elected the first president. The members for the borough (Messrs. J. H. A. Majendie and R. Lucas) and Alderman Jenkins and Mr. G. C. Vernon Inkpen, T.C., were appointed vice-presidents; Mr. Ernest Sapp, secretary, and Mr. J. White, treasurer. A strong committee, comprising many prominent local motorists, was also elected, and the headquarters will be the George Hotel, High Street, which has many historical associations. Nelson sleeping there on the eve of his departure to participate in his last great engagement. Ample accommodation is provided here for automobilists and there should be a bright future in store for the Portsmouth Club.

Durban, Natal, already possesses three motor cars, a motor tricycle and motor bicycle.

The new type Werner will be sold in Rhodesia by Messrs. Duly and Co. The head of this firm, it is interesting to note, is Lieut. Duly, D.S.O., the famous cycling scout.

**Excludes the Motorist.**

The Middlesex County Council have passed a bye-law in regard to the blowing of horns by persons in vehicles on Sundays. The bye-law aims more especially at suppressing the rowdy element, but it embodies a clause which has evidently been inserted as a protection to well-behaved motorists. It runs thus:—"Nothing in this bye-law shall prevent the use of a horn in a reasonable manner by one person on a coach or similar vehicle."

**Coasting in the New Style.**

Coasting on a motor bicycle is a delightful game if you have a complete mastery of the machine and know exactly what to do in case of emergency. The weight of the machine gives it greater impetus, and as it thuds and jars over the road one feels that it would take something abnormally aggressive in the way of road obstructions to upset one's equilibrium. Cyclists who have essayed to coast on ordinary machines down hills with which they were not familiar, have started serenely at the top but have been thrown before reaching the bottom, owing to strips of road repair work which they were unaware of. In motor bicycling there is less likelihood of falls through stones, etc., but the wear and tear on the tyres is very much greater than under the same conditions in ordinary cycling.



SMALL BOY (to motist who has been vainly endeavouring to get a start):—  
"CAW'NT YER GIVE US THE 'LORST CHORD,' GUV NOR?"



Conducted by  
EDMUND DANGERFIELD  
and WALTER GROVES.

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## OPINION.

### Appearance.

In a number of letters which have reached us it is clear that, in the opinion of our correspondents, there is ample scope for improvement in the appearance of the motorcycle and, whilst every endeavour should continue to be made in the direction of efficiency, the important matter of appearance should be well borne in mind, for however powerful or speedy a machine may be, all will be of no avail if it is unsightly by comparison with its more modest but better-looking rival.

A few days ago we were discussing the subject with a well-known manufacturer, who expressed the opinion that the bicycle which would sell in the greatest quantities would be one that could not possibly do more than twenty miles an hour, but which would be graceful and taking in appearance, and there is doubtless a great deal of truth in the remark; at the same time we are aware that nothing will hold the gentry who are out for power and efficiency. We suggest to those who intend taking part in the controversy upon "The Bicycle and what will it become?" that they give full consideration to what is in reality a very important matter to the buying public.

### Many Purchasers.

Within the last fortnight there has been a most marked and unmistakable increase in the demand for motorcycles from all parts of the kingdom, but more particularly the provinces. Almost without exception the manufacturers of the leading machines confirm this, whilst the makers of good motors are being pressed exceedingly hard. Judging by our ever-increasing correspondence, a feature of the demand is the number of enquiries from provincial medical men, who are quick to see in the motorcycle a means of transit essentially suited to their requirements. More noticeable still are the opening remarks of enquirers to the effect that they write us for information on behalf not only of the respective writers themselves, but of friends who also intend going in for the new pastime; indeed, one correspondent, writing from Ashton-on-Ribble, asks us about a machine—the "New Werner"—as he and three friends desire to order. The advantage of companionship and the attendant pleasure of discussing the many questions at issue is already responsible for the impetus which is now being given to the new movement. Another writer, who hails from Dulwich, tells us that both he and his friend have decided to dispose of their cars and go in for motor-bicycling, and, in fact, are starting at once on a tour through Germany; they will ride respectively a "Derby" and a front driver. The communications quoted are but instances of the increasingly favourable manner in which the motorcycle is being regarded, and we could quote *ad infinitum* to show that the pastime is not only rapidly spreading, but that it is doing so in ways

which were scarcely to be anticipated. Despite all this, however, the evidence which predominates is of a nature which shows that a large proportion of our readers, although closely following every line, are deliberating, the chief explanation of which is that they are, to a large extent, ignorant and perhaps a little timid of a machine so entirely novel. It must not be forgotten, too, that the sudden appearance of "MOTOR CYCLING" has itself taken everyone by surprise, but, like its sister publication, it has quickly succeeded in gaining the confidence of its readers, and it is only a question of a little time before it will be able to lay claim to having materially assisted in the expansion of an enjoyable pastime and gigantic industry.

### Motor Pacing in Amateur Events.

Up to the present, a ruling of the General Committee of the National Cyclists' Union has prevented the use of pacing by means of motor-driven instruments, but the recent rapid developments of the sport of motorcycling have evidently induced the committee to look with a somewhat more lenient eye towards this method of pace acceleration. It decided at its last meeting that any Centre of the Union may, on application, give permission to a bona-fide club to promote a race for its members in which pacing by single motorcycles shall be allowed. The Centre giving the permission will formulate regulations for each particular case. We hope that at a fairly early date races will be promoted by prominent London clubs, in which the practicability or otherwise of the motor-bicycle as a pacer under the stress of a keen competition may be put to the test.

### The Dawn of Motor Club Life.

One of the most pleasing developments of the pastime is the formation of motorcycling clubs in various parts of the country. With the example before us of what clubs have done for the sport and pastime of bicycling, the new movement is extremely encouraging. The pioneers of the sport may well be likened to those who make the excavations for a new building and, if the foundations take the form of clubs and other organisations, then the superstructure can be regarded as being firmly established, and changes, many and often, may even be made without impairing the soundness of the structure.

The Motor Cycling Club formed amongst London motor cyclists was the pioneer club, and its formation was followed up by a proposal to establish a similar organisation in Birmingham. Clubs have now been formed in Portsmouth and Dublin, and motorcycle sections have been proposed for the Manchester Wheelers and the St. John's C. and A. C. of Tunbridge Wells. We shall be glad to hear from any other organisations of the kind as they are formed and also to be kept informed of their ambitions and doings from time to time.

### HOW THE TRADE REGARDS "MOTOR CYCLING."

We have just received the following testimonials to the value of our paper from an advertising point of view:

#### ORDERS AND ENQUIRIES.

March 11, 1902.

"I must congratulate you on your new paper. I may tell you that our post often includes from 20 to 30 enquiries mentioning 'Motor Cycling,' and I think I can trace at least 18 orders direct from same up to date."

Yours faithfully,

The Precision Motor Co.,  
W. L. Adams.

#### MORE THAN SATISFIED.

March 13, 1902.

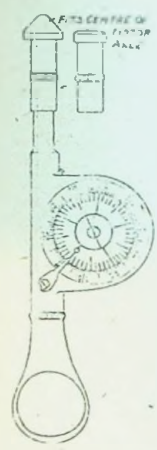
"Since our advertisement appeared in 'Motor Cycling' we have received on the average quite 15 enquiries per day, and taking into consideration the daily increase of interest evinced in this particular form of motoring I am more than satisfied with the results, and consider the space we have taken in your paper a cheap investment."

The Motor Traction Co., Ltd.,  
J. H. Adams.

# THE BRAKE HORSE POWER OF A BICYCLE MOTOR.

## WHAT IT MEANS AND HOW IT IS TESTED.

The term "brake horse" power, or h.p., is nowadays a very familiar one in motor talk and literature, but that it is clearly understood as a definition, even by many practical motorists is rather doubtful. To the technically trained engineer the term itself seems an unscientific one, and he would prefer it changed, no doubt, to "power units." Even to a casual observer it seems that this "horse power" term must be a misleading one from a commonsense point of view. Take, as an example, the case of a so-called 2½ h.p. motor tricycle. This will probably be equal, under average conditions, to drawing its own weight and rider on a smooth road at 25 miles an hour. Well, considering that a good horse can trot at something very near this speed in the hour and draw a light carriage and rider as well one would expect an engine of 2½ h.p. to be equal to a very much better performance. The fact is the term is applied at random; that this is so is proved by the fact that one notices in the various types of motor bicycles that one maker will claim 2 h.p. for his motor, which has practically the same cylinder and stroke measurements that another maker adopts for his 1½ h.p.



A SIMPLE SPEED COUNTER.

**DEFINITION OF A "HORSE POWER."**  
Put in the simplest language, power is "a rate of doing work, and is made up of three factors, viz., weight, distance, and time." As an example: If a 10 lb. weight

rests on the floor, and it is raised to a height of 20 feet in six seconds, the amount of power expended in performing this operation is expressed in foot-pound seconds, and engineers have adopted the "unit" rate of doing work as being equal to that power expended in raising 550 lbs. 1 foot high in 1 second, or 33,000 lbs. 1 foot in 1 minute, or 1 mechanical h.p. is equal to 550 foot-pound seconds.

In the small internal combustion engine the power available at the pulley is developed by reason of the impulses given to the piston by the explosion of the petrol vapour and air mixture. These impulses are of individually small force, but as they take place with great rapidity (from 500 to 800 per minute) the high speed thus imparted to the motor pulley is easily geared down to give considerable power, or, to put it in another way, we can regard the total mechanical energy developed as being made up of leverage multiplied by speed. At the motor pulley we have high speed and a small leverage available, and by means of the simple principle of "gearing down" we obtain a much larger leverage but at the expense of reduced speed.

**METHODS OF MEASURING POWER:**

From the above explanations it might be inferred that the simplest way to find out the power of a motor would be to have an arrangement so designed that the motor could be set going and then made to wind up a certain weight through a measured height and the time occupied in so doing accurately

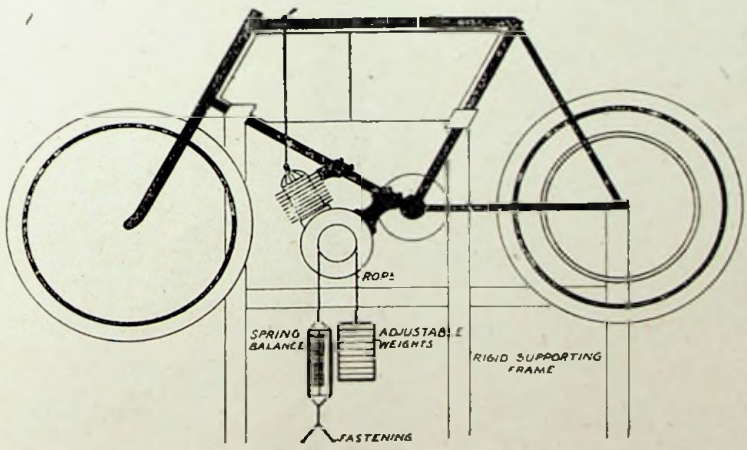
measured by a stop watch. As a matter of fact, this principle is the one used, but in a modified and more convenient form. THE FRICTION BRAKE APPARATUS.

This consists of a cord or band which can be passed over the motor pulley. At one end is fixed an ordinary spring balance and at the other a hook to which weights may be hung. A good stop watch and a revolution counter only are necessary to complete the apparatus.

With ordinary steam, gas, or electric motors this arrangement is in every-day use, and even with fair sized petrol motors of the water-cooled type the power given out may readily be tested by bolting the motor temporarily to a strong bench or stand, but with the small air-cooled motors fixed in position on the frame of a bicycle there are several minor difficulties to be overcome before a satisfactory test can be made. Firstly a stand, which must be very rigid, must be arranged to hold the whole machine at least 12 inches above the floor. Then there is the air cooling difficulty. It is, of course, well understood that the efficient working of these little motors depends greatly upon the cooling effect of the current of cold air set up when the machine is running. If stationary, this effect must be produced by a small rotary fan, although tests can be made by experts simply by running the motor in the open air, as a few minutes' running suffices for the test. There is also the starting difficulty. Large motors can be "started light" by means of a special handle arrangement, but, perhaps, the simplest way to start a "jacked up" bicycle motor is to have the belt on for driving, and for one operator to manipulate the lever while the other pulls the driver wheel round smartly by hand. As soon as the motor has got up speed the belt can be run off the pulleys.

**ARRANGEMENT OF THE APPARATUS FOR TESTING.**

This will be fairly clear from the diagram: the cord may be a piece of ¾-inch sash rope; the spring balance an ordinary parcel balance, reading from 1 oz. up to 2 lbs. or so; the weights are best of the flat cylindrical type, fixing on a central support, but any kind that can be readily fixed by hooks to the cord will do; they should be equal to a total



BICYCLE AND MOTOR RIGGED UP FOR HORSE POWER TEST

of about 35 lbs. The revolution counter may be of any simple type, so long as it is provided with a "point" centre to fit the centre of motor axle. An ordinary watch with seconds hand will, of course, give more accurate readings. METHOD OF CALCULATING

**THE B.H.P.**

With the motor running at its highest speed, we put as much weight on to the end of the rope as will allow without noticeably altering it. Then the mean diameters (D) of the pulley in fractions of a foot must be known, and accurate readings taken of the

balance reading  $W_2$  and the large weights  $W$  and the speed  $N$  in revolutions per minute. Then from the simple formula we get the brake horse power, thus:—

$$B.H.P. = \frac{(W_1 - W_2) \times \pi \times N \times D}{33,000}$$

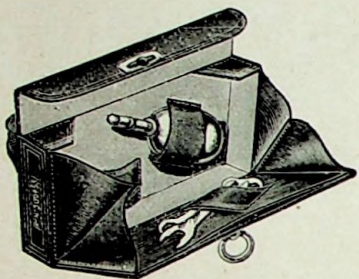
As an example: If the weights totalled 30 lbs. 4 ozs. and 4 ozs. reading on balance, pulley diameter 3 inches, and speed 1,700 revolutions per minute, on figuring it out we get as the horse power 1½ h.p. Several tests should be made, and the "mean" taken to ensure accuracy.

## INVENTION.

*The latest improvements in motors, motor cycles, and accessories.*

### Lycett's "H" Bag.

An interesting addition to our selection of motor accessories has been made by the placing on the market of a motor bag by Edward Lycett, Ltd., 164, High Street, Deritend, Birmingham. The style, it will be observed, is of the square variety, which opens in front, and is fitted with all tools and a suitable oilcan. The sizes are six inches for cyclists and up to ten inches for motorists. They are, in fact, made in four sizes. This company, we might say, have several good lines for the motorcyclist, these including saddles, back-rests, mudflaps, and gear-cases.



### "La Française" Tricycle.

An excellent little vehicle is the tricycle made by the Society "La Française." The type is, of course, well known; but there are not many which combine elegance and usefulness to a degree shown in this construction, and it is produced at a moderate figure. Two-seated vehicles will no doubt be in increased demand; and, placed as the seats are here, the greatest comfort for driver and passenger can be obtained. The frame is in the shape of a parallelogram of ordinary cycle tubing, the motor is carried in the middle of the vehicle, and the weight of the machine, driver, and passenger has been carefully distributed. Then the rear part of the frame is the same as on other motorcycles, the rear fork being solid, and curved so as to permit of the free running of the belt.

### A New Motor-cycle Jack.

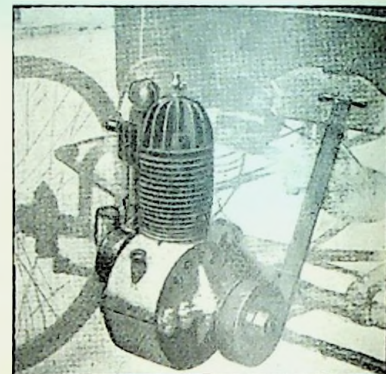
The tricycle supports which Mr. W. A. McCurd, of 21, Clapton Square, N.E., placed upon the market a year or two ago filled, in a very simple and practical manner, the need for a permanently fitted jack for stable or roadside use. Since the introduction of the motor-bicycle, he has paid considerable attention to the production of a jack that should be light, always available, simple to manipulate, and low in price. He exhibited one idea at the Crystal Palace Show, but has recently written to tell us that he has struck a much better one, and will shortly be able to produce the article required to sell at 12/6. We will illustrate the device in an early number.

### The Scott Motorcycle Tyre.

In common with the other leading tyre makers, the Scott company have introduced a special pattern for motor-bicycles. The lining is of much stouter material than used in the firm's cycle tyre, and the tread is reinforced with a layer of fabric and then an additional thickness of rubber.

### The Crest Starting Device.

The Crest Manufacturing Co., of Cambridgeport, Mass., have a new starting device which we illustrate. This is fastened to the axle of the motor, and allows the rider to start the engine from his seat. The pulley has a strap wound on its surface. Within this pulley is a clutch mechanism which is attached to the motor shaft, and only comes into use when the motor is started. When started the mechanism is thrown out, preventing wear and noise, and when the engine is stopped, the mechanism again comes into action. The strap runs from the starting device through the bottom of the car, having a double handle at one end for the driver to operate.

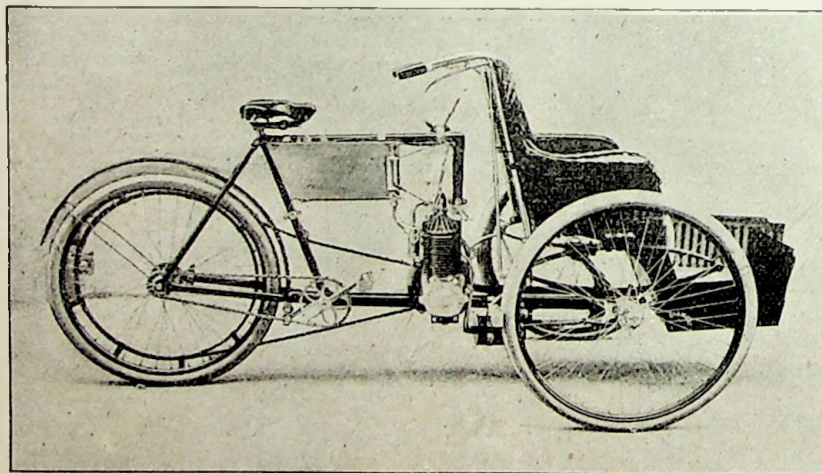


### The Excelsior Anti-Vibratory Head.

A new and specially noteworthy feature of the latest pattern "Excelsior" is an anti-vibratory head. On a long journey such an arrangement will be much appreciated, as, owing to the pace at which a motor-bicycle travels, the vibration at times is very unpleasant. In the case of the "Excelsior" there is nothing to detract in the least from the appearance of the machine, as a glance at the illustration will prove. The coiled springs are neatly boxed in, and as there is one at both top and bottom of the head tube the front part of the machine is thus practically suspended. In appearance the arrangement appears very satisfactory, but we hope to say more after a practical trial.

### A New Belt.

As a result of the general dissatisfaction given by the present type of belting, Mr. E. Lycett, of Birmingham, has been experimenting with a view to securing a special kind of leather to withstand the wear and tear that a belt on a motor-bicycle is subjected to. One of the first samples of the new belt has been sent to our Midland representative for trial, and as he intends putting it to a thorough test in the course of the next week or so, we hope to report on its merits or otherwise at an early date. It is claimed for this particular kind of leather that it is not affected by either oil or water, and that it will not stretch beyond a certain point, but always retain its "life," and consequently will wear much longer than the belting at present in vogue.



"LA FRANÇAISE."

A neat tricycle of French manufacture.



# THE MOTOR BICYCLE: WHAT WILL IT BECOME?

(Continued).

By ANTHONY WESTLAKE.

*In this instalment the question of wheel-base, petrol consumption, and the much vexed transmission matter are dealt with by Mr. Westlake; also valve arrangements, and the applicability of two stroke and multi-cylinder engines. It is not difficult to see that Mr. Westlake believes in perfecting what already exists before launching out into further experiments.*

## Wheel Base.

The foregoing somewhat brings us up against the question of wheel base. Of course, this can be made too long, but hitherto I have not seen this fault emphasised; in fact, on the contrary, the majority are, in my opinion, too short. This is due to manufacturers making use of the usual bicycle frame as a basis. For a machine capable of averaging 25 miles per hour, I have found 52 inches from axle to axle a suitable length, giving great steadiness at top speed, and decreasing the liability to side-slip. It has also appeared to minimise vibration, and certainly allows a larger storage of petrol, etc. Regarding the latter item, I do not see any immediate gain in carrying a larger supply of petrol and lubricating oil than will suffice for a hundred miles, as this means much increased weight, and if one intends taking a longer journey than 50 miles out and 50 miles home, I think it is usual to look out for depots en route. Speaking of petrol reminds me of a useful hint, which is that the petrol engine working the Otto cycle should consume one pint of .680 petrol per horse-power per hour. Thus an eight horse-power engine should consume at full load one gallon an hour. I have found this little fact most valuable, and it is a scientific fact, not an opinion. But going back to our wheel base question. This question can be much helped by other opinions being put forward, and I fancy that many minds of experience (I cannot use the hateful word "expert") will agree with what I have stated generally, although they may consider my estimate a little over the mark.

## Transmission.

Now let us try and tackle that much-taxed question of transmission. I may mention that nearly every possible form of transmission has been already experimented with, starting with the 1878 Paris Exhibition machine and its direct driving, then in '85 Daimler's Bicycle (belt drive), in '95 the Hildebrand-Wolfmuller, also De Dion gear driven with pinions; in '96, Heigel-Weguclin bevel gear drive; in '97, Bluhm chain driven, down to all our present-day varieties, including friction rollers, worm and wheel, etc. Now, to sum all these up in a few words in their order according to our old watchword, efficiency, we come to (1) direct drive; (2) chain drive; (3) pinion gearing; (4) belt, and lastly, other combinations.

It is easy to see that a combination of the second and third have practically superseded all others on cars, showing that there is more than mere fancy in what I have stated. But to analyse these systems a little more, and the applicability to our immediate needs. Direct driving is out of the question with high speed engines; by such I mean engines revolving at more than 1,000 turns per minute, chains are too rigid by themselves, and involve the complication of a friction clutch in order to be practical at all, and preferably also a spring drive.

## The Various Methods.

Gear pinions have all the disadvantages of a chain and a little extra friction thrown in. Belt drive is simplest, if in proper condition, and at least nearly equal in mechanical efficiency (considering our special purpose) to a chain. But, alas! that little "if." "A mighty word your if," as Shakespeare says, and, judging from results, so far that proper condition is not easily maintainable.

It is easily seen that a belt is much more affected by atmospheric changes and by wear than a chain, and it is just these two little items which I think will cause the chain to survive. My own actual experiences of chain transmissions is a long one. This extends over three years, all on practically one machine. As first made, the chain was rigidly connected between engine and driving wheel, and used to break with exasperating regularity. However, we discovered the cause, and by fitting strong free-wheel clutches on the engine chain, so as to allow the driving wheel to over-run the engine, we practically succeeded in obviating this failing, and I have had one chain last over a year in constant use. The cylinder was 2.9-16 inch diameter, by 2.3 inch stroke, fly wheels 24 lbs., 6 inch diameter, h.p. 1.5 to 1.7. Now, the experiences gained by such a thorough testing of chain transmission led me to believe that a friction-clutch and spring drive would be superior, and also possess various inherent advantages, such as free engine at will, also a free bicycle. Of course a small proportion of power is lost by using a spring drive, but the loss is very, very small, and I believe the advantages are more than correspondingly great. However, this question remains to be worked out, and anyway, as engines are made at present, only a belt drive is feasible, because it is observable that each system must have an engine properly designed for its special needs, and but little

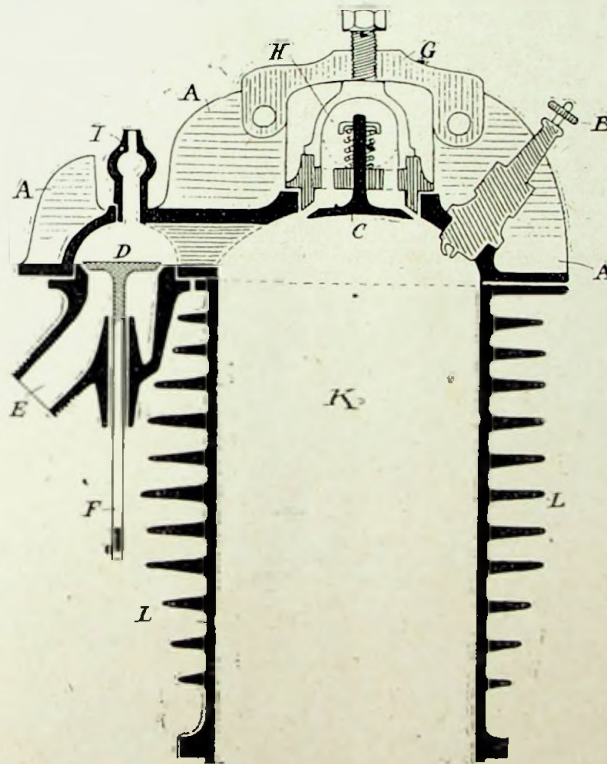


FIG. 1.—PROPOSED ARRANGEMENT FOR VALVES AND PLUG.

A Vertical Radiators on Cylinder Cover. B Plug Ignition. C Induction Valve. D Exhaust Valve and Chamber. E Exhaust Exit. F Stem of Exhaust Valve. G Stirrup for securing Dome of Inlet Chamber. H Inlet Chamber and Inlet Valve Spring. I Compression Tap. K Cylinder. L Radiators.

has been ascertained up to now regarding chains, so that most engines sold are suitable for belt transmission only. But incidentally, I hear remarkably good reports of the Princeps (Bruneau) system, which comprises a small friction clutch carrying a chain pinion on the engine shaft.

The Bowden arrangement of clutch in the back wheel hub is another successful effort towards the perfection of a desirably efficient, positive drive. With other systems we need not concern ourselves at present, thus confining ourselves to the three I have dealt with, viz., direct drive, such as the Holden, for example, and the chain drive, through that less elastic medium, the friction clutch, as in the Princeps, Petrocyclette, Bowden, Humber, etc.; and thirdly, the widely-adopted belt system, with or without jockey pulleys. Now assuming the chain and clutch can be perfected and made reliable, I believe it to be undoubtedly the transmission of the future, and I feel sure a little careful attention from chain makers and engine designers should overcome the present drawbacks of this system. I would draw particular attention to Hans Renold's perpetual

and constant pitch system. If that maker will only give his attention to a motor-bicycle chain on the same lines, I am certain it would repay him a thousandfold, and help us, as well as our movement. I do not think the present 1 inch and half inch block chains are suitable for transmitting high power at a great chain speed, and if this transmission system is to obtain, these conditions are essential to simplicity. Now let us return for a space to the engine and its accessories. I have already given strong reasons why the inlet or induction valve should occupy a central position in the head of a vertical cylinder. Now, the much-copied Daimler system of valves, as used in De Dion, Minerva, etc., though to be commended on the score of simplicity of mounting and manufacturing, gives a valve position very detrimental to the life of the inlet valve. It is also not the best that could be adapted in order to give a powerful mixture, although I have heard it claimed for this arrangement "that it kept the exhaust valve cool."

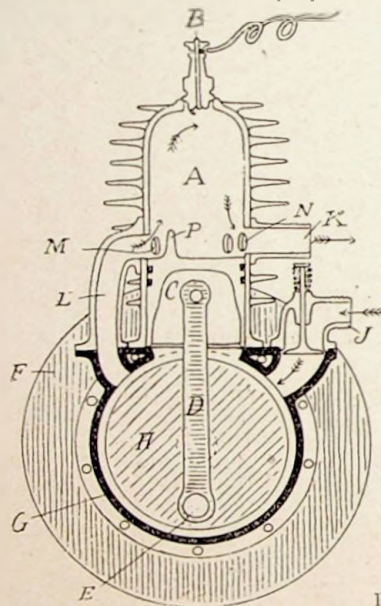


FIG. 1.  
A TWO-STROKE MOTOR.—AA Cylinder and Cooling Ribs. BB Ignition Plug. CC Connecting Rod. EE Crank Pin. FF Flywheels (indicated by vertical lines). GG Phosphor Bronze Crank Case. HH Crank Disc and Engine Shaft (diagonal lines). I Clip for Frame Tube. J Inlet Valve to Crank Case. K Exhaust Outlet. L Tube from Crank Chamber to Inlet Entrance. MM Orifice in Wall of Cylinder. N Orifice for Exhaust Gases. O V-Shape Pulley for Transmission. PP Baffle Plate to deflect incoming mixture upwards to Combustion Chamber.

**Valves.**

Now the exhaust valve, even in water-cooled engines, is generally nearly, if not quite, red hot, and if made of solid nickel no evil results will follow, and there is absolutely no gain obtained from trying to keep it cool. In an air-cooled engine it should be as much exposed as possible to the impinging atmosphere, as the heating of cylinder cover generally starts from this point; but remember that wherever the inlet valve is placed, its cooling influence will be just as good, and the mixture more concentrated if not expanded from contact with a red-hot valve directly it enters the cylinder. Theoretically, the valves should be as far apart as possible. I have tested for a long period an engine arranged in this manner, and its results bear out all I have stated, as in the course of over a year's continual running I have only ground in the exhaust

valve once, and have never had to renew any portion, not even an inlet valve spring. I will show this cylinder to anybody interested, and willingly bring proofs of what I have stated. If high-tension ignition is used, the plug should be placed as far from the exhaust as possible, and as near inlet as convenient, because there will always be found the purest mixture, and the plug will last much better than if over-heated by continual contact with exhaust products. I may point out before finishing with valves, that exhaust and inlet valves cannot in reality be too big. Even if the whole head of cylinder constituted one big valve, or if there was no head on at all at moments of exhaust and induction, there would still be back pressure and a more or less "attenuated" charge on induction.

One need go no further than the resistance of the atmosphere for a solution of this phenomenon, but of course the above hypothesis of no head to cylinder is given as the "reductio ad absurdum" for the sake of impressing designers that the valves must be as large as possible, consistent with their proper mechanical working, which latter would be very difficult to

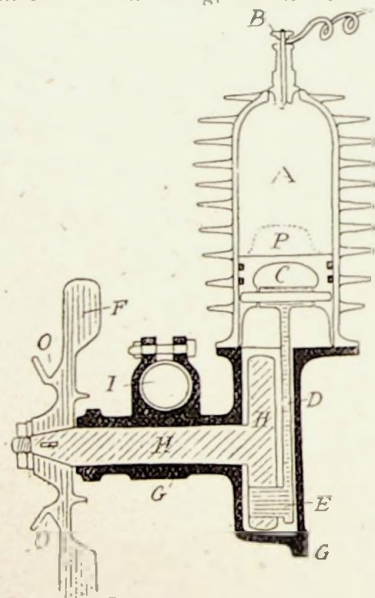


FIG. 2.

obtain if made of very excessive dimensions. The "Napier" practice of three small valves will give quicker closing for a given opening than a large single valve. The reason of this is not far to seek, as the area of a circle increases at a much greater rate than its lineal circumference. For example, a circle 1 inch in diameter has a circumference of, say, 3 inches, and an area of, perhaps, 7/9ths of a square inch. Now, of course, the resistance that prevents the inlet valve closing instantaneously is the pressure of incoming mixture, as the column of air in the induction pipe, once started in violent motion, exerts considerable force, and it is against this force that the inlet valve has to return. Supposing our mixture to be entering with a pressure of 18 lbs. to the square inch, our valve of 7/9 inch diameter has

to close against 7/9ths of this force, which would mean 14 lbs. resistance. Of course, the figures I give are not actual, but are rounded off simply to explain my meaning. Now suppose we must have a larger valve. Our present one, if lifting 1.8 of an inch, gives 3.8 of a square inch clear passage. Then let us triple our diameter of valve, giving 3 inch diameter and 9 inch circumference, same lift; we thus obtain 11.8 inch opening with an increased valve area 7 square inches. So we gain three times the area of orifice at expense of nine times increased area. Thus if our mixture was entering at the same speed, our valve would have to close against 125 lbs. pressure (!) as our valve now has 7 square inches area. Of course actually our mixture would not be entering at anything like such a speed or pressure, but the conditions are true, nevertheless. Thus for high speed engines of large size I am certainly a friend of multiple inlet valves. I give a drawing of what I consider the best arrangement of valves for present air-cooled engines (See fig. 1). In fig. 2 a two-stroke motor is illustrated. I propose to deal with this in my next contribution. (To be continued.)

## IN TRANSIT.

*Some Feelings and Experiences of a Cyclist in the Transition Stage.*

### The Causes of Side-slip.

Just when, how, and why a bicycle—and especially a motor bicycle—should side-slip has been much discussed lately in certain circles that I wot of, and the theory which was put forward (with a large amount of temerity!) in these columns recently, has been turned inside out, upside down and generally distorted with a view to "knocking the bottom out of it" as one man tersely put it. But, somehow or other, the theory was possessed of good staying powers and, after the gruelling it received, even I began to have confidence in it.

It's just the same with a new machine. For the first two or three rides you feel that your life and well-being are at the mercy of a beast in which you repose about as much faith as you would in a tamed tiger. You know—or think you know—that it is a creature of whims and caprice, seeking for an opportunity to either take the bit in its teeth or to quit work for the day. But, one day, she brings you safely through a storm, or lands you home first out of the crowd of other men and motors, or carries you successfully to the top of a hill, leaving its rivals still panting or trying to pant, and then she has found the way to your heart and your confidence. Thereafter, every hour spent in her company is keenly enjoyed, and when mishaps occur, as they have a knack of doing, they become sources of knowledge rather than causes of regret.

But we are wandering from our subject, which was that of theory on side-slip, which had been tried and not found wanting.

A certain amount of evidence has come to hand from my readers, and so far it all tends to support the theory that side-slip is caused by the centre of the total weight being before or behind the pivotal centre of the machine. Mr. E. Douglas Fawcett has, I know, had a good deal of experience with the two-wheeled motor vehicle, and he writes me from Totnes to the following effect: "I will not discuss theory, but the practical tests are favourable to your view of slips. Devonshire grease is notoriously treacherous; in fact, the districts round Torquay and Totnes are the most difficult to negotiate in wet weather of any I know." This district is well known to me, and I can from experience confirm this statement. Mr. Fawcett goes on to say, "Consequently we have here a good testing ground. I found the Singer back wheel slip badly often, but with my Werner front driver it was always the front wheel that betrayed me. On the front driver, the

side pull of the belt, and a strong motor, tend to prevent the bite of the tyre. By far the best non-slipping machine I ever rode was a 1901 Excelsior, and one may presume all Minervas are as good." Of the three machines which have passed through my hands, two have had the engine in front of the head, and both have been subject to side-slip, in each case the front wheel being the delinquent. My present machine, an Excelsior, has served me well, and at the week end it stood up through some awful grease that caused my companion (driving a machine with the engine forward) to dismount before he should be laid low.

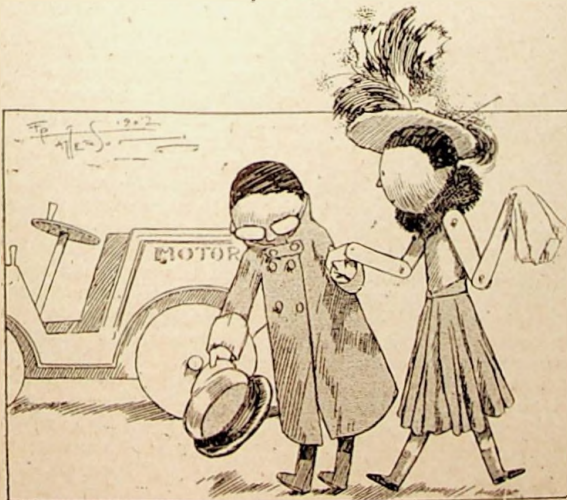
### And Some Side Lights.

There are two other things that tend towards the upholding of my theory. The only motor bicycle that I have been able to steer hands off (engine working, of course) has been my present one, with I admit that it is not a trick to be indulged in, but I learnt it for the same specific purpose that caused me to learn riding the safety bicycle hands off. I found that I was holding the handlebar with far too firm a grip, with the result that my forearms used to ache fearfully at the end of a day's ride. Now this clenching of the handles is generally caused by imperfection of the body balance, and the only way to cure it is to go to the root of the evil. And to learn to properly balance the body one must have no assistance from the hands. So in quiet thoroughfares I have been practising the art and have now reaped the reward of my labours: Not only is undue strain and aching of the muscles avoided, but the arms are saved a lot of vibration that is otherwise communicated to them.

The second point for consideration arises from the different methods which I have tried for carrying a camera on a bicycle. I have carried my photographic kit in various positions (1) in front of the head; (2) slung in the frame; (3) over the back wheel; and (4) on my own back; and the second method has proved far and away the best. Whenever the weight has been either forward or behind, the steering has inevitably been effected, and the tendency of the wheel with the additional weight over it, to slip, has been very manifest. As I do rather a lot of photographic touring, I can speak from experience, and with the camera slung in the frame I have ridden for miles without touching the handles.

Other correspondents have gone into this question of side-slip. I propose to publish some of the letters in our open columns, and perhaps if we get a number of experiences we may be able to arrive at some definite conclusion on the causes and cure of side-slip.

CYCLOMOT.



Off with the  
Old Love and on with  
the New.



FOR BEGINNERS ONLY.

By ERNEST GODBOLD.

In an earlier article I endeavoured to paint some of the delights of motor cycling, but I tried at the same time to be quite candid, and to emphasise the fact that some experiences must be gained and some drawbacks encountered before the convert can expect to enjoy those delights to the full. For, truth to tell, a motorcycle is like other delicate and complex instruments which must be thoroughly learned and understood before one can hope to get the best results from it. Too many are apt to think that with half-an-hour's instruction of the uses and purposes of the various taps and levers they know all about it; that all they have to do is to start away, switch on the current, and the machine itself will do the rest. Some succeed in this way and proceed gaily for a few days or even weeks, but then something happens, and when they cannot put it right they blame the motor and its maker rather than their own lack of knowledge or experience.

For myself, I prefer experience however dearly bought—that is, within certain limits, of course—to any amount of theoretical knowledge gained from instruction books or makers' catalogues. Personally I have learned far more wrestling with the machine by the roadside or in a stable or barn miles from anywhere than ever I learned in the workshop or at home by the fireside. When I started as a motor-cyclist the only printed information available was contained in a Parisian catalogue, from which my limited knowledge of technical French did not permit me to learn a great deal; and a small pamphlet written by a gentleman who appeared to have "translated" pretty freely from this catalogue.

Equipped with all this learning I set out with a motor tricycle. During the next few months my knowledge of electricity, my acquaintance with mechanics, and my abilities as a walker were all largely developed—especially the last. But in nearly every instance the remedy which I ought to have applied was quite a simple one. I am not, I think, a greater fool than my fellows, but the same thing had not happened to me personally before; I had had no experience and so I did not know what to do. Besides, in those days the fittings generally of a motor cycle were very different to what they are now. The makers, like the riders, had had little experience. The electrical work—battery, induction coil wiring, and all—was of the toyshop sort; very nice for a parlour plaything but of no use whatever on a machine that was banged about in all sorts of weather over all sorts of roads. Vibration had not been taken into any account; one nut at the end of a spindle was deemed to be quite sufficient for holding a wheel or mudguard stay in place; such a thing as a split cotter through the axle end was a luxury too absurd to be thought of. It was not wanted on a bicycle—why, therefore, on a motor-cycle?

The first time I met a short circuit I did not recognise it at all. Perhaps because I had not met it before; or maybe because I had a man on a bicycle with me, who, besides being not strongly sympathetic, would suggest all sorts of theories to none of which he adhered for more than five minutes at a time. It was growing dusk when the trouble began, and in the gathering gloom I pushed and pedalled that infernal machine three solid miles till, utterly exhausted, I left it in a barn and walked home the remaining seven. Next morning, by the light of day and a night's reflection, I returned to it, found out in two minutes that the covering of the high tension wire

had chafed through, bound it up, and in less than ten minutes was on my homeward journey—triumphant. Nowadays a high tension wire is covered so that it resembles a deep-sea cable. The buyer of to-day is getting the benefit of my experience.

On another occasion, having borrowed a quadricycle, I sweetly offered to take my sister out for a ride on it—it really was my sister. She with pride consented, and no doubt thought I was really a useful brother; I felt that I was doing a noble deed! We went very well for a few miles, but the thing then began to go slow on hills. I grew tired of pedalling up one long slope, so called to my passenger to jump out. She did so, but with more haste than judgment, stepped out in the wrong direction and a moment later was prone on the road, which, fortunately, was dry, although very dusty. After that she got out at the bottom of each hill—and at the top jumped in—the right way. But notwithstanding this the machine grew worse and worse, until at last I had to pedal downhill. This was too much, and at the foot of a long descent we got off. I sent my sister to sit in what artists call the middle distance where she could not hear my language, and I set to work to make a thorough examination. I went through all the usual forms and ceremonies; there was no oil on the contact breaker—a very usual source of trouble in these days; the sparking was correct, if feeble; and the only thing I could think of was that the battery was run down—



Photo.

H. Speight, Bidditch.

Mr. Godbold on his "New Enfield."

it was before the days of accumulators—and of course I had no ampere-metre with me. But suddenly I happened to touch a wire when the switch was on, and the shock I received was strong enough to convince me that the battery was a very live one. So we packed up quickly, got aboard once more, and that motor simply raced home at a pace very considerably beyond the legal limit.

But in telling my experiences I do not wish to frighten the man who has not yet made the plunge and purchased his motor-bi-tri- or quadri-cycle. I want him if possible to profit by my example, though in my inmost soul I am quite sure he will do nothing of the kind. He will learn his lesson where I did—by the roadside.

He can, however, save himself some of the more ordinary troubles if he will bear in mind that his machine is a machine, and that it must be treated as such. In our early days, as owners of bicycles, we found both enjoyment and employment in constantly taking them to pieces, carefully oiling and adjusting every part and often spending hours in trying to fit them properly together again. Nowadays—owing partly to the fact that the novelty has worn off, and partly that modern bicycles are so well built—we are inclined to gloriously neglect them. Some of us, I fear, only oil the bearings when they begin to squeak, and only touch the tyres to blow them up when their flabbiness becomes obvious in our steering. With motorcycles it is necessary for us to return in some measure to our earlier habits. I do not mean to pull them all to pieces, but to examine them carefully whenever opportunity affords and treat them with intelligence.

Some men I know use motorcycles as they do bicycles, viz., on every possible occasion and merely as vehicles for getting from one place to another, even if they only be a mile or two

apart. But I do not consider this fair to themselves or to the motor. For myself I am still content to consider motor cycling as a pastime, and I regard as extremely well spent an odd half-hour or so in going carefully over the machine from front to rear before starting out on a ride. Always do it before a ride—afterwards there is never any time, or there is no light, or somebody is waiting to see you. Always remember to inject those few drops of paraffin into the cylinder; test your battery or accumulator; see that the spark is strong and fat; examine well your tyres and fully inflate them; see that the contact breaker is free from oil; fill up your petrol tank; lubricate your crank chamber and see that you have a full supply of lubricating oil with you; try the bearings for side shake and put a spanner on every nut and see that it is tight.

The half-hour may stretch into an hour and somebody may be waiting impatiently for you; but do not let that worry you. It will save you time later and render your ride more pleasant, even if only from the feeling of security gained from your knowledge that everything was right when you started.

### *A Few Hints Regarding the Accumulator.*

Always remember to remove the plug from the handle switch when the machine is resting for any length of time.

This will avoid risk of current being wasted if machine is not to be used for some days. Disconnect the wires from accumulator terminals altogether; this will prevent leakage. Also remember to keep the cover of the battery dry for the same reason. In case you should spill any of the acid on your clothes when handling it, have a little strong ammonia at hand to apply to the spot at once; this will prevent burning or rotting of the cloth.

### *Tyre Repairing.*

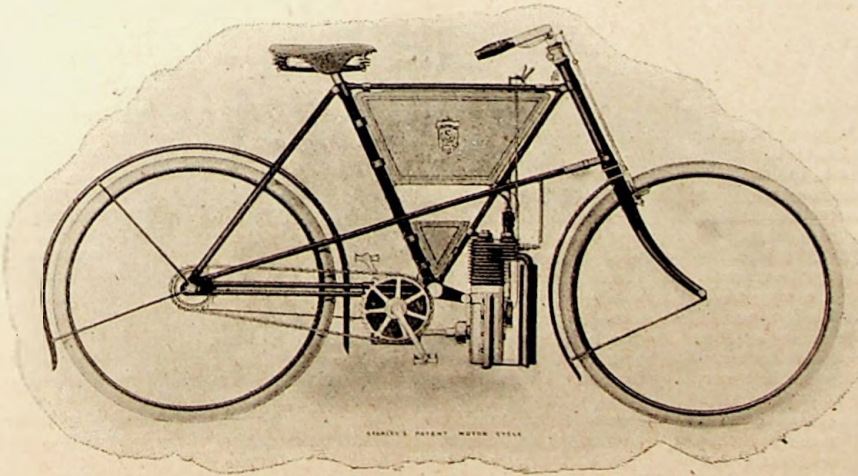
A puncture in either tyre is, of course, sufficient to put the machine out of action for the time being; to attempt to ride upon a deflated tyre would mean the cover being quickly torn to pieces. The method of repairing being exactly the same as for a bicycle, little need be said, excepting that the repair must be, if anything, more thorough and stronger in every way—in fact, a special motorcycle tyre repair outfit wants putting on the market; this should contain larger patches, more canvas, French chalk and solution than is contained in the ordinary cycle outfit. Punctures on a motor bicycle must be safeguarded against in every possible way, because although the repairing of the inner tube is just as simple in itself as on an ordinary machine, the task of removing the cover is a decidedly awkward one, from the fact that the machine cannot be turned upside down. This last difficulty must certainly be solved. What is urgently required is some light and compact arrangement for "jacking" or lifting either wheel from the ground; this could readily be attached at will to an extension of front and rear axle, and designed so as to strap up alongside one of the frame tubes when not in use. Who will provide this handy accessory?

### *Starting Troubles.*

It is sometimes the case that although the motor itself and the running gear generally may be in the best possible order, some trouble may be experienced in getting a good start. As a rule this will be found to be caused either by not having the proper proportions of air and gas to form a strong enough mixture, or else, if this be right, the sparking will be found to be retarded too much. It must be remembered that there is only a slight compression of the mixture at starting, and just a little experience in adjusting the sparking lever is necessary to be able to fire it at the right instant. On the other hand, care must be taken not to have it advanced more than absolutely necessary, because as there is not much momentum in the flywheels of the motor till the speed gets up, a premature explosion will produce a very unpleasant back fire and jerk to the machine. It is generally possible to tell if you are likely to get a good start previous to mounting the machine, by just switching on the current and adjusting your levers, and then walking briskly alongside with the machine. If all is right the motor will start and begin to pick up speed, if not, try injecting a small quantity of petrol through the compression tap.

### *Lubrication for Motors.*

W. M. Walker and Co., 16, Sydney Street, City Road, are about to place on the market an oil specially prepared for the lubrication of motors. This oil is the outcome of many years' experience of oils and their properties, and in its preparation special attention has been paid to rendering it practically non-freezing. It does not appreciably thicken at a temperature much lower than any experienced in this country, so the makers claim. We are now testing samples of this oil and will report at an early date. Their No. 1 oil is suitable for air cooled motors and steam cars,



THE IMPROVED "STARLEY."

It will be remembered that in our first number we illustrated the Accles, De Veulle and Starley motor. The above illustrates several improvements effected since that time, which we shall fully describe in our next issue.

## OTHER PEOPLE'S VIEWS.

### Belt Driving.

Sir,—I have read your valuable article on the above question in your last issue, and although I am only interested in motor-cycling as a rider, I think I may lay claim to a lengthened experience in driving high-speed machines by means of belts. Speaking of flat leather belts for motorcycle driving, a little slip may be beneficial, but sometimes there is a great deal too much slip, especially in wet weather, and I know of several cases with heavy motors in which belts have given place to chains.

Amongst the chief reasons for belts slipping, may be mentioned: (1) too short driving centres, which means tight belts, and consequently more rapid deterioration of belts and bearings; (2) too narrow a belt to transmit easily the required power; (3) a driven pulley of too small diameter and width; (4) a belt of poor quality, not properly stretched, jointed, or dry and out of condition; (5) running a belt in a vertical plane; (6) a suddenly applied load; (7) the driving or driven pulley not exactly parallel with one another, or out of balance; (8) a belt running at an improper speed; (9) driving from very large to very small pulleys, etc.

Dozens of remedies have been introduced to increase the driving power and prevent belts slipping with more or less success, and my object in writing you is to mention a plan I have used latterly in driving high speed machinery at short centres—where it was impossible to increase the length of belt—with success.

In the place of a single belt, I have compounded them, or, in other words, run two separate belts one on the top of the other. The two belts are not connected in any way, and I have found, from absolute experience, that the second belt considerably increases the power transmitted. Perhaps some of your readers may have an opportunity of trying this plan on a motor, and if they did so and would communicate the result to "MOTOR CYCLING," it would be of interest.—Yours faithfully,

M. POWIS BALE, M.I. Mech.E., etc.

### The Weight of Motor Bicycles.

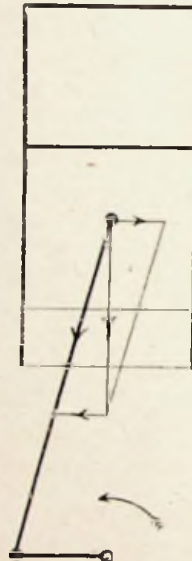
Sir,—I should be the last to advocate any serious reduction in the weights of motor cycles, but at the same time I must admit that I cannot understand the idea which some makers and users of machines of this class seem to entertain, to the effect that weight is of no consequence. So far as the motor is concerned this is probably true, for any increase can always be more than compensated by the fitting of a very slightly larger engine, but there are other considerations. Not the least of these is handiness. It is one of the charms of the motorcycle that, should any unforeseen mishap occur, the rider is not absolutely stranded as he is in the case of a car. He can resort to the railway, and it is worthy of note that should the booking clerk or any other official demand to know if the machine is charged or not, he can, by sacrificing the petrol—which will be little good to him in the case of a mishap—compel the railway company to convey the machine at fifty per cent above the charges for an ordinary bicycle. It is when taking a machine by rail that slight weight scores.

A fairly light machine is a great convenience in this case as the porters and guards are not yet used to handling motor bicycles, and are apt to cause damage inadvertently. Therefore it is better for the rider to look after his machine himself, which he cannot do unless it be of fairly light weight. I think that a motor bicycle scaling about seventy pounds should be quite heavy enough, if it be made properly and of good material.

Yours faithfully, C. W. BROWN

### The Position of Engine.

Sir,—With regard to the theory set forth on the action of piston rings by Mr. P. A. Biggar, in your last issue, I quite fail to see how rings, as usually fitted to motors, can possibly tend to keep the piston from bearing on the lower cylinder wall (horizontal cylinder). It could be done by springs underneath the ring reacting on the piston on the lower side only, but these springs would need such delicate adjustment to prevent undue wear that, regardless of expense, they would prove impracticable.



and expansion, the piston is actually pressing on the upper wall of the cylinder. These notes may help to start a debate on the principles involved.—Yours faithfully,

A. N. R.

### Some Troubles and How to Remedy Them.

Sir,—I have read with great pleasure the articles contributed on the troubles that are likely to arise with motor cyclists. Kindly permit me to point out two causes which are rarely met with, but, if happening, would be a big worry to the novice and possibly to some of the more advanced. The aluminium sleeve which holds the air lever barrel and the throttle barrel is fastened to the top of tank by a screw inside bottom of sleeve. The constant vibration of machine sometimes loosens this screw; result, sleeve not being tightly bedded to groove on tank, the air which should pass through gauze on air lever passes underneath, making it impossible to regulate the air for vaporisation. This also causes petrol to become stale, because carburettor cannot be made airtight.

Remedy.—Unscrew both taps from sleeve and tighten screw by tapping head with screw-driver and hammer.

Trouble No. 2.—The pin of inlet valve in some machines has a small piece of copper wire fastened through hole in end to prevent nut coming off in case it became unscrewed through vibration. Valve will sometimes fail to close properly, through wire slightly touching sides of valve. Remedy: Remove wire and insert half an inch (head end) of a very thick pin and bend up at end.

Yours faithfully,  
"SPEEDWELL."

### Side-Slip.

Sir,—I have taken your valuable paper from the commencement. Please accept my congratulations on your complete success. I may say that I think the moting community shows its good taste in patronising the pioneer of the new branch, known as "MOTOR CYCLING."

With reference to "Cyclomot's" paragraph on side-slip, I have found that side-slip is almost entirely due, in the first place, to steering. That is to say that as long as the course is kept straight and the cycle remains perpendicular to the ground line there will be no side-slip. As soon as a wobble throws the machine out of the perpendicular then it tends to slip and, if the tyre cannot bite through the grease to the firm road, well, the result is an ungraceful dismount, if not worse.

The second sort of side-slip is due to the momentum of the machine and it is about this that I wish to give an experience I had a while back. I was riding one very greasy day in a town when suddenly I felt my back wheel swing round in exactly the same way that "Cyclomot's" Ariel tricycle did. I was turning a corner at the time, and travelled some yards with the frame lying at an angle of about 45 degrees to the direction of motion before it resumed its normal position. I believe the cause of this slip was that the majority of the weight was at the back of the machine. It struck me at the time as being somewhat curious that I had not the slightest difficulty in keeping my balance. Personally I am inclined to favour "Cyclomot's" view on the subject and think that the centre of gravity of the whole machine, including the rider, should be kept slightly nearer to the centre of the back wheel than that of the front. I have not come across a single instance of competent rider coming off as the result of the back wheel alone slipping or skidding sideways. I do not think that the extra weight of motor and accessories on a power-driven machine is likely to increase its slipping propensities, because the greater weight gives a better chance of a firm grip of the tyres on to the solid road underneath the greasy mud.

I think, however, that the opinions of other riders will be valuable on the principle that "two heads are better than one."

My axiom has always been "Never brake your front wheel when riding on wet or greasy roads."

Wishing your venture every success in the future.—Yours truly,

W. EASTBURN.

[Want of space prevents us giving any of the other letters which have reached us, dealing with this subject. They will appear in the next and following issues. The matter is also dealt with in the current contribution of "In Transit," and further correspondents is invited.—Ed. "M.C."]

**Pedalling in Motorcycle Races.**

Sir.—With reference to your article in this week's "Motor Cycling" re "Pedalling in Motorcycle Races," I think that pedalling in motor-cycle races should be limited to, at the outside, 50 yards from the start, as the races should be trials of skill and not muscular strength. Also races will be tests for the various makes of motor-cycles competing, and the results will be a guide to intending purchasers. I have heard it argued that a competitor might possibly make a mistake during a race and pull up so much that pedalling would be needed to restart, and that in a case of this sort pedalling should be allowed. I do not agree with this, for if a machine pulls up during a race, it is either because the driver is clumsy or incapable, or else the machine is faulty, and in either case I think that it should be ruled out of the race. If we are to have motor-races, let us have no half-and-half business, but do the thing properly.

The question then arises as to what form of government motor-cycle racing is to have. It seems to me that unless a special union is formed for the purpose, it will be much the best to look to the Automobile Club for guidance than to any other body at present existing, as the gentlemen connected with this have at any rate a knowledge of the requirements of motorists.

The Automobile Club now seems to be taking special interest in the motor-bicycle question, and will no doubt in future include sections for motor-bicycles in its competitions, and these should be beneficial both to the sport and to the trade.

The N.C.U. is not quite the right body to control the new sport, unless the methods are to differ very considerably from those employed towards ordinary cycle racing. Take, for instance, the N.C.U. definition of an amateur. Why this, to begin with, would prevent many prominent gentlemen motorists from ever becoming racing motor-cyclists. Anyone who has raced against a professional, even though the prize (if any) were not a money prize, is declared by the N.C.U. to be not an amateur. Is it not rather illogical?

I understand a professional to be one who earns his living, or at any rate derives pecuniary benefit, from racing. I suppose the N.C.U. would consider the gentlemen who have driven cars in the open French races to be professionals. Imagine the Hon. C. S. Rolls or Mr. Mark Mayhew being told that they were not amateurs!

Another strong point is that the N.C.U. does not recognise road events, whereas the Automobile Club not only recognises but does its best to promote, competitions of various sorts on the road.

These must necessarily be of interest to the majority, as no test from a buyer's point of view is so good as a road test.

The matter of the government of motor-cycle competitions needs to be gone into carefully, as much depends upon it.

Yours faithfully,

ERNEST H. ARNOTT.

[It will be readily admitted, even by those who, unlike Mr Arnett, are not "agin the Government," that the whole matter requires to be thoroughly thrashed out. The views of other readers will be welcomed.—Ed. "M. C."]

**The Quadrant Combination Lever.**

Sir.—It has come to our knowledge that certain persons, through prejudice, interest, or lack of knowledge, are speaking against our combination lever as being wasteful of gas. Will you therefore permit us through your columns to inform the public, who take so deep an interest in motor-cycles, that we have made a practical experiment with a view to decide the matter. We mounted two riders, both high-class, expert riders, with diverse views on the matter, on two perfectly new machines, identical in every respect, except that one had four levers, and one had the single lever. The run was over nearly thirty miles of road, practically all hills—Birmingham to Bromsgrove and back—the roads soft, and the atmosphere in a drizzle. The result was a saving by four per cent. of petrol in favour of one lever, but the rider of the other is convinced that in the hands of an ordinary rider, who would not make such scrupulous efforts as he did, the saving ordinarily would be ten per cent. This, we think, will dispose of ignorant statements as to wastefulness. The result showed, under the unfavourable conditions, that the cost of petrol came out at 28 miles for twopence, so that the whole matter is very trumpery except that it has been deemed good enough to decry a good invention.

In the matters of the heating of the cylinder and in hill climbing, special observations were taken, and always favourable to the one lever machine. In ease of manipulation there was no comparison.—Yours truly,  
THE QUADRANT CYCLE CO., LTD.



There is nothing better than Petrol to clean the Sparking Plug brushing with an old toothbrush. Care should be taken the brush does not find its way back to the Toilet table

Tendency apparent to confine the motor inside the ordinary tread of 33 inches does not permit of bearings of sufficient durability.  
Width of tread is no longer important provided the motor continues to do its work

It must not be forgotten that a machine weighing approximately three quarters of a hundred weight is not to be handled as easily as an ordinary cycle. To carry a motor cycle up and down a flight of stairs means a two handed job.

"HINTS AND WRINKLES" ILLUSTRATED.

## OUR INFORMATION BUREAU.

D. Malcomson (Mentone, France).—Thanks for subscription duly received.

G. L. K. (Amsterdam).—Your subscription duly received with thanks.

C. W. B. (Durban, Natal), in sending his subscription, adds:—"I need not say how 'CYCLING' is appreciated, or how we look forward to it. May 'MOTOR CYCLING' be as good! Best wishes." We hope our well-wisher is pleased with the paper.

L. C. D. (Handsworth Wood) writes:—"I must congratulate you on your new paper. It is indispensable to anyone who intends ordering a motorcycle, and deserves to be a success." We have forwarded "Speedwell's" address by post.

### Silencer Troubles.

H. S. M. (Eye) finds that the silencer of his motor is too noisy, and from his description it would seem that the whole of the exhaust does not pass between the baffle plates, but part of it is expelled through a large auxiliary hole in the silencer. If this is so, the noise will be great. A slight internal alteration might mend matters without necessarily choking the exhaust, or the makers might supply a silencer silencer!

### A Petrol Query.

H. O. B. (London, S.E.). Usually a gallon of petrol will carry one a hundred miles, but everything depends on the skill of the driver. Of course the heavier powered motor will use up more petrol if allowed to, but the same consumption of fuel should practically give the same results. The tip about accumulators is not to let them run down at all; in other words, frequent recharging is the best course to adopt, but do not run it down much below 4 volts. The speed indicator you name should be satisfactory.

### Tips are Apt.

"Novice" (Birmingham) adds a word of praise to the general testimony of our new paper.—"Along with all whom I have spoken to on the matter," he says, "I consider it excellent. Your remarks on page 51 re tap for oil outlet at bottom of crank chamber are very apt. I have just had one fitted to mine."

### Wants Touring Companions.

A. B., of Brighton, wants to go for a fortnight's tour on a motor bicycle in France just after Easter, and would like to know of one or two others who would join him. We shall be pleased to forward any letters that are addressed to our care. He also asks what the Customs requirements are with regard to the motor bicycle.

### .. NEXT WEEK ..

We shall start a series of Illustrated Articles descriptive of the best known types of Motorcycles and their parts. The special features of the Quadrant Bicycle and Tricycle will be dealt with in our next issue.

H. W. (Halling, Kent).—Have the Excelsior motor bicycle.

S.E.B. (Newark, Notts).—Thanks for calling attention to printer's error. It should have been "bicycle," though Mr. Westlake assures us that the "Jooss" is also made in tricycle form. The bicycle engine is catalogued as giving 5.8 b.h.p., and the tricycle engine as 11.5 b.h.p. Very glad to hear you are pleased with our new "baby."

### Some Early History.

T. B. (Birmingham) forwards these items apropos of Mr. Westlake's article on the "History of the Bicycle."—"(1) The first steam carriage was made by Isaac Newton in 1680. Of course it was not such a practical device as Murdoch's, but then it was a century earlier, and Murdoch's was (like Newton's) of no practical use. (2) The crank was invented by one Jonathan Hulls, who applied it to

"PEDALLER" (Tipton).—A set of batteries should run you a good many hundred miles before new ones become necessary, whilst storage accumulators (generally considered a much better method) will carry you four or five hundred miles without recharging. You cannot recharge a battery. You could not fix the magneto ignition to an ordinary motor. The Simms-Bosch system is good.

"SPLIT-PIN" (Clapham) writes congratulating "MOTOR CYCLING" on its appearance and contents. He says that he has recently taken to the pastime of motoring after 30 years of cycling, and much regrets that the refusal of the C.T.C. to recognise the sport, and certain editorial weaknesses that threaten to become chronic, have induced him to relinquish his membership.

### A Question of Patent.

"Progress" (Wolverhampton) asks if he would be infringing any patents by using four long bolts for holding cylinder and head of bicycle motor to crank cases. So far as we know our correspondent would not be infringing any patent, but we give the statement with all reserve.

### Life of a Motorcycle.

W. P. G. (Southampton).—The machine you name would really be hard to beat, because the special feature of it is that all the troublesome details that usually have to be put right by the purchaser are already done by the maker. In our own experience we had no trouble, and we think that with a certain love of mechanics the working details are readily picked up. Of course, trouble is far and away the best tutor. The life should be four or five years with careful attention, but we have known motor tricycles to last longer. No, the distance you mention would be a mere trifle. The expense is merely for petrol, lubricating and burning oil, recharging of accumulator, and simple occasional replacements.

### Choice of Machine.

R. A. S. (Warrenpoint).—Really, it is difficult to decide, because both are good and satisfactory. The second type mentioned by you is more readily adapted to the present style of cycle frame, the other requiring a special design to accommodate it. Moreover, there is greater capacity in the frame for petrol storage, etc.



Lady Elcho packing up in readiness to follow the hounds. (See page 93.)

'a newly-invented machine for carrying vessels or ships into any harbour, port, or river against wind or tide or in a calm.' This invention he patented in 1736, and as Watt was not born till January 19, 1736, he (Watt) must have commenced inventing very early in life for Hulls to have stolen his idea. Hulls patented his invention as a whole, but a Mr. Wasbrough, of Bristol, patented the crank as a separate invention in 1778. James Pickard may have patented a crank, but I do not remember reading of it. The above dates can be verified at the Patent Office."

### An Ideal Pattern.

"WHIZZER" (Sutton Coldfield).—You admit that the specification you send us, if it could be materialised, would make an ideal motor bicycle, but the worst of ideals is that it is but seldom they do materialise. No, we confess that we know of no machine which even approximates to your own views. Parts of the specification are to be found in the Chapelle, the Phoenix, the Humber, the Hewetson, and the King, but we doubt whether a single machine conforming to your ideas could be turned out at anything near £50. We may in an early issue publish your specification, and see what other people think of it; meanwhile study the articles closely on "The motor bicycle; what will it become?"

You will be interested in

### "CYCLING'S" GRAND SPRING NUMBER

On Sale Wednesday, 19th.

It contains Routes, with Maps, of interesting Tours, special articles dealing with every phase of Cycling, and is full of sketches by all the best Cycling artists of the day.