THE AUTOCAR

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

EDITED BY H. WALTER STANER.

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THE AUTOCAR.

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Notes.

The 1903 Trials.

Last week we published the formulæ which had been prepared for the calculation of the marks in the Automobile Club reliability trials next September. These formulæ are not final, as we understand that they will be further discussed, and the judges as well as the Trials' Committee will have a voice in the matter. As this is the case, we do not propose to criticise the system at any length, as it is subject to further emendation, but it seems to us a mistake that the question of price should have been introduced into any of the headings, except the one for cheapness. We consider it entirely out of place in the hill-climbing formula, and quite as much so in deciding the marks for speed. The mission of these trials is admittedly to guide prospective owners of automobiles as to the actual performances of the different cars, and the introduction of the price factor into the question places a misleading value on the total marks scored either for hill-climbing or speed. The cars are already divided into classes, according to price, and this appears to us sufficient, particularly as marks for cheapness *per se* are given; that is to say, if a car in the class restricted to machines between £400 and £500 wins the gold medal in its class and also happens to be the most costly machine, the prospective purchaser who is looking to the trials for guidance will see at once that the most costly machine has performed the best, and it will be merely a question for him to decide whether he can afford it or not. If he cannot, he will go through the cheaper machines and see how their performances compare with the gold medal car, but he does not want the total marks earned under hill-climbing or speed to be mixed up with some division in pounds sterling, which he does not understand, and which is really nothing whatever to do with the case. We think those responsible for the regulation of the trials would be well advised to remove price from the formulæ altogether. It has already been suggested that the marks for brakes are not sufficient, and in this we entirely concur, as it seems out of proportion that such vital matters as brakes and steering should only be awarded 250 marks as a maximum for each, the same maximum being allowed for silence, vibration, dustlessness, re-starting on a hill, vapour or smoke, appearance, accuracy of advertised horse-power, fuel consumption, and cheapness respectively. None of these things are comparable in importance with brakes and steering.

The Oiled Road.

After a careful inspection made a few days since of the section of road at Farnborough, Surrey, which was treated some months ago with crude petroleum at the expense of *The County Gentleman*, we fear that, so far as this section of road is concerned, the experiment must be written down a failure. When we viewed it shortly after treatment, the effect of the oiling was to bind the surface together into a plastic substance, which the wheels of passing vehicles rolled down and flattened. As we set forth at the time, no dust was thrown up, even

by the heavy tyred wheels of Mr. Alfred Harmsworth's fast Mercedes car when driven over it at a 1m. 30s. per mile speed. To-day this is altogether altered. In the first place, the oil has practically vanished from the surface, and the portion of the road which knew it is difficult to distinguish from the untreated parts. In lieu of being rolled down by iron wheel tyres, the oiled surface is now cut up, and is just as friable as anywhere else. The passage of a 12 cwts. car, running on 3½in. pneumatic tyres at about twenty-five miles per hour, left just as much dust from the oiled surface as from that which had not been so dealt with. Clearly oiling has not scored here. Recalling the excellent reports of the wear and effect of oiled roads which have appeared from time to time in the columns of the French automobile press and the *Gazette* of the Touring Club of France, it would appear that the matter is differently handled over there, and that therein we have something to learn from the French road makers. Mr. R. E. Phillips, the well-known consulting engineer, visited Farnborough during bad weather some little time since, and reported the oiled road to be in a very bad condition, the rain having apparently softened the surface to such an extent that the wheels cut it up into ruts, in which the water stood in pools. Last week the road was dry, but the effects of the oiling had disappeared. It would be a hundred pities if the result of the Farnborough experiment were to check any further trials of this road treatment in this country; but before money is again expended in this direction it would be well if a road expert were sent to France to investigate the materials and methods which surround the successful *goudronnage* of French highways. In this matter, it would be well to profit by the experience and practice of those who have found road oiling a success. It is at least probable that their early trials were no more satisfactory than our first and solitary effort. To the Automobile Club, ever ready to undertake work for the benefit of the autocar world, we commend the matter as well worthy of careful investigation.

British Car Design.

The discussion which has taken place on this and a kindred subject in our columns has been of an interesting character, and instructive withal to those who look upon the matter with some knowledge and without prejudice. Now, we think no student of the columns of *The Autocar* can deny that in its pages the foreign designer and maker has always been given his due; but at the same time there has never been that inclination to see good in everything produced abroad and the reverse in most home products which is too prevalent to-day among English people. There appears to be such an anxiety to keep pace with the world that the average Englishman regards it as his duty to adversely criticise every action and production of his fellow countrymen, and as an additional spur to effort he cites (often with little real knowledge of facts) the foreigner as an example of one who does the thing better. This has become so much an everyday custom that it has had its effect, not only on people at home, some of whom seem to think no good thing can originate in Great Britain, but on those beyond our shores who read these criticisms by Englishmen on English work, and who have long ago made up their minds that, if a man will write thus of his own people, what he says, and much worse, must be true. The stimulating intent of much of the home belittlement is entirely lost upon the intelligent foreigner, and no one can wonder at it, as his definition of patriotism does not include anything of this kind. However, it is not our province to moralise on these matters; still less do we wish to deal again with the causes which started automobilism so late in this country.

The Crux of the Matter.

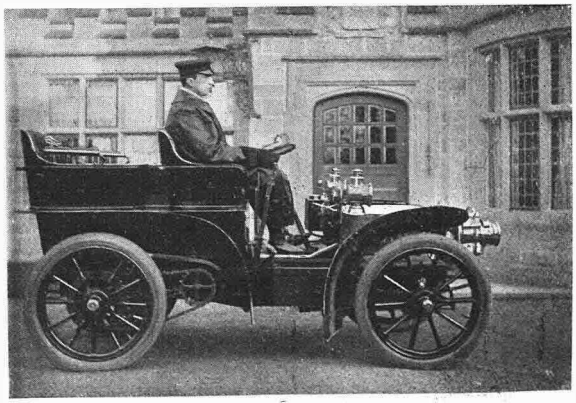
This late start is nearly always introduced into the subject, though it really has nothing to do with the case. It is not a question of when Britain started to manufacture automobiles, but entirely of what is the quality of the machines now turned out in this country. We use the word quality in the

A Foden steam lorry and an 8 h.p. Daimler car (see A Record of Reliability, page 236).

sense of excellence of design, material, and workmanship, and regularity of performance. Speed, in the automobile sporting sense, may be ignored, as it cannot be practised in this country. He who severely criticises the British car too seldom approaches it from the practical standpoint; in fact, he ignores the behaviour of the machine entirely, and seems far too much inclined to regard the car as a stationary instead of a locomotive machine. He examines the French cars, and observes certain mechanisms are used by almost all their makers, and if he finds the British car does not embody precisely the same details he at once makes up his mind that his country is falling away in the race for supremacy, and that its motor manufacturers are foolishly blind to their own interests in not immediately copying some particular foreign car. We would be the last to deny that there is a great deal to be learned from some foreign cars, or that they embody no features which are worthy of adoption. This is equally true of any good car, irrespective of its country of origin, and is acknowledged by all automobile constructors throughout the world. Each one of them profits more or less by the practice of the others, and the motor car of to-day contains features which have originated in Great Britain, France, Germany, and America. The point which is missed by so many critics of English cars is the fact that the matter about which the owner should be, and usually is, most concerned is the quality of reliability. It really does not concern him very much whether the car has or has not certain internal features, so long as it is reliable, quiet, and generally an easy car to control and to keep in order. If it can be proved that British cars lack these features as compared with those of foreign construction, an entirely different aspect will be given the discussion; but up to the present nothing of the sort has been attempted. The reliability trials which have been made in this country under absolutely impartial management have shown that, to say the least of it, the British car has not been wanting when compared with that of foreign origin; and we think those who are disturbed because their countrymen are not all copying certain foreign ideas should bear in mind that a car should be valued by what it does and not by what it is. In other words, the end attained should be regarded rather than the means. At the present stage of the evolution of the car, nothing would be more detrimental to progress than the subjection of the individual ideas of good British designers to a wholesale copying of any one model, whether it be British or foreign.

A Notable Speech.

At the opening of the Liverpool Show, Dr. H. S. Hele-Shaw made a notable speech. In referring to the development of the autocar, he pointed out that, as judge of the machines exhibited for four years, he had had a good opportunity of forming an opinion of the advance which had been made, and he could only say that the vehicles of to-day would have been considered four years ago beyond the bounds of possibility in anything like so short a period. He had been particularly struck with the advance in reliability. At the beginning of the movement, the common thing was to see cars stalled by the roadside. Now it was very exceptional, despite the greatly-increased number of cars, and this feature of reliability had been most conclusively proved by the trials which had been held. In other words, the motor car, as a practical and trustworthy mechanical appliance, was recognised as thoroughly established. He did not think the public appreciated the great difficulties involved in the construction of a thoroughly satisfactory road locomotive. The problem was a much more difficult one than the construction of a railway locomotive, and it was safe to say that the motor car in its present form represented the results of the work of some of the brightest and keenest inventive intellects all over the world. He dwelt upon the necessity for a man looking after his machine intelligently, or, if unable or unwilling to do so, to seeing that the machine was properly attended to by a skilled mechanic. As to the most suitable class of car which should be chosen by the would-be automobilist, they had four types to choose from—the bicycle, the tricycle, the voiturette, and the large car. For use by the general public he prophesied a great future for motor bicycles, and, comparatively speaking, he considered that the improvements made in them were as great as those made in the larger automobiles. The selection of a suitable vehicle was not so much a question of suiting the individual, but the objects he had in view. Turning to the traffic question, he could not help thinking it was remarkable that the generally slow moving stream of horse-drawn vehicles to be seen in great cities was the same in speed as it has been for a thousand years. Now they were seeing great changes, and the swift silent-running motor vehicles were taking their part in the traffic and negotiating its intricacies in a way in which no horse-drawn vehicle could possibly accomplish. Already the police had learnt that the motor was far more manageable than the horse carriage, and while it could get through the traffic much more quickly, it occupied but half the space, and could be stopped in much less distance, if necessary. In a few years' time they would be asking themselves how it was they had so long tolerated such out-of-date methods of conducting the traffic in the heart of our great cities.



This 10 h.p. Panhard, which belongs to Mr. T. F. Hooley, of Cambridge, has, its owner tells us, been driven over 3,000 miles without a single mishap. The tyres, which are Dunlops, also behaved equally satisfactorily.

USEFUL HINTS AND TIPS.

Many motorists advocate the use of paraffin injected into the cylinder in order to facilitate the motor starting. Although it accomplishes this in a most satisfactory manner, it must be remembered that it will leave a film of oil behind, even though the bulk be ejected through the exhaust valve, and when the motor starts it will result in a most unpleasant smell at the exhaust of the silencer, and will cause a deposit of carbon to be left in the cylinder. It is better to use petrol, new or stale, in place of paraffin. It accomplishes the same end if the motor is started before the spirit has had time to evaporate. If it is really necessary to use paraffin, it should be followed by the use of a little petrol to clean out the remaining paraffin deposits. The same thing applies in a lesser degree to the washing out of the crank chamber. If any quantity of paraffin remains in the crank chamber after washing out, it will thin down the lubricating oil, causing it to lose its efficiency as a lubricator, and, further, a most unpleasant smell will follow and last for a considerable time.

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Beware above all things of allowing oil or grease to get and to remain upon the tyres. All fatty substances are detrimental, as they act as a solvent upon the rubber. This can be easily proved by rubbing vaseline upon a piece of an old cover. The vaseline will cause the rubber to become spongy, and when dry it will crumble, and can be rubbed into powder by the friction of the hand. It is most important, therefore, that the rubber of pneumatic tyres should at all costs be protected against grease. Messrs. Michelin et Cie. write that they have had covers under their hands in which the stiffened edge had been completely rotted off by a neglected lubricator allowing oil to trickle down on to the tyre. Lubricators which are in positions likely to admit of this should, therefore, be frequently scrutinised. Also care should be taken that no part of the moving mechanism of the car throws oil on to the tyres. For the above reason, spare tubes should always be placed in rubbered cases whenever they are likely to come in contact with oilcans, oily cloths, or tools.

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Although we never advocate disturbing the mechanism unnecessarily, it is always wise when any defect is discovered to remedy it as soon as possible. Of course, the most vital points are the brakes and the steering. If any failure in the power of the first or the quick action of the second is noticed, it should be looked to at once. So far as the adjustment of the brakes is concerned, provision is always made for shortening the tension rod or rods, so that the brake pedal will not be as low down as it is possible for it to be pressed before the brake is at full power. The brake pedal should always stand sufficiently high above the footboard to give it an inch clearance when the brake is as hard on as it can possibly be applied. The same remarks apply to the side brakes, and in this case the hand lever should not be much more than half-way along the sector when the brake is nearly full on. The connections of the brakes should be examined at regular intervals, and if any sign of failure is noticed it should be put right immediately. In all properly-finished cars the nuts, with the exception of those which are provided for adjusting purposes, are pinned, so that they cannot possibly come loose. The adjustment nuts are provided with lock-nuts, and care should be taken to see that they are properly tightened.

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With regard to the steering, this must wear, as it is in constant use the whole of the time the car is running, and the lost motion due to this will gradually increase, and if it is allowed to become too great it will be impossible to adjust it, and new wearing parts will be necessary. If the steering wheel can be moved much more than half an inch without the road wheels being deflected, it is time to look to the adjustment. In different cars slightly varying methods are used, and in the lack of instructions from the makers, it will be easy to grasp the principle by recollecting that practically all machines fitted with wheel steering have a toothed wheel working in a toothed segment, or a rack or a thread working in a similarly threaded block, and in either case the adjustment required is to bring the teeth or their equivalent close up to each other, so that the wheel does not turn in the segment or the worm in the block without giving motion. The connecting rods of the steering throughout should be examined, and particularly the pins at the joints. These take the form of bolts, which are nutted at their ends, the nut being secured with split pins, and in many cases castle nuts are used. If any of these joints are found unduly loose, they should be looked to and the pin taken out. If lubrication has been neglected, it is probable that the pin is worn, but in many cases the eye or hole in the rod in which the pin works is also worn. If this cannot be bushed—that is, filled with a thin piece of tube, so that the pin is a proper working fit—a new rod should be procured. On the best cars lubricators are fitted to every joint of the steering. These should be kept filled with grease, and a turn given to the top from time to time. When no provision for lubrication is made, the joints must be oiled regularly.

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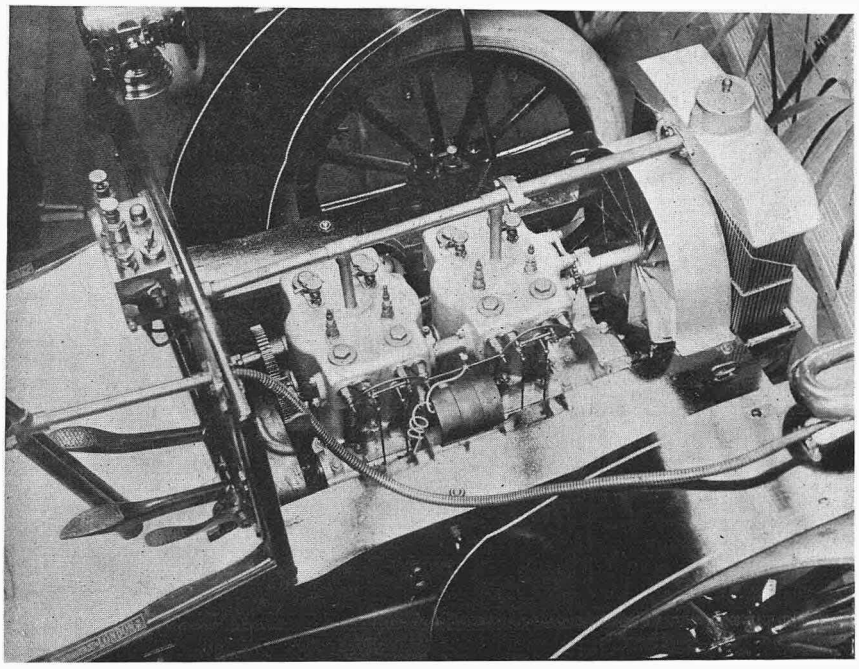
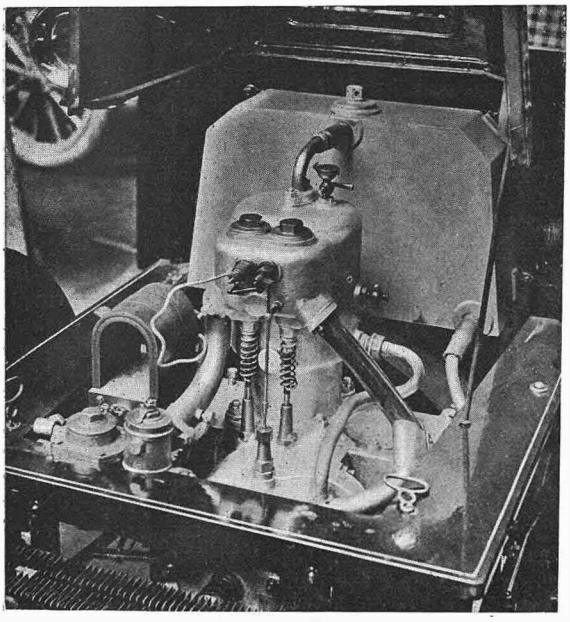
Some difficulty is occasionally experienced by the so-called artillery wheels going out of truth, either circumferentially or laterally, or both. When a wheel is noticed to be so affected, it should immediately be attended to, otherwise it is quite possible that it may be followed by an entire collapse. Re-truing is a thing which cannot be attempted by the ordinary repairer, and must be put into the hands of a competent carriage-builder who makes his own wheels or who can get them trued up by a firm which makes a speciality of wheelbuilding. This going out of truth is caused chiefly by the wheels being built up with imperfectly-seasoned timber, which is greatly affected by atmospheric changes, causing fluctuations in the tension upon the wheel. This will expand in wet weather, while in dry seasons it contracts and tends to split apart at the felloe and at the junction of the spokes with that part, despite the fact that the whole is bound by the iron rim of the tyre.

NEW TYPES OF BEAUFORT CARS.

Too late for description in our report of the Crystal Palace Show, the Beaufort Motor Co. staged a four-cylinder 20 h.p. Beaufort Alexandra tonneau body car which exhibited, in addition to sound and solid workmanship, some excellent features. The frame and underframe are of channel steel throughout, the engine being very rigidly carried. The bore of the cylinders is 100 mm. and the stroke 110 mm. Both induction and exhaust valves are mechanically actuated, a second camshaft being provided for the purpose. Both camshafts run in oil-bath cases, as also does the governor controlling the speed of the engine through a throttle valve on the induction. The engine is fired by a current derived from a rotary magneto gear driven, this gear also running in oil. The ordinary sparking plugs are fitted together with the necessary accumulators and coil, so that the engine can be started from a switch on the dashboard. The cooler, which fills in the forward end of the bonnet, is formed of upper and lower water pockets connected by no less than 550 vertical tubes, through which draught is induced by a fan driven off the engineshaft. In case of the car being run in districts where chalky water only is obtainable, the upper and lower waterpockets are easily removed for cleansing the tubes. The accelerator lever is so connected to the governor that when moved right up it stops the engine. In mid-position the engine runs normally, while acceleration of the motor is obtained by depressing the lever from its central position. So soon as the foot is removed therefrom, the accelerator lever returns to mid-position. The gear gives four speeds forward and one reverse, with direct drive on to the countershaft on the top speed.



The 20 h.p. Beaufort engine.



The 9 h.p. single cylinder Beaufort engine with mechanically-operated inlet valves.

The foot applies cast-iron jointed check blocks to a water-cooled drum on the countershaft. Double-acting compensated brakes are applied to brake drums on rear road wheels. All shafts, save the crankshaft, run on ball bearings, and as these have been in use on similar cars on the Continent over long distances, they are to be relied upon. The 8 h.p. Beaufort, with two-seated phaeton body, is driven by a single-cylinder engine of stroke and bore equal to those of the 20 h.p. It drives through gearing and propeller-shaft to live axle, and is a remarkably low-priced machine considering the specification. The 9 h.p. Beaufort tonneau (1904 model) was also staged since our report, and is an interesting vehicle. The single-cylinder engine is 120 mm. bore by 135 mm. stroke, is fired by magneto, and has mechanically-actuated valves. An accessible inspection lid is fitted to crank chamber. The gear provides three speeds forward and reverse, with direct drive on top speed. The tap seen on the right-hand side of the cylinder is opened to release compression when starting the engine. In addition to the ball bearing features of these cars, the advance of the ignition is obtained by the use of helically-toothed gearing in connection with the half-time shaft, the cams actuating the make and break being formed on a sliding sleeve with the driven pinion, and slid on the camshaft when it is desired to vary the firing moment.

THE TWO-CYLINDER 10 H.P. DE DION ENGINE, ETC.

(Continued from page 207.)

This section shows the manner in which the De Dion-Bouton well-known expanding clutch arrangement has been designed to give three speeds forward and a reverse. In B B, the primary feathered gearshaft carrying a sliding sleeve $D^1 D^1$, upon which are mounted the toothed driving pinions 1, 2, and 3. On the left we find a pinion marked 4, which is the driving pinion of the reverse speed.

On the secondary-shaft below C C, within the gear box, are two of the well-known expanding clutches, by one or other of which the secondary-shaft C C is rotated. Attached to three sleeves sliding on the secondary-shaft are the clutch boxes—the first speed clutch box H H, the second speed clutch box K K, the third speed clutch box I I, and the reverse speed clutch box L L. Each of these clutch boxes (as can be seen) carries attached to it the driven pinions 1^1 of the first speed, 2^1 of the second speed, and 3^1 of the third speed respectively. The 1 and 1^1, 2 and 2^1, 3 and 3^1 are always in mesh, no matter which particular pair are being driven through, because the sliding $D^1 D^1$ on the primary-shaft and the sleeves upon which the clutch boxes I, H, and K are mounted, always move together.

Let us suppose that it is desired to drive upon the first speed, *i.e.*, through the toothed wheels 1 and 1^1 and the clutch box H H. By the actuation of the gear levers, the sleeve $D^1 D^1$ and the sleeves carrying the clutch boxes I, H, and K, are slid to the right until the clutch box H encloses the expanding clutch H^1. A movement of the clutch lever then expands clutch H^1 within clutch box H, and contracts the clutch M within the clutch box L L. (It must be noted that when the toothed wheel 4^1 is brought underneath the pinion 4, they do not mesh, but just clear.) So we have the first speed.

Now for the second. By another movement of the change gear lever, the sliding sleeves on both shafts are brought back to the position shown in the drawing, the clutch H^1 contracted within the clutch box I I, and the clutch M M expanded within the clutch box K K. Now the drive passes from the pinion 2 through the toothed ring 2^1, the clutch box K to the shaft C C by means of the clutch M M. Thus we have the second speed.

To obtain the third speed, no movement of either of the sleeves is required, but the necessary actuation of the change gear lever causes the clutch M to contract and the clutch H^1 to expand. Then the drive passes from the driving pinion 3, through the toothed ring 3^1, the clutch box I I, to the shaft C C, by means of the clutch $H^1 H^1$. Thus we have the third or high speed.

To obtain the reverse, the necessary actuation of the change gear lever causes the sleeves on both shafts to move to the right exactly as they did in the case of the first speed; but the action upon the clutch expanding and contracting rack N N is reversed—that is to say, the clutch M is expanded within the clutch box L L, and the clutch $H^1 H^1$ contracted within the clutch box H H. This movement of the sleeves has brought the toothed wheel $4^1 4^1$ beneath the driving pinion 4, and in mesh with another pinion slightly below and behind 4, so

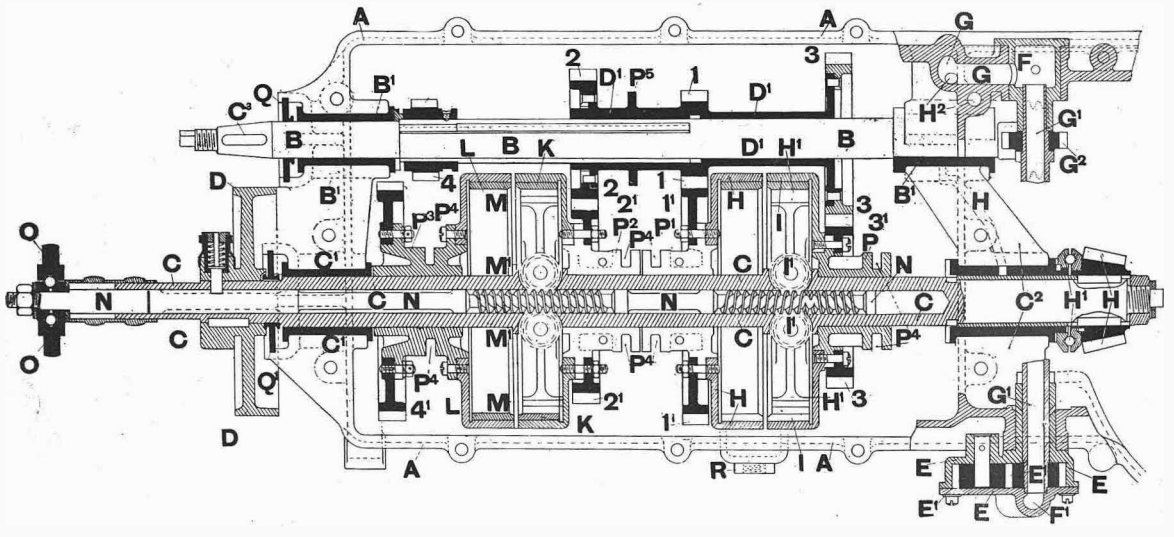


Fig. 5.—Sectional elevation of the three-speed and reverse gear.

A (repeated), aluminium gear box.
B B B, primary gear (feathered) shaft.
B^1 B^1, phosphor bronze bearings to shaft B B.
C^2 C^2, attachment for universally jointed shaft from clutchshaft.
D^1 D^1, sliding sleeve carrying first and second driving pinions 1 2.
C—C, secondary hollow gearshaft, first, second and third forward speed and reverse speed clutch boxes.
C^1 C^1, phosphor bronze bearing to shaft C C C C.
C^2 C^2, phosphor bronze bearing to shaft C C C C.
E E E, rotary oil pump.
F, oil delivery pipe.
G^1 G^1, hollow pumpshaft forming oil delivery pipe.
G^2, worm wheel on same.
E^1 E^1, pump pinions.
F, oil chamber.
G G, oil chamber feeding oil leads H^2 H^2
H H, first speed clutch box.
^{1} H^1, first and third speed clutch.
I I, third speed clutch box.
I^1 I^1, pinions actuated by rack to expand clutch.
K K, second speed clutch box.
L L, reverse speed clutch box.
M M, second and reverse speeds clutch.
M^1 M^1, pinions actuated by rack to expand clutch
N—N, rack expanding clutches.
O O, ball bearing attachment for gear striking rod.
P P^1 P^2 P^3, flanged sleeves sliding on C, and carrying clutch boxes and toothed rings
P^4—P^4, grooves in flanged sleeves to take gear striking forks.
p^1, flange on sleeve d d to take gear striking fork.
Q Q^1 oil retaining disc.

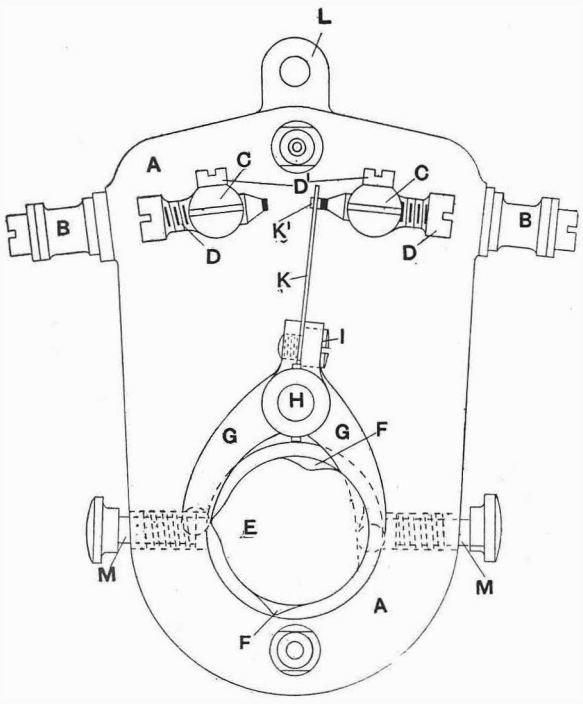


Fig. 6.—Contact breaker for two-cylinder engine.

A A, base plate (metal).
B B, primary wire terminals insulated from plate.
C C, insulated studs carrying platinum pointed screws.
D D, platinum pointed screws.
D², locking screws.
E, front ignition cam.
F F, back ignition cam.
G G, arm rocking lever.
H, pivot upon which G G oscillates.
I, set screw securing contact blade in split lug of G G.
K, contact blade.
K¹, platinum block.
L, lug for attachment to timing lever.
MM, spring wedge pointed studs for holding base plate in position on grooved boss on crank chamber.

that the drive passes from 4 through the intermediate pinion not shown, the toothed wheel 4^1, the clutch box L L, to the shaft C C, by means of the clutch M M. Thus the shaft C C is rotated in a direction opposite to that in which it is driven by the previously-explained combinations.

The lubrication of the gearshafts, bearings, etc., is performed in a manner precisely similar to that followed in the case of the sliding change-speed gear (fig 4). The oil leads formed in the gear case casting are not so well shown, however.

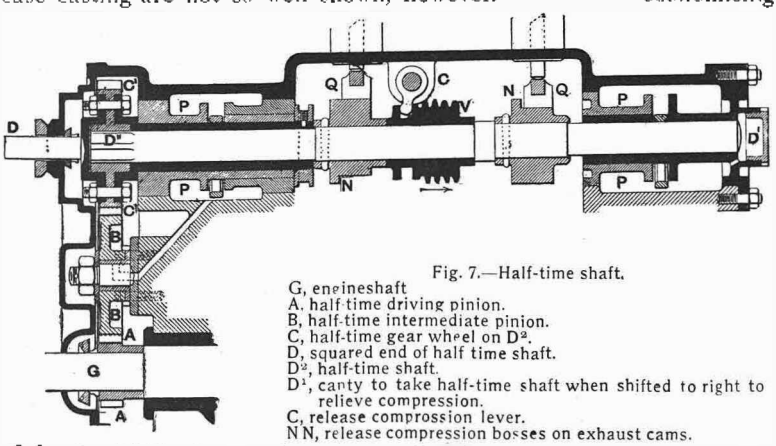
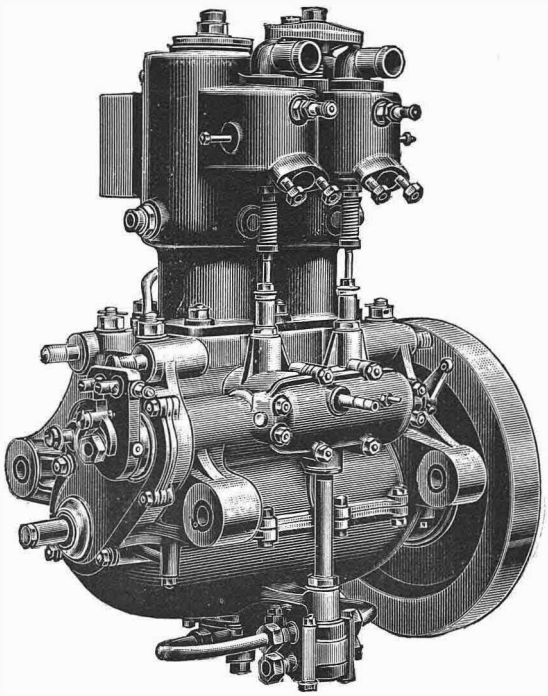


Fig. 7.—Half-time shaft.

G, engineshaft.
A, half-time driving pinion.
B, half-time intermediate pinion.
C, half-time gear wheel on D².
D, squared end of half time shaft.
D², half-time shaft.
D¹, canty to take half-time shaft when shifted to right to relieve compression.
C, release compression lever.
N N, release compression bosses on exhaust cams.
Q Q, exhaust lifting levers under exhaust striking rods (s e V, fig. 2).
P P, oil wells for ring lubrication of half-time shaft bearings.
V, sliding sleeve on which is formed worm wheel driving oil pump, exhaust release, and compression cam, etc.

In the case of the 10 h.p. two-cylinder De Dion engines, we find a contact-maker of somewhat novel design. The ancient and occasionally much objurgated trembler blade has vanished. Its place is now taken by a stiffish contact blade K, which makes contact alternately upon the ends of the platinum-pointed screws D D, but without vibration.



The De Dion 10 h.p. engine.

The contact blade is mounted, as shown, on a double armed rocking lever G G, oscillating on the pivot H in accordance with the form of the two cams E and F_1 set one behind the other on the end of the half-time shaft. The exact action of contact-making by means of this arrangement is plainly shown in the drawing. By the shape of the noses of the cams, it will be realised that contact is almost instantaneously made and broken, thus so greatly economising current that dry batteries can still be continued to be used. So good have been the results obtained with this contact-maker that a form suitable for single-cylinder engines is contemplated. The commutator plate A A is in metal, the terminals of the primary wires B B and their connections to the studs and screws C D C D alone being insulated.

The ends of the studs M M are held by the springs shown in dotted lines down into a groove turned in the boss through which the half-time shaft issues, and are the sole means of attaching or detaching the commutator. The lug marked L is for the attachment of the rod or wire connecting the contact-breaker plate A A to the sparking lever, which is situated on the steering column.

By means of the partial section of that portion of the crank chamber case which encloses the half-time shaft, we are able to see the method by which the compression is reduced for starting up the engine. The arrangement is by no means novel, as we have it on the two-cylinder De Dion it is much improved in detail. The half-time shaft D can be made to slide from left to right by the partial turning of the spindle C, on which is fixed a short arm dipping into a groove formed on the left of the worm wheel V rotating the pumpshaft, as shown and described in fig. 2. The wheel V is fast on the half-time shaft D, so that both move together.

The effect of this side movement to the right is to move the exhaust-lifting cams similarly, so that the smaller cams N N formed on the same blocks are brought beneath the exhaust-lifting lever Q (see V, fig. 2). These smaller cams, it will be noticed, have their bosses in an opposite position to the bosses of the exhaust cams proper. The result of this is that the exhaust valves are slightly opened on the

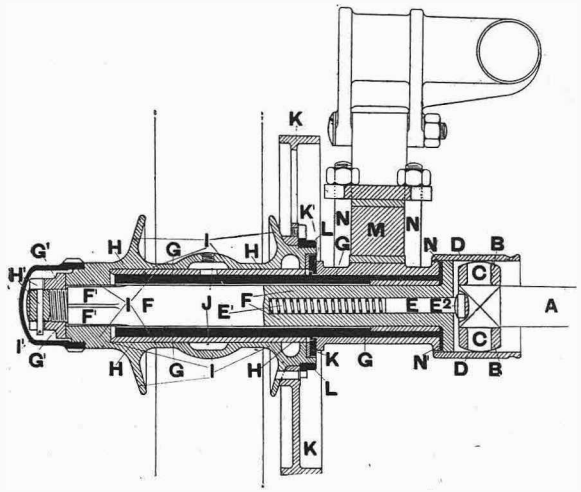


Fig 8.—Section of the driving hub and axle.

A, Cardan drivingshaft
B B, brass driving blocks on pivots in A, renewable
C C, arms on end of Cardan axle
D D, sleeve enclosing universal joint
E and E¹, plunger and spring to take thrust of Cardan shaft
E², hardened segmental head on end of Cardan axle
F F, road driving wheel shaft
F² F², squared portion of same by which drive is conveyed to road wheel hub
G¹G¹, adjusting nut to F F
H²H¹, retaining key to same
I¹, split pin through above
G G, main journal clamped to frame
H H H H, phosphor bronze liner to road wheel hub
I—I, road wheel hub
J J, oil space
K K, brake drum
K² K¹, brass washer to take thrust
L L, brake drum locking ring
M, spring
N N, spring clip bolts
N²N¹, brass washer to take thrust

compression stroke of the piston, and the compression is thereby considerably decreased on the turning of the engine by hand. In short, the exhaust cam blocks are formed as to their left-hand sides with these small bosses Q Q, which open the exhaust valves slightly on the compression stroke, as we have already stated. The cavity D¹ receives the end of the half-time shaft when moved to the right, and the portion of the shaft passing through the boss is squared, as shown at D.

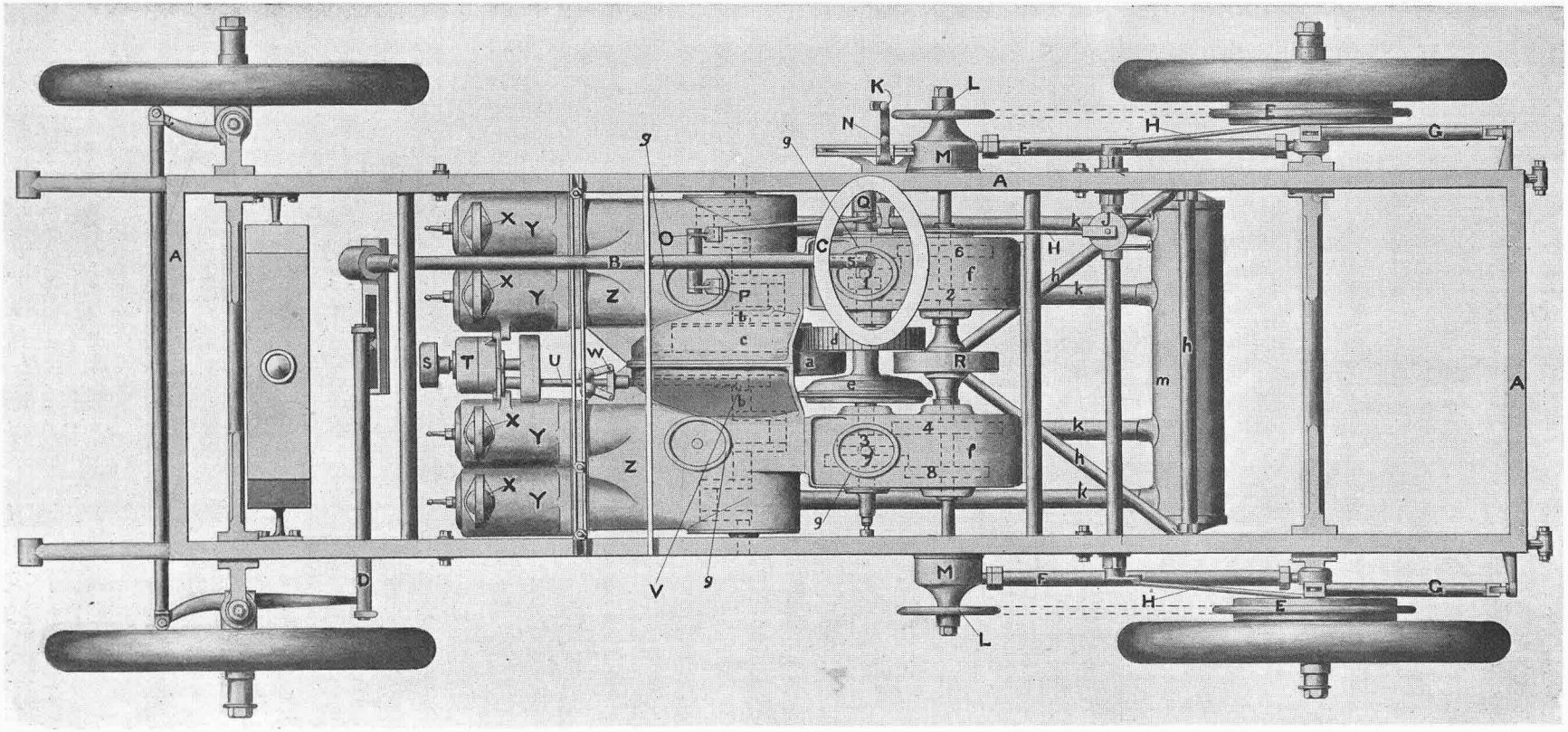
In the design of the manner in which the road-driving wheel is carried, and the method in which it is driven, we have yet another instance of the care an ' thought always evinced by this firm in the production of all vital parts of their vehicles. With this arrangement, the driving members of the axle are secured against all road shock, which is delivered from the wheel directly to the spring. To trace the manner in which this is done, it must be realised that M is the spring in section to which the collar immediately below is attached by means of the spring clip bolts N N. Within and by this collar is held the main journal or sleeve G G G G, on the outward projecting portion of which the road wheel hub I I rotates. A is the outer end of the Cardan shaft, rotating the road-driving wheelshaft F F, the outer end of which F¹ F¹ is squared to fit into the correspondingly squared hole in the end of the road hub. It is by this portion of the shaft F F that the road wheel hub is driven, the latter being secured on F by the adjusting nut G and retaining key H¹ H¹. On the end of the Cardan shaft A are mounted the four armed pivots C C, the segmental ends of which permit the rocking of same in the cross cuts in block end of road-driving wheelshaft F F. Whatever outward thrust results from the play of the Cardan shaft A A is taken up by the plunger E and the spiral spring E¹ placed in the central aperture in the road-driving shaft F F. The brake drum K K is mounted upon the inner flange of the road-driving wheel hub I I. Whatever inner thrust results from the road wheels impinges upon and is taken up by the phosphor bronze disc K K.

In the first part of this article appearing in *The Autocar* of last week, on page 205, in describing the new cylinder heads, it would appear that access to the cylinder could be obtained by removal of the inner and outer caps. This is not the case, as it would also be necessary to remove the cylinder bodily.

THE 18 H.P. JAMES AND BROWNE.

On the opposite page we give an illustration of the new four-cylinder 18 h.p. James and Browne car which was first shown at the recent exhibition at the Crystal Palace. By many it was contended that a car having four cylinders could not be constructed with these placed across the car; but Messrs. James and Browne have conclusively proved that this is possible, and that, too, without making any enlargements in the dimension of frame. Each of the four cylinders has a bore of 4in. and stroke of 6in., and is water-jacketed; yet the whole of these are contained within a space of 30½in. It will be seen that even then there is a space between each pair of cylinders for the layshaft and commutator, etc. The connecting rods act on to a common crankshaft, each pair of cranks being set at 180°. The transmission is an enlarged replica of that used on the 9 h.p. car. This system, it will be remembered, is one in which the whole of the shafts, that is, the crankshaft, primary and secondary countershafts, and back axle, are parallel, so that the use of bevel gear is obviated. The power is transmitted from the crankshaft to the primary countershaft by means of a spur gear, the pinion of which is composed of fibrous material to reduce the noise to the lowest possible limit. Upon the primary gearshaft are mounted the friction clutch and the sliding pinions of the change-speed gear. These are arranged in pairs on each side of the clutch, the spur wheels giving four speeds forward and a reverse, all of which are actuated by a single lever.

PLAN OF THE NEW FOUR-CYLINDER 18 h.p. JAMES & BROWNE CAR.



A, frame.
B, steering-pillar.
C, steering wheel.
D, steering connection.
E E, chain wheels with internal brake drums.
F F, chain adjusting rods.
G G, brake tension rods.
H H H, brake operating rods.
J, brake compensating pulley.
K, brake lever.
L L, chain sprockets.
M M, sprocket bearings.
N, change speed lever.

O, clutch pedal.
P, countershaft brake pedal.
Q, clutch operating nut.
R, countershaft brake drum.
S, commutator.
T, camshaft in gear box.
U, high speed shaft driven by
V, mitre wheels.
W, governor operating throttle.
X X, inlet valves with exhaust valves under.
Y Y, cylinders, water jacketed.
Z Z, crank chambers and flywheel case.
a, flywheel.

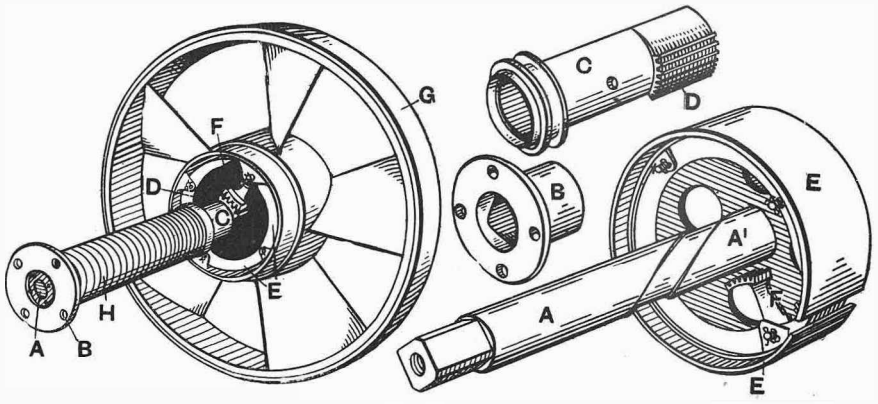
b, crankshaft.
c, buffoline gear wheel driving
d, gear wheel on sleeve of
e, clutch.
f f, gear boxes.
1 & 2, low speed gear wheels.
3 & 4, second speed gear wheels.
5 & 6, third speed gear wheels.
7 & 8, high speed gear wheels.
g g, hand holes.
h h h, stay tubes to take strain of countershaft brake.
k k, exhaust pipes.
m, silencer.

THE 1903 MERCEDES EXPANDING CLUTCH.

Last year's Mercedes clutch (see *The Autocar*, 10th May, 1902, was singular for its small size as compared with the more generally used cone clutches. This year's device is also of small diameter, the clutch being still contained in the boss of the flywheel, as was the case last year. In outward appearance the clutch is almost unaltered, the flywheel still being employed as a fan to induce a strong current of air through the radiator. The new drive is obtained by the extension or expansion of two metal segments within the boss of the flywheel, and on the left the clutchshaft is seen with these segments slightly withdrawn from the flywheel boss. Oil has no terrors for this form of clutch — indeed, chases for the complete lubrication of the same are cut on the outer faces of the segments. The extension and contraction of the segments are performed in a very simple manner.

The small arm F, which actuates an eccentric upon which the segments are articulated, is actuated more or less by the toothed portion of the loose sleeve meshing with the teeth on the foot of the small arm F, as seen in the enlarged view of the clutchshaft A^1 and the segments E E.

At its forward end, the clutchshaft has rapid helical channels formed thereon, as shown at A^1, and the sleeve C being provided with studs to fit same, the longitudinal movement of the sleeve on the clutchshaft gives a certain rotative movement to the sleeve. And as the teeth seen on the forward end of the sleeve at D engage with the teeth on the foot of the small arm F, the forward and backward rotative movement so communicated to the latter serves to expand the clutching segments against the inner surface of the flywheel boss, or to contract them from contact therewith. A strong spring pressing against the flanged collar B carried on the square end of the clutchshaft thrusts the sleeve C forward along the helical channels A^1, and causes the sleeve to expand the segments E E against the driving surface of the flywheel. The sleeve C in the boss of the wheel G is caused to move rearwards on the clutchshaft by the action of the clutch striking fork, which compresses the clutch spring, and so relieves the segments from driving pressure, and at the same time moves C slightly rearward, contracting the segments. This clutch, it is claimed, rises superior to the effects of water, mud, or heating. All that it requires is ordinary care in lubrication, like the rest of the driving mechanism. It will be noted that the flywheel G has its arms formed propellerwise, so that the engine being encased above and below all air must be drawn through the cellular radiator in front of the bonnet, thus doing away with the independent air fan and gear for rotating the same.



A, clutchshaft
A^1, helical groove on A
B, clutch spring collar on A
C, sleeve mounted upon A
D, teeth cut upon C
E E, expanding segments of the clutch
F, lever expanding the segments E E
G, flywheel, the arms of which form a fan
H, clutch spring

A RECORD OF RELIABILITY.

The Foden steam lorry and 8 h.p. Daimler car illustrated on page 228 are the property of Messrs. Walker and Sons, of Leicester. This firm is one of the largest and one of the oldest (established 1755) among the manufacturers of hosiery and underwear, and is, we believe, the first to adopt steam traction for the haulage of yarns to its country factories, and to bring back from the outlying districts to Leicester the goods when finished. The motor waggon has proved a great success, and has replaced four horses. Not only so, but it does the work much more quickly and much more cheaply. Messrs. Walker and Sons inform us that the Foden lorry has more than fulfilled their expectations, and they have found it particularly convenient to have the engine on the top of the boiler, and in an accessible position like that of an ordinary traction engine. The work has been very carefully checked, and proper way bills are made out, so that there is no doubt about the economy of the motor waggon as compared with horse haulage. As to the Daimler, it has been driven over 30,000 miles, and the front tyres are now being renewed for the first time. This is, to say the least of it, a good recommendation for the durability of solids, and another good record of durability is in the gear, which has never been touched since the car was built, except for lubricating purposes. The car has been driven over eight hundred miles in a week, and its longest day's run is from Penrith, over Shap, and through Manchester (including forty miles of Lancashire cobbles), over the Peak range, and into Leicestershire. Records such as these should reassure those who have doubts as to reliability.

We have an enquiry from a reader asking if we can tell him of any good place in England where he could start a motor depot for the sale and repair of cars. Perhaps any of our readers who may reside in districts which are barren in this respect will communicate with us

THE EISEMANN SYSTEM OF MAGNETO IGNITION.

THE Eisemann system differs from other magneto systems of ignition, as the spark is produced by means of a high tension current, and this is brought about by the simplest possible means, viz., a rotary magneto machine working in conjunction with an induction coil without a trembler.

The generator consists of three permanent magnets of the usual horseshoe shape fixed side by side, between the poles of which an armature (see fig. 1) revolves constantly at the same speed as the engine. The machine has no commutator, but is fitted with two collector rings, suitably insulated from the spindle and each other, to which the ends of the armature winding are attached (see fig. 1), and it thus becomes a very simple form of alternator, that is, the current changes its direction, or alternates twice during each revolution.

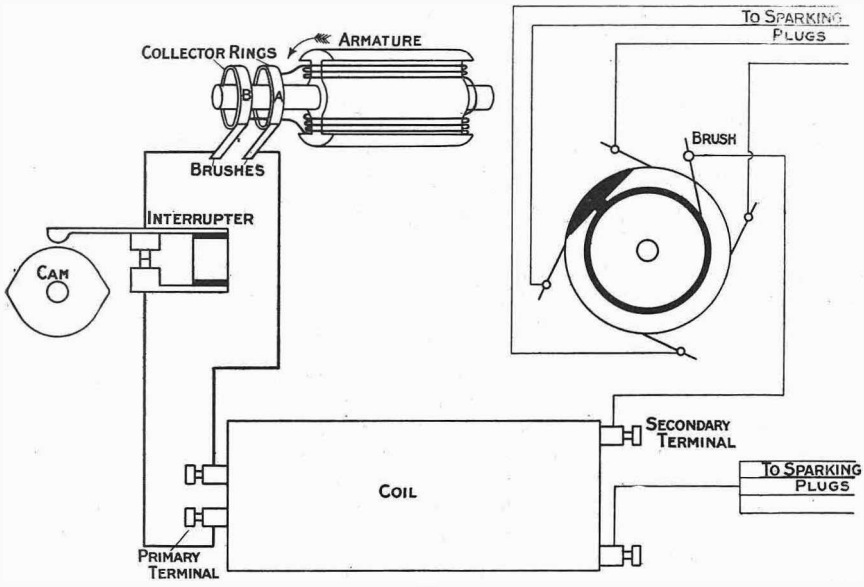


Fig. 1.—Diagram of the wiring of the Eisemann system.

The armature is of the pattern known as the "Siemens," "H," or shuttle type, and is wound in the manner shown in fig. 1. Now, supposing that we are viewing the revolving armature from the end which carries the collector rings, and that the left-hand pole of the magnet is the north and the right-hand pole the south, the magnetic lines of force will then be flowing from N. to S. across the armature, and in the wires on that side of the armature nearest the N. pole will be induced a current flowing *towards* the observer, while in those under the influence of the S. pole of the magnet will be induced a current flowing *away* from the observer; that is to say, there will be a flow of current away from the ring A and towards the ring B; or, in other words, A becomes the negative and B the positive pole. As the armature revolves, this current gradually dies out, until when the armature stands in a position at right angles to that in which it is shown in fig. 1 the "lines of force" from the magnets pass through the iron core of the armature, and no current is induced; then as the armature revolves still further, the windings on the side which were previously under the influence of the S. pole of the magnet come under that of the N. pole, while those on the other side, which were previously under the influence of the N. pole, come under that of the S. pole; and, consequently, those wires which before had induced in them a current flowing *from* the observer now have one flowing *towards* him, and *vice versâ*; thus, the current reverses its direction and flows from B to A, rendering B the negative and A the positive poles respectively.

It will thus be seen that an alternating current is produced, the number of changes (called the *frequency*) of which per second depends upon the speed of the armature; for example, if the armature spindle makes 600 revolutions per minute, or 10 revolutions per second, as the direction of the current changes twice for each revolution, the frequency will be 20; that is, the terminals of the machine become alternately + and — 20 times per second.

One of the brushes of the machine is connected direct to the primary coil of the induction coil or transformer, as it might be more correctly called. This coil is of the simplest possible description, as, the current being already an alternating one, no trembler is required, and so consists only of the primary and secondary windings and the soft iron core upon which they are wound, the whole being enclosed in a watertight casing.

The action of the coil is simply this: When a current of electricity is passed through a wire wound around a core, lines of magnetic force flowing from N. to S. poles are produced; and if another wire

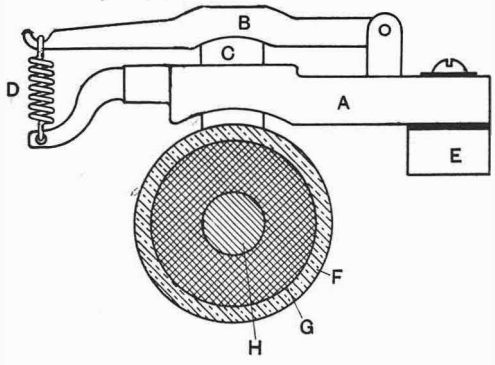


Fig. 2.—Brush holder.

A, brush holder.
B, hinged arm for holding brush in place.
C, carbon brush.
D, spring.
E, arm which supports brush holders and interrupter.
F, collector ring (brass).
G, red-fibre core.
H, armature spindle.

be placed within the influence of those lines of force, a current of electricity will flow through it, although it has no metallic connection whatever with the first wire. This is known as an *induced* current, hence the name induction coil. Now, so long as the second wire remains still, no current is induced in it, for it is only while it is actually *moving* through the lines of force and cutting them that the induction takes place, so that if the second wire be moved back and forth across the magnetic field produced by the first, a series of momentary impulses will take place, the direction of which alternate with each change of direction of motion of the wire. This is supposing that a continuous current be flowing in the first wire. On the other hand, if an alternating current be available, the necessity for the motion of either wire ceases, as the flowing of the current first in one direction and then in the other rapidly makes and breaks the lines of magnetic force around it. Each change of direction in the current causes a corresponding change in the poles; and, consequently, in the direction of the lines of magnetic force, and induces a corresponding current in the second conductor. In this case, the motion of the magnetic lines of force takes the place of the motion of the second conductor. The reader will thus see the need for the trembler on a coil when supplied with a continuous current, as from an accumulator, and the reason why it can be dispensed with in the present case.

We have considered how an electric current in one conductor can be made to induce a current in another conductor placed near it, and we have now to show how, by the same means, the pressure of that current can be raised to any required degree. The action is simply this: A given number of watts flowing through the primary coil will induce an equal number of watts in the secondary coil. Now, a *watt* is ampères × volts, that is, a current of 20 ampères at a pressure of 50 volts = 1,000 watts, which, by the way, is the Board of Trade unit, so that if the primary and secondary coils are made of the same gauge of wire, and have the same number of turns, a current of two ampères six volts supplied to the primary would give the same amount at the terminals of the secondary coil, but by increasing the number of turns in the secondary coil and decreasing the size of the wire, and thereby increasing the resistance and consequently the voltage necessary to overcome that resistance, we can obtain a very small current at a very high pressure from the secondary terminals. The number of watts must always be the same at both primary and secondary terminals, but if we use a primary current of two ampères six volts, that is, twelve watts, we can wind the coil to give out five ampères at twenty-four volts; or by using still thinner wire and giving it more turns, .005 ampères at 240 volts; or, in fact, any combination that we like provided that the volts × ampères equals twelve.

On the other hand, if the secondary coil be wound with a wire coarser than the primary, and having fewer turns, the opposite results—viz., a larger current having a less pressure—will be obtained. This latter form of transformer is called a *step-down* transformer, while the former in which the potential is raised is termed a *step-up* transformer.

Briefly, then, in the Eisemann system a small step-up transformer is used to raise the low-tension alternating current supplied by the magneto machine to a sufficient voltage to produce a good-sized spark.

As before stated, one brush of the magneto is connected direct to one of the terminals of the primary coil, the other being connected to the

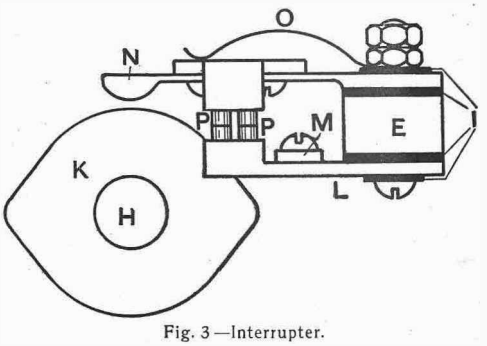


Fig. 3.—Interrupter.

H, armature spindle.
I, insulation (mica).
K, cam.
L, brass contact piece.
M, brass strip making connection to brush holder.
N, steel hammer.
O, spring.
P P, platinum contacts.

interrupter (see fig. 3), which is in turn connected to the other terminal of the primary coil.

The brushes consist of small blocks of carbon C (fig. 2) of rectangular section, which fit in a slot in the holder A, and are held on to the collector ring by the hinged arm B, which is in turn secured by the spring, and which also supplies the necessary pressure to keep the brush in proper contact with the ring. The brushes are supported on the arm E, which is secured to the frame carrying the magnets.

To the outer end of this arm is attached the interrupter (see fig. 3), which is actuated by the

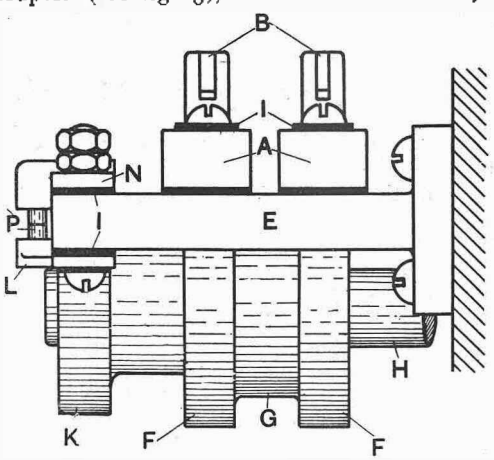


Fig. 4.—Side view of brush holders and interrupter.

A, brush holders
B, hinged arm
E, arms carrying brush holders
F, collector rings
G, red fibre core carrying collector rings
H, armature spindle
I, insulation (mica)
K, cam
L, brass contact piece
N, steel hammer
P, platinum contacts

cam K fixed on the end of the armature spindle H. By means of this cam the arm N is lifted twice during each revolution, thus separating the platinum contacts P P and breaking the circuit. It is this sudden breakage of the circuit which creates

the spark, as it causes a large increase in the *rate* of cutting of the magnetic lines of force in the coil; and, consequently, an increased electromotive force in the secondary coil, which causes the current to jump the gap and produce the spark.

One of the terminals of the secondary coil is connected to one terminal on each of the four sparking plugs, while the other is connected to a rotary fourway switch or distributer. This distributer, as we will call it (see fig. 5), consists of a

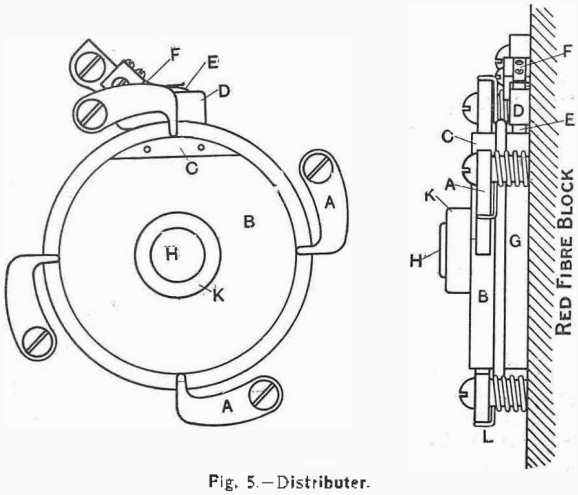


Fig. 5.—Distributer.

A, steel pawls
B, red-fibre block
C, brass contact piece
D, brush holder
E, carbon brush
F, spring
G, brass collector ring
H, distributer spindle
K, nut
L, springs for keeping pawls in contact with B

circular block of red fibre B mounted on a spindle H, which passes through the magnets above the armature spindle, and is supported at each end in bearings fitted into blocks of red fibre attached to the magnets. At the end opposite to that on which the distributer is mounted is fixed a spur wheel, driven by a pinion, having half the number of teeth possessed by the wheel fixed on the armature spindle (see V, fig. 6), the distributer spindle thus having a speed equal to half that of the armature

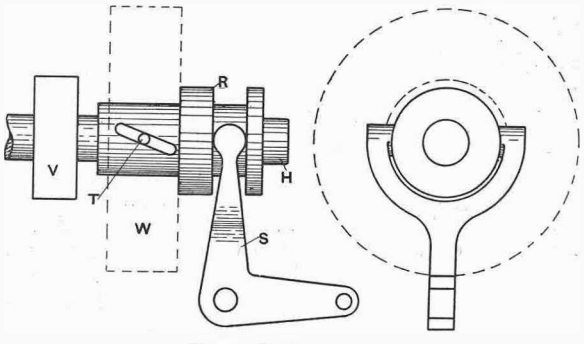


Fig. 6.—Timing gears.

R, sliding sleeve
S, forked lever
T, pin fixed in armature spindle
V, pinion for driving distributer spindle
W, spur wheel driven from engine
H, armature spindle

spindle. The red fibre block B has a central flange on its periphery, dividing it into two parts; the rear half has a brass ring G fitted to it, upon which bears a carbon brush E, held in a slotted holder D by the flat spring F. This brush is connected to the secondary coil of the transformer. On the front of the block B, a piece of brass C is let into the periphery, of which it occupies about one-fifth. This is in contact with the brass ring on the back of the distributer, and as it passes under each of the steel pawls or brushes, which are connected to the remaining terminals of the sparking plugs, the circuit is completed to each cylinder in turn. It will be seen that as the armature spindle makes two revolutions to one of the distributer, the cam K breaks the circuit four times, while the distributer is making a complete revolution, and it is so arranged as to give a spark when each of the cylinders is in circuit.

The timing gear is mounted on the armature spindle at the opposite end to the brushes, and consists of a sliding sleeve R (fig. 6) carrying a spur wheel W, through which the machine is driven by means of an equal-sized wheel mounted on the engine crankshaft. Fixed in the armature spindle is a pin T, which fits into a slot in the sleeve R. This slot is at an angle with the axis of the sleeve; that is, it takes the form of a portion of a quick-pitch screw thread, the result being that when the sleeve is moved along the spindle by means of the lever S, which is connected by suitable rods to a handle at the driver's seat, either the sleeve with the spur wheel W or else the armature spindle has to make a portion of a revolution. It will be obvious that the sleeve cannot revolve without revolving the engine, which it cannot do; therefore the armature spindle is revolved a portion of a revoluti n backwards or forwards, as the case may be, thus altering the position of the cam K relatively to the engine and advancing or retarding the spark.

Of course, either the wheel W or the one on the engineshaft into which it gears has to be wide enough to permit of the other sliding across it to the required amount. When the driving is done by means of a chain, other means are adopted to keep the sprockets in line.

The brushes, interrupter, and distributer are all enclosed in a case made of *papier-maché*, which is quite dust and mud-proof. Whether it is entirely water-proof is a doubtful question, and this is a point which might with advantage receive attention, for although the parts are carefully insulated the one from the other, yet in many cases but very little water would be required to bridge across from metal to metal, causing short circuits and their accompanying vexations.

The machine described above is for a four-cylinder motor, those for two cylinders and one cylinder being precisely similar, with the exception that the machine for the two-cylinder motor has only two contacts to the distributer, and a single instead of a double cam, while the one-cylinder machine requires no distributer at all.

The over all dimensions of the magneto machine are 130 mm. by 115 mm. by 60 mm., and of the coil 135 mm. by 50 mm. diameter.

Ordinary sparking plugs are used, the machine taking the place of the usual contact breaker and accumulators.

We are indebted to Messrs. G. T. Riches and Co., of 4, Gray's Inn Road, W.C., for a thorough examination of the machine, in order to give the above description of a system which is likely to come very much to the front.

CONTINENTAL NOTES AND NEWS.

The Autocar in the Carnival.

The autocar, which is patronised by nearly all the crowned heads of Europe, is also to become the state chariot of the uncrowned Queen of Queens, who, during her brief reign of a day on the occasion of the mid-Lent carnival, will make her royal progress through Paris on a motor vehicle. These festivities are organised by a committee of students with the collaboration of the *blanchisseuses*, among whom they select a number of queens, and these have in their turn to choose a queen of queens, who, attired in royal robes, is seated on an ambulatory throne. The students thought this year that it would be more in keeping with the progress of the times to replace the time-honoured chariot with an automobile, and they obtained the patronage of the Automobile Club de France, which has offered to supply the necessary vehicles. The throne will be erected on a motor waggon gorgeously decorated for the occasion by a well-known artist, and behind will follow half a dozen cars, as well as some light vehicles, that will serve as attendants. All the other carriages will be drawn by horses, as it is not proposed to admit too many private autocars, for fear that they may not be in the hands of experienced drivers. This innovation will prove an excellent advertisement for the autocar, as well as for the firms which have undertaken to supply the vehicles.

The Circuit des Argonnes.

The alcohol circuit race being organised by the Chambre Syndicale de l'Automobile, under the new regulations based upon the weight of the cars and the cube of the cylinders, will be known as the Circuit des Argonnes. This is to prevent a confusion of title, since the name of the French Ardennes might prove misleading in view of the Ardennes circuit promoted by the A.C. of Belgium. Nevertheless, the courses will be very close to each other, the Argonnes taking in an eighty-eight miles course from Flize—a small town situated between Sedan and Mézières. There will be no neutralisations, and the course will be covered a certain number of times without stopping to bring up the full distance to probably 310 miles. The race will take place in July, in the event, that is, of permission being obtained to run it off. As enquiries have been made concerning the conditions under which entries are received, we may state that none are yet open except for the Paris-Madrid race. Each entry must indicate the class of vehicle—whether big car, light carriage, or voiturette—and must be accompanied with the amount of the entrance fee, addressed to Monsieur le Secrétaire-Général de l'Automobile Club de France, 6, Place de la Concorde, Paris. In the case of the Argonnes Circuit, the information accompanying the entrance fee should give not only the class of vehicle, but also the bore and stroke of the engine, as well, probably, as the gear to be used, though on this point we shall give full details when the regulations are ready. For the Belgian Circuit, entries and fees must be sent to the A.C. of Belgium at Brussels, though here again the entries have not yet been opened.

The Paris-Madrid Race.

In view of the increasing number of British automobilists taking part in Continental races, it would be a great convenience no doubt if they could send their entries and fees to the A.C. of G.B. and I., who could thus hand them over to the foreign clubs *en bloc*, and save time and trouble to everyone concerned. This was done in the great international races by Berlin and Vienna, and the practice is so convenient that it ought to become general. The foreign clubs, of course, would have equal rights with the French in the matter of balloting for places. In the Madrid event, only those makers who entered vehicles before February 15th will have the privilege of taking part in the ballot, and after that date all the cars will start in the order of entering. In connection with the Paris-Madrid race, a tourists' caravan will be organised, when, owing to the difficulty of getting accommodation in Spain, a tourists' agency will carry out all arrangements from the frontier to Madrid for a fixed sum, which will cover everything, including hotels, meals, tips, the transport of fifty kilogs. of luggage for each tourist, garage for the autocars, entrance to museums, etc., so that the tourist will have nothing to pay until he gets to Madrid. The run through Spain will take six days, and will include the following towns: Zarauz, Bilbao, Vittoria, Mirando de l'Ebro, Burgos, Vanta de Banos, Valladolid, Salamanca, Avila, and Madrid.

The Entries for Paris-Madrid.

Though only a month has elapsed since the entries for the Paris-Madrid race were opened, and there are yet two months to run, the number of vehicles already entered has reached the splendid total of 225, without including five others announced by telegram and awaiting confirmation. Even now this exceeds all previous records, for Paris-Berlin only received 171 engagements and Paris-Vienna 218. This magnificent result is due to the considerable number of new firms who seek racing honours. All of the French makers are competing, of course, some of them, like Panhard et Levassor, Mors, Renault, De Dietrich, Darracq, Clément, Georges Richard, and De Dion, having from six to twelve cars; but the most interesting thing in the list is the number of foreign vehicles. These comprise half a dozen Mercedes, Mr. Mark Mayhew, Mr. S. F. Edge, Mr. C. Jarrott, Mr. H. R. Kirk, M. Ettore Bugatti, Mr. H. S. Harkness (one of the American competitors for the Gordon-Bennett cup), four Pipe cars, Mr. J. A. Holder, Mr. J. Ernest Hutton, Mr. Gray Dinsmore, three Fiats, Mr. Foxhall Keene, two Benz cars, Mr. John B. Warden, Mr. Mansfield Cumming, two Spyker cars (Dutch), the Wolseley Tool and Motor Car Co., and Mr. Ernest H. Arnott (motor bicycle). No race has ever had such a strong foreign element, and it is to be hoped it will be further increased during the two months the entries remain open. The recent prohibition of the Pioule, Nice, and Pau meetings has aroused a good deal of misgiving as to the possible fate reserved for the Paris-Madrid race, and the A.C.F. is understood to be making arrangements in

case the contest should be prohibited on French territory, in which event the cars will run as touring vehicles to Irun on the frontier, and thence race to Madrid. The King of Spain has already officially sanctioned the race in the Peninsula. We do not think, however, that any such trouble will be met with, for the sanction, after all, is a question of international courtesy, and the French Minister will hardly withhold his permission for a race which is already approved of by the Government of Spain.

By Telegram.

At the moment of going to press, we learn by cable that the French Government have authorised the Paris-Madrid race, so that the uncertainty as to its taking place has now been entirely removed.

Correspondence.

The Editor is not responsible for the opinions of his correspondents.

EASY STARTING.

[2823.]—It may be of interest to some of your readers to hear of an innovation which I had fitted to my car some three months ago, and which I have found to answer very well. I have a genuine De Dion car of 8 h.p., and for months after I purchased it, I experienced great difficulty in getting the motor to start. Sometimes I spent as much as half an hour grinding away at the handle and getting myself into a terrible mess with but very little result beyond an occasional back fire, which nearly sprained my wrist. Messrs. Strickland and Co., of Teddington, substituted a high speed trembling coil and rubbing contact for the ordinary system of ignition, and since then I have never had any difficulty in starting the engine at the first attempt.

NEVILL COPLAND.

BRITISH CAR DESIGN.

[2824.]—Your correspondent, Mr. A. E. Cohen, in your last issue, seems to me somewhat inconsistent. He finds fault with you for publishing a letter in a previous issue written by Mr. Austin, which to my mind seemed to be a most fair and straightforward statement of facts, and only unpalatable to Mr. Cohen because of his interest in the importation of foreign vehicles. I think everyone admits that owing to the industry being an older one on the Continent, other countries have had a starting advantage over Great Britain, but it is well to remember that with all these advantages only one country is manufacturing more automobiles in a year than we are, viz., France.

We in England have the largest Automobile Club in the world, with the greatest income and a still rapidly expanding membership. We have held reliability trials of a nature that bring out the points of the motor carriage that are useful to the ordinary user, and these trials have clearly proved that the English manufacturer and designer, both in price and quality, holds his own with the production of the world's factories.

On the various points of design raised by Mr. Cohen, it seems to me he confuses mechanical or manufacturing advantages with fashion changes, instead of fixing in his mind the fact that an automobile should be made for a particular purpose, and provided it fulfils its object in the best possible way in price, efficiency, comfort, and all the points that go to make a perfect automobile, one should not criticise the means that have obtained a perfect result, even though these means are dissimilar to well-advertised current practices. Why should he object to the British manufacturer making cars that are high from the ground I cannot understand, as the work of some users requires this form of construction. He appears to forget that the speed at which one may travel may have something to do with the height of the vehicle. My own Napier racer had the lowest frame of any car in its class in last year's Gordon-Bennett race, but I claimed no merit for this. The car was made for racing, but if I had sold the car to any of my customers I should not be giving them the best vehicle for their own particular purpose.

It seems to me that the adaptability of the British maker to his customer's requirements is far better than merely copying successful racing vehicles.

Mr. Cohen asks for examples of mechanical improvements that have been copied from English makers. I give points for the Napier. British makers will no doubt give their list.

POINTS COPIED:

Ball thrust to bevel.
Easy access to valves.
Enclosed valve gear.
Aluminium body to engine.
Elimination of tube ignition.
Elimination of water joint to cylinder head.
Use of roller bearings to reduce friction.

Perhaps it would not be uninteresting if Mr. Cohen, as he claims to be a true British sportsman, would set out the ideal motor car the English manufacturer should commence to manufacture.

S. F. EDGE.

CARS FOR MEN OF MODERATE MEANS—A WARNING.

[2825.] I quite agree with your remarks in the "Notes" of your last issue on Captain Campbell's paper—"Motors for Men of Moderate Means." Although my car, a 10 h.p. Wolseley, cost a little more than the limit you give, £350, yet I think the extra outlay is well repaid by the low cost of upkeep.

My car cost £400 complete, with all tools, rugs, lamps, and spare parts, and fitted with Falconnet tyres, which account for £10 extra over pneumatics.

It is just ten months since the car was delivered to me, and I have driven it 4,000 miles with only two stoppages from breakdowns. One a bad side-slip, when I broke a wheel, and the other a broken chain.

The first stop delayed me an hour, and the second two hours, as I had left the spare links at home, and had to get a local blacksmith to repair it. Now as to cost:

	£	s.	d.
Fuel and lubricants	14	4	8
Insurance	10	0	0
Repairs £25 10s. (less recovered from insurance £5)	20	10	0
Total	44	14	8

The item for repairs includes £2 10s. for a new pair of chains, which I hope will take me another 3,000 miles at least; it also includes a new set of differential gears which I had the misfortune to smash, but which I believe is a very unusual breakage; and the repairs to wheel.

The tyres look good for another 8,000 or 10,000 miles; they appear very little worn.

I have not included any charge for stabling or man's time cleaning the car, as I already had these, having previously kept a horse and trap.

I may say I do all the driving myself, and look after the mechanism, which seems as simple as possible, and has given me no trouble.

I have frequently driven it from 100 to 130 miles a day without the least defect in the mechanism.

FRANK E. BARKER.

[A portion of this letrer has been previously published, but as a vital part was omitted owing to it being written on both sides of the paper we reprint it *in extenso* as the most satisfactory means of explaining the portion omitted.—ED.]

[2826.]—The writer of letter No 2,821 under the above heading in your issue of the 14th inst. makes what practically amounts to a sweeping condemnation of all cheap foreign-made small cars, with one exception, as "pretty, trumpery rubbish." I own, and have kept in moderate use for the best part of a year, a small car of Belgian make, and my experience with it contradicts that of your correspondent in almost every particular. To take some of the points mentioned, a "pleasing exterior" is just what it lacks, the painting and upholstery being second rate. The brakes are not unreliable, but give to-day, as they always have given, complete control over the car. Wheels, axles, springs, and steering-gear have never given the least trouble or cause for anxiety. Valves, trembler, etc., are easily accessible. I recently had the car thoroughly overhauled, and found engine, gear, bearings,

etc., practically as good as ever they were. Of course, it is not a fast car, and no doubt will not compare with British-made cars at £200, but one must allow for the difference in price. As it happens, the car referred to is identical with that of which another correspondent gave a satisfactory account in *The Autocar* of the 7th—a 4½ h.p. Pieper.

As regards the lamentable experiences of a friend narrated by your correspondent of last week, it probably occurred to some of your readers that a man capable of running his car on the roads when "neither foot nor hand brake would act," and he had already had one bad accident on that account, deserved all he got. I have a strong suspicion that if the car had belonged to me I should have found means to keep those brakes in order.

Of course, I do not mean to assert that cheap foreign cars as a class are satisfactory bargains. I only know one make, but as my experience of that has been satisfactory, it seems only fair to state it on the principle of hearing both sides. LONDONER.

[2827.]—If there are any more of the above like the son of Mrs. Kennard's friend, they do not want English cars with French engines—they want steam rollers or traction engines. They can then take such trifles as curbstones and coal carts three times a day with impunity, and never mind about adjusting the brakes.

W. HUGH WARBURTON.

[2828.]—I have been much interested and not a little amused by the lengthy correspondence which has appeared in the columns of your valuable paper under the heading of "British Car Design."

In the last issue especially, Mr. A. E. Cohen accuses Mr. E. Austin of using your correspondence columns as a cheap advertising medium for the Wolseley machines, and apparently blames you for publishing the letter.

He then tells us that he is interested in the importation of foreign vehicles.

In the light of this information, the rest of Mr. Cohen's letter looks to me like an advertisement for those foreign cars which he imports.

At any rate, his condemnation of British manufactures is surely too sweeping. With regard to tubular frames, for instance, it is only necessary to think which French make still sticks to them, and then to compare the uses to which its cars are put with the use to which the majority of English-built light small cars are put.

The changes in frame construction may be very great advances when applied to racing and high-powered cars, but surely there is a difference between these and most of the cars now fitted with tubular frames in this country.

It is also a fact, I believe, that the De Dion vehicles are imported by us in larger quantities than any other foreign make.

Mr. Cohen also looks upon the mechanical inlet valve as a necessary step towards perfection. Why? And, finally, does Mr. Cohen really wish us to believe that English makers are "providing for a narrower track in the front than in the rear"?

Luckily, the British manufacturer has the strength of his opinions, and is not likely thoroughly to re-model his design, in spite of any amount of well-intentioned advice.

I have no interest in any car, and merely write as a PATRIOT.

THE AUTOMOBILE CLUB TYRE TRIALS.

[2829.]—Since the decision of the judges in connection with the recent tyre trials organised by the Automobile Club of Great Britain and Ireland, there has been considerable discussion as to why the "Collier" tyre did not take first prize, considering that it proved the most durable tyre in the trials, and on the other hand why the "Dunlop" tyre should have been given first prize upon resilience only.

We should like to point out that when these trials were first arranged we were given to understand that durability was to be the point upon which a decision would be given; the other factors, such as resilience, detachability, etc., were only introduced after we had nearly completed four thousand miles. Therefore, taking the matter as it stands, only one set (out of four) of "Dunlop" tyres was found to be more resilient than the "Collier," and the four sets of tyres in question lost 657 marks; consumed twenty-seven inner tubes, besides, as stated in the judges' report, "having cover badly vulcanised; canvas separating from the inside; cover burst; tubes nipped."

It was stated that there was a difference of fifteen to thirty per cent. in tractability in favour of the "Dunlop," but also that the "Collier" required a greater effort at slow speed; therefore the difference should read thirty to fifteen per cent., and if a greater speed could have been attained, there is no reason why the "Collier" should not have done better than the "Dunlop."

There is another important point, viz., "Detachability." With the "Collier" attachment there is absolutely no chance of "creeping," and therefore the life of the tyre and tube must be considerably lengthened, and, as demonstrated in the trials, it was only necessary to replace one tube in four thousand miles, which lost us twenty-six minutes, and further, if running at high speed, and an accident should occur to the tyres, you are perfectly safe because the cover cannot leave the rim.

We have no desire to go into a more lengthy criticism of this matter, but must leave it to automobilists generally to decide as to whether they prefer a reliable tyre to the unknown quantity called "resilience."

For the COLLIER TWIN TYRE CO., LTD.,
W. GEO. WILLIAMS, general manager.

[2830.]—Pending the decision of these trials, my company refrained from issuing any notice or advertisement that could by any possibility influence the public mind with regard to the verdict. Other competitors, however, pursued a different course, and succeeded in imparting a certain amount of prejudice into the public mind. As it is now, however, public property that this company has obtained the verdict and award, we venture to say a few words on the question of "durability," about which an atmosphere of misconception has been created.

The main durability question was solved by all the tyres which finished the 4,000 miles, but the *relative durability* of the tyres has never been solved, and the proposal of my company to the Automobile Club, that the tyres should run until they were destroyed, was unfortunately not accepted.

This would have been the only real test of "relative durability," and, as we have said, it has not—contrary to our wish—been applied.

We know, however, that Dunlop tyres are far more durable than any other tyres that took part in this test, from the fact that they are reparable, simply and easily, by the user.

The tyre trials, as is generally admitted, embodied for the judges many features which were absolutely new to them, and naturally some mistakes were made.

Having regard to the fact that the trial was to test *pneumatic* tyres, genuine road punctures—which are distributed according to the fortune of war—should not be counted against durability, because as a matter of fact they do not interfere with the durability of Dunlop tyres, and in proof of our view the following facts may be adduced.

The Dunlop car driven by Mr. Mosses finished the whole of the original trial of 3,000 miles without any puncture whatever—the only authentic record for non-puncture over 3,000 miles.

The Dunlop tyres in the last Gordon-Bennett race finished without any puncture whatever.

And further, the four sets of Dunlop tyres entered in this test were identical in quality, but some of them picked up more nails on the road than others, so that the placing of one set of our tyres before the others was purely a matter of chance, and therefore we say the method adopted by the judges in testing the relative (and not the general) durability of the tyres was ineffective.

On the other points of the "absorption of vibration" and "tractive efficiency," the judgment was necessarily based on scientific conclusions, and on such conclusions true pneumatic tyres must prove their superiority.

The object of this letter is to point out that the results of these trials were never in doubt when scientific points were considered, but on the other hand they were considerably jeopardised when punctures were counted against true pneumatic tyres especially constructed to absorb vibration, to give tractive efficiency, and to be easily repaired. If these factors be left out of consideration, then my company could produce tyres guaranteed to travel 6,000 to

10,000 miles without any puncture at all under the conditions of the late trial.

For the DUNLOP PNEUMATIC TYRE CO., LTD.,
LOUIS M. PUGIN, secretary.

[We think our correspondents would be well advised to bring out as a supplementary pattern to their present types the 10,000 miles tyre they refer to, as there are numbers of owners who are much keener on reliability than resiliency, and on avoidance of puncture rather than on ease of detachment.—ED.]

MAGNETO IGNITION—PARAFFIN HEADLIGHTS.

[2831.]—Visitors to the show must have been struck by the large number of cars fitted with magneto ignition, and one came away with the impression that it is rapidly making headway. In spite of enquiries, I failed to find out what its weak points are, but I refuse to believe that it has none, and I think that any information that your readers may give on the point will be timely. One objection against fitting it to existing cars seems to me that this cannot be done without alterations of the cylinder, with some risk of injury thereto. This does not apply to the Eisemann system (on which the article promised will be awaited with interest), but there you still retain coil, trembler, and sparking plugs with their attendant trouble; so is the game worth the candle? The cost, too, is considerable.

Acetylene headlights are troublesome things at best. It would be a relief to substitute oil lamps, of which there are plenty on the market, but does any of them give enough light for a reasonable speed to be kept up with safety? Perhaps some of your readers who have tried them will oblige with their experiences.

LONDONER.

A WORD FOR THE BELT.

[2832.]—In your notice of the Pick Co.'s cars you say that "bending to popular prejudice," they have introduced a gear drive.

Last year when hesitating what make of car to order, I consulted my motoring friends, and the one point on which they were unanimous was, "Do not have a belt-driven car." In spite of that, I got a Pick.

During the first few hundred miles, I had to shorten the belts several times (an operation not taking ten minutes), but since then I have never touched them, and have never had the slightest trouble from them.

The reason is that all other belt-driven cars had little short narrow belts like box straps, whereas the Pick high-speed belt is sixteen feet long and three inches wide, and the low speed only a foot or so shorter.

As everyone knows, granted reliability, they are for silence and flexibility the ideal transmission and far cheaper than expensive gears to keep in order or repair. I have no interest in the Pick Co. except as a very satisfied purchaser.

P. LL. NAISH.

EFFICIENT BRAKES.

[2833.]—Seeing in your valuable journal last week an account of the Siddeley car mounting a very steep hill at the back of the Crystal Palace, I would draw particular attention to the fact that there is no sprag fitted to these cars, but the brakes which act upon the differential and the back wheels are so positive that they will hold the car on any hill without the necessity of carrying the unsatisfactory sprag which so many times has caused accidents to unsuspicious drivers of autocars.

T. J. WILLIAMS.

We have received a letter from Messrs. Shippey Bros., Ltd., with reference to the statistical synopsis of the shows which we published last week. They state that a slight error crept into the classification respecting the nationality of the four types of vehicles exhibited by them at the Earl's Court. Two were of Canadian build and another was of an Anglo-Canadian type. A number of letters are unavoidably held over but will be dealt with as space permits.—ED.

THE MANCHESTER AND EDINBURGH SHOWS.

Among the principal exhibits in the Manchester Show, which opened on the 13th inst., were a nicely-got-up 10 h.p. Horbick car, having direct drive by means of propellershaft, bevel gear, and live axle, and a chassis of the same car. A 12 h.p. car specially built for local theatre proprietors is to be seen. On this the drive is direct on to the back axle in the usual manner.

A similar car of 8 h.p. is exhibited, and a very fine specimen of the 12 h.p. Humber car with standard high-backed tonneau body is also on view. A 12 h.p. Belsize and chassis are shown, and attract a considerable amount of attention. Other cars to be seen in the show are the John-o'-Gaunt 8 h.p., 8 h.p. De Dion, 5 h.p. Baby Clément, 16 h.p. Vinot (having a four-cylinder engine and slow-speed mechanically-operated valves), two types of the M.M.C. (a 20 h.p. and 8 h.p. voiturette), 16 h.p. Siddeley, 10 h.p. Lanchester, 15 h.p. Hermes, and 6½ h.p. Rigal. The steam cars are represented by three Locomobiles. The firms dealing in accessories and components exhibiting at this show are Messrs. A. Dunhill (with his usual extensive display), Dunlop Tyre Co. (with their new non-slipping cover), the North British Rubber Co., Swain's Patents' Syndicate, Ltd., the Clipper Pneumatic Tyre Co., and David Mosley and Sons, Ltd.

A general view of the motor section of the Edinburgh show. One half the Waverley Market was devoted to cycles, and the other to motors.

The Edinburgh Show opened on the 6th inst. in the Waverley Market, and was the most successful exhibition of its kind which has yet taken place in the northern capital. The total number of cars on view was upwards of seventy, the exhibitors including the Ariel Motor Co., Caledonian Motor Car Co., S. F. Edge, Ltd., the Glasgow Motor Car Co., the Hozier Engineering Co., Lorr's Automobile Agency, the Mo-car Syndicate (Paisley), the North British Rubber Co. (Castle Mills, Edinburgh, with the Clincher-Michelin tyre), Rennie and Prosser (Glasgow), the Rossleigh Co. (Edinburgh), the Scottish Automobile Co. (Edinburgh), Stirling's Motor Carriages Co., Ltd. (Granton, Edinburgh), the V.R. Motor Agency (Glasgow), and Warden and Inglis (Glasgow).

Flashes.

The latest municipality to consider the advisability of establishing a motor omnibus serivce is Eastbourne. It is proposed to start this before the summer sets in.

* * *

In last week's *Autocar* on page 211 in French notes on the Crystal Palace Show, the car made by Messrs. Weller Eros., of West Norwood, was referred to as the Waller. This might possibly lead to some misconception, and on that account we draw attention to it here.

* * *

A driving school is being opened in Nottingham by Messrs. Evart Hall, Ltd. It is proposed not only to teach the driving of any kind of car, but also the theory and practice of motors.

* * *

The directors of the P. and O. Co. have a project in hand for establishing a motor car service between Woolwich and Tilbury. The idea is to convey the staff to and from the different docks; and for the transit of heavy stores and baggage, a service of heavy motor vans is to be provided.

* * *

The displacement of the horse by the motor car is having an effect on the harness trade of Walsall, and the ever-increasing demand for motive transport is not viewed with equanimity by the harness manufacturers. It is said that in many country houses it was the practice for owners of horses to have a complete renewal of harness every two or three years, and £60 or £80 was no unusual figure to pay for a set for a pair of horses. Where four pairs of horses used to be kept, one pair and a motor car are now to be found, and this reduction in the stable, coupled with the competition of the electric tramway and the motor omnibus, has reduced the trade. Another proof that the supremacy of the horse is being successfully challenged.

* * *

We learn from Messrs. Michelin and Co. that they have in preparation the fourth edition of the "Guide Michelin," which met in former editions with such success last year, obtaining a circulation of 60,000 copies. The guide is presented gratuitously to tourists and chauffeurs. The coming edition will afford even more information than those that have preceded it, and will assuredly be welcomed by all automobilists who contemplate touring with their cars on the Continent. We shall refer again to this work so soon as a review copy is to hand.

The latest pattern two cylinder 9 h.p. Deschamps. This vehicle belongs to Mr. A. C. Crowder, of Bow. He tells us he bought the machine from the Graphic Motor Co., and that he is very pleased with it, his first drive with four up being 140 miles, and this was carried through without a hitch. In fact, in the initial 500 miles which were made by the car there was no involuntary stop except for a dirty plug through over lubrication

The correspondent who wrote us lately for the address of the makers of the Lowne crank log, but whose address we have mislaid, is hereby informed that this distance recorder is made by Messrs. R. M. Lowne and Sons, Ravenscroft, Bromley Road, Catford, S.E.

* * *

We recently illustrated the twin Buffer tyres which have been brought out for carrying heavy loads. As the tyre question, particularly with heavy vehicles, is one of importance, it will be of interest if we point out that the Milnes Daimler double-decked 'bus which we illustrated on February 7th, page 194, is fitted with these tyres. The vehicle carries thirty-six passengers, and weighs five and a quarter tons loaded. Each of the twin tyres is 3in. in diameter. We believe this is about the heaviest load which has yet been put upon rubber tyres.

* * *

Last week it was discovered that the letterbox of the Wilkinson Tyre and Tread Co. had been robbed periodically for some weeks past. The thief was caught, and was found to have on his person mutilated letters to the firm as well as cheques sent by their clients to them. The new address of the company is Chapelhill Mill, Huddersfield, and any who have written without obtaining replies should send copies of the letters at once.

* * *

We hear that an internal combustion engine is being made which will embody the following features: An explosion at every piston stroke, hill-climbing ability at slow engine speeds, complete expulsion of exhaust gases, and simplicity of construction.

* * *

The Kingston police have begun the persecution of autocarists early this year, encouraged thereto by the fact that road repairs or drain laying are in progress along the Riverside Road, and that a shelter hut (painted bright red) affords a convenient place of concealment. The watch-holders manipulate their Waterbury chronographs in the usual policeman's gloves, so the results are bound to be accurate. On Sunday last they stopped at least one car that was not going twelve miles an hour: and drivers going south would do well to keep a lookout in the neighbourhood of any road works, and also on approaching the usual hiding places, notably the furze bushes on Esher Common, the high bank to the left of Esher Shute, and the Ripley policeman's ditch under the holly tree, the London side of the turning to Ockham. Cyclists should also keep watch, and if they can afford the time, turn back and warn the drivers of any trap that may be noted by them.

The American mile record for steam cars is being rapidly brought down. It stood at 1m. 31s., the machine being a Stanley driven by J. F. Hathaway, but he has now cut it down to 1m. 14⅖s. Both records were made at Narraganset Park, Providence, R.I. The first record was made against the wind, and the second with a very strong breeze in the rider's favour.

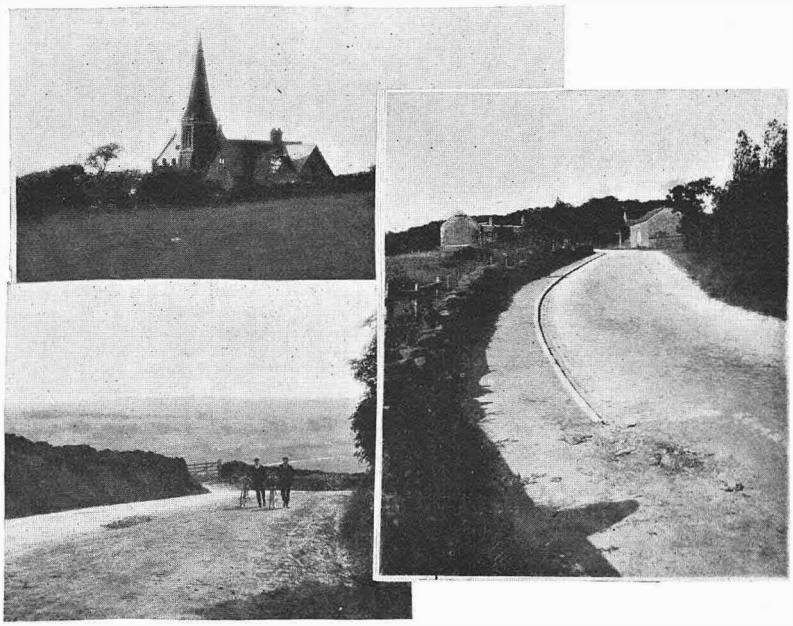
* * *

Mr. Chas. Friswell has just returned from Clerio, near Nivji Novogorod, in Russia, whither he betook himself to purchase the notorious "Passe-Partout" Panhard 15 h.p. touring car, which, it will be remembered, was shown at the last Agricultural Hall exhibition, previous to starting with Dr. Lehwess and others on board for an automobile tour round the world. After many vicissitudes, Clerio was the ultimate point reached, and there Mr. Friswell found the big car, frozen into three feet of snow. By the aid of many peasants and some horses, the big car was hauled out and over several miles of snow-covered track to a railway-station, where she was loaded up on to a truck to be returned to England. Mr. Friswell tells us that he had a great deal of trouble to get into Russia, but infinitely more to get out, probably because Russian officialdom was loth to see so much enterprise quit the country so soon after entering it. The "Passe-Partout," after having passed but a fifth of what it set out to pass, will shortly be on view at Friswell Limited's Free Garage, 1, Albany Street, Regent's Park, and at the motor exhibition at the Agricultural Hall in March next.

* * *

The makers of the Napier cars point out that the sets of tyres which secured the first and second awards in the Tyre Trials were both fitted to Napier cars. They regard this as another proof of the correct design of the car saving the tyres to a very great extent. This, of course, is a question into which we can hardly go without very much more extended data, but there is no doubt that the wear on the tyres is reduced by correct design and careful driving. If the frame of a car is bent so that there is a tendency for any of the wheels to be dragged sideways, greatly additional wear is set up. This, of course, is a proof that the more truly built the car is the better. Properly acting brakes and clutches, the smoothness of the action of the engine, the setting of the steering, and many other points have all to be considered. At the same time, all the maker's care can be undone by careless driving. The man who bangs his clutch in and out and jams on his brake and skids the wheels on the smallest provocation is all the time putting his car, and particularly his tyres, to a vast amount of needless wear, and much of the maker's care is thrown away.

The Stirling motor omnibuses built by Messrs. Stirling's Motor Carriages, Ltd., Granton, for use in London, have been such a success that they have led to a large number of enquiries from abroad. The firm have this week received an order to build a fleet of these omnibuses for Johannesburg. The vehicles will be of special construction, and will be seated for sixteen passengers. They are to be fitted with Stirling petrol motors of 24 h.p.—exactly double the power of the omnibuses being supplied to London. The plate glass windows will be removable, and in addition the light spaces will be fitted with Venetian blinds of wood for use in the hot season. The omnibuses are to be luxuriously upholstered and hung on easy springs, and fitted with solid rubber tyres. These omnibuses are to be used in connection with the development of important residential estates in the suburbs of Johannesburg. The same company have also brought out types of motor omnibuses and lorries for use in the colonies in places where there are practically no roads. The engine works, when needed, a winding drum in front, so that should the vehicle get stalled in a morass or river bed a rope can be hitched on to a tree or rock, or otherwise anchored, and the vehicle will wind itself out.



Snap shots of Parbold Hill. The left bottom view was taken from the top of the hill, and gives a good idea of the altitude reached. The church stands halfway up, and the right hand view is from the foot of the brow. The photographs have been kindly sent to us by Mr. Geo. Cammack, of Ormskirk. The gradients of the hill and diagram showing the sections appeared in "The Autocar" for January 24th, 1903.

* * *

Mr. E. Shrapnell-Smith has been ordered by his medical adviser to take a rest, and has gone to the Grand Canary for a few weeks. There are few men in the motor world who have more thoroughly earned a rest, and we wonder that it has not been imperative earlier when we remember the hard work of the Liverpool heavy trials for some years in succession, and then immediately afterwards the heavy responsibilities undertaken in connection with the Liverpool road-carrying enterprise.

The King of Belgium bought a C.G.V. car during the Brussels exhibition.

* * *

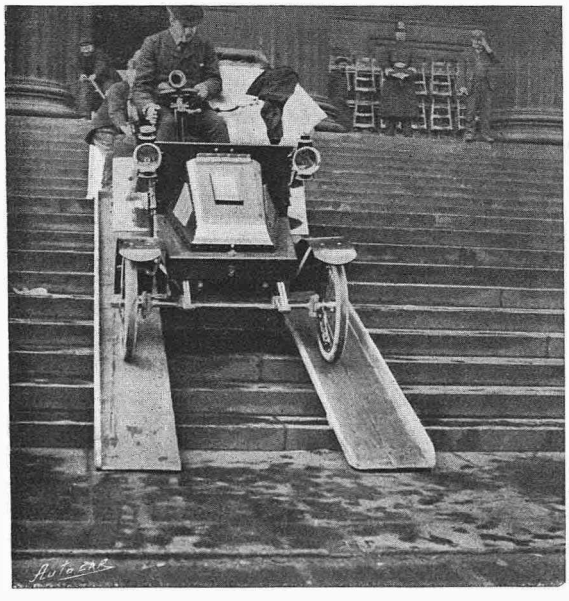
Maurice Fournier writes, in reply to C. F. Barden's challenge, that he has taken it up, and they have signed articles for a motor cycle contest for £500 a side. There will be five matches, the best three out of five to decide.

* * *

Last week a smart drive was made on two De Dions—an 8 h.p. and a 6 h.p.—one driven by Mr. J. W. Stocks and the other by Mr. J. S. Matthew. The cars started from London at 7.35, and reached York (200 miles) the same night at five minutes to eight. The next morning they started at a quarter to eight, and arrived at Edinburgh (404 miles from the start) at nine o'clock the same evening. The running powers of the 8 h.p. De Dion are already well known, but a good many will be particularly interested in the performance of the little 6 h.p., as a machine which will do two hundred miles a day in practically twelve hours for each two hundred miles may well be regarded as a thoroughly roadworthy car.

* * *

On a recent motor tour, Mr. T. F. Monier Williams, accompanied by his wife, met with a serious accident, owing to the condition of the tramlines in Gosport. The car was thrown out of its course and dashed into a plate-glass window. Mr. Williams has now succeeded in obtaining a verdict for damages to the extent of £40 against the Provincial Tramways Co. During the hearing of the case, it transpired that there had been a number of accidents to motor cars and bicycles at this particular spot, and though the secretary of the Tramway Co. said the lines were in a perfect state of repair, he admitted having written that the line required "thoroughly relaying."



Driving a car from St. George's Hall to the street during the Liverpool show. The cars came down with their own brakes, though, to provide work for the unemployed, check ropes were attached to each car which were held by four men. Considering these ropes were not made fast to anything but simply loosely held in the men's hands it is perfectly certain they would have been useless had any of the brakes failed.

To-night (Friday) Mr. Mervin O'Gorman will read a paper at the Automobile Club on "Motor Bicycles."

* * *

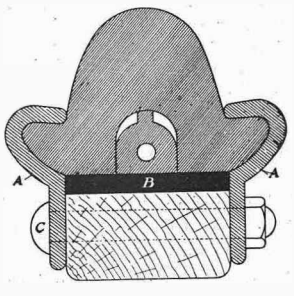
The Roadway Autocar Co. have issued a nicely-illustrated catalogue of the Mors and Renault cars, for which they are British agents. It is interesting to note that the standard types of Mors cars for 1903 are 80 h.p. racing, 18 h.p. and 11 h.p. four-cylinder type, with honeycomb cooler, mechanically-operated valves, direct drive on top speed, and stamped steel frame, though the 15 h.p. four-cylinder, which was so much liked last year, has been retained, as well as the 12 h.p. and 8 h.p. patterns. The Renaults include the four-cylinder 14 h.p. type (very similar, so far as engine is concerned, to the Paris-Vienna victors, but with mechanically-operated valves), the two-cylinder 10 h.p., single-cylinder 9 h.p., and last, but not least, the little 4½ h.p. car which was the first and is still one of the best sociables ever introduced.

* * *

The most imposing set of catalogues which have been issued by any motor manufacturing firm is that of the Thornycroft Steam Waggon Co. Catalogue A deals with the steam waggons, giving full specifications and drawings of the boiler, as well as a general view of the transmission and waggon complete. Catalogue B is devoted to standard vehicles for goods transport, from the one ton up to the four ton type. Catalogue C covers municipal vehicles, such as tip vans, watering waggons, and road sweepers. Catalogue D includes steam passenger vehicles. Catalogue E is for colonial steam waggons, and several special types to meet the conditions of work in different latitudes are given. These are altogether larger vehicles than those used in this country, as there are no tare restrictions of the "light locomotives" order to consider. Book F gives the opinions of numerous users of the Thornycroft vehicles, and, lastly, there is book G, devoted to the Thornycroft petrol vehicle, which only made its first public appearance at the recent Crystal Palace show.

* * *

The accompanying illustration shows a section of the double arch tyre, as exhibited upon the United Motor Industries stand at the Crystal Palace show. The tyre takes the form of a solid rubber tyre having a channel cut on its underside, into which a second rubber is inserted, so that the weight tends to spread the tyre proper, which settles upon the inner arch, thus giving it more life than the plain solid tyre. It is claimed that it keeps its resiliency until it is worn right down to the rim, and that it is impossible for it to become detached or to creep, owing to its method of fixing. It has no wires, and the illustration shows its method of fixing on the Vipen rim. The tyre has been in use for some considerable time in the North of England on horse-drawn vehicles, where it has met with a large measure of success, so that it can hardly be said to be an entirely new departure.



It is a matter for surprise that regulations for the lighting of horse-drawn vehicles are not enforced in Derby. A recent motor accident there was attributed to the absence of a light on the cab into which the motorist collided. As mechanically-propelled vehicles are universally lighted, the regulations for lighting horse-drawn vehicles should be equally uniform.

* * *

The second great Belgian Automobile Exhibition has just opened its doors at Brussels in the large hall of the Parc du Cinquantenaire, where the exhibits cover 3,500 square metres. 160 stands have been erected, and are admirably arranged and decorated, among them being forty firms foreign to Belgium. The whole of the building and the gallery framework have disappeared under flags and draperies, and it is perfectly lighted by arc and incandescent lamps. The Syndicated Chamber of Automobiles, with M. Mettewie at its head as president, must be congratulated on a splendid show admirably organised. It was opened by Prince Albert who, an ardent automobilist himself, went from stand to stand with unflagging interest, while the King visited the show two days later, examining into and enquiring about every novelty. His Majesty greatly rejoiced the chauffeurs by promising to do his best to get the speed regulations altered, expressing a wish that the present racing record "may be beaten and beaten again and again." Twenty thousand invitations were sent out for the opening, and were freely made use of. An immense crowd gathered, and the show is packed all day and every day.

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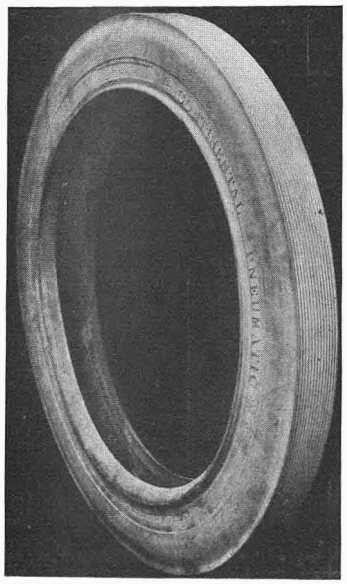
We are informed that during the Crystal Palace Show, 122,000 persons visited the Palace. For last year's show the total number passing the turnstiles was 62,000.



One of the Clipper-Continental non-slipping patterns. This cover is a good example of the square-treaded type which is now coming into prominence. Another Clipper pattern is made with detachable metal studs, and is still more effective as a non-slipper.

* * *

On Friday, March 6th, the members of the Automobile Club will be given an opportunity of discussing the legislative proposals prepared by the Legislative Committee, with additions adopted by the Club Committee. As the accommodation is limited, members desiring to attend should send their names to the secretary at once. Guests of members who are dining with them at the club on the night in question will be permitted to be present at the meeting.

CLUB DOINGS.

The Yorkshire Automobile Club.

On Saturday, the 14th inst., the above club held its second annual run, the venue being Knaresborough, distant about twenty miles from Leeds and twenty-four from Bradford. Fifteen cars arrived at Knaresborough, carrying a goodly party, who, after partaking of tea at the Elephant and Castle Hotel, left for their various destinations.

The Scottish Automobile Club (Eastern Section).

With so many motorists in Edinburgh the Scottish Automobile Club, Eastern District, which, under the new secretarial control of Mr. George MacMillan, is doing so much for the sport and pastime in the East of Scotland, resolved to hold its first annual dinner. This was held in the North British Station Hotel on Friday, 13th inst., under the chairmanship of Professor Dawson Turner. Mr. Norman Macdonald, advocate (after the loyal and patriotic toasts had been duly honoured), proposed the guests in a felicitous speech. Mr. S. F. Edge replied. Mr. John Macdonald, who responded to the toast of the Scottish Automobile Club, said their branch (the Eastern District) was the largest section of the Automobile Club of Great Britain, and had a membership of 212.

The Lincolnshire A.C. and the Trade.

A special meeting of the members of the Lincolnshire A.C. was held at the White Hart Hotel, Sleaford, on Saturday, Dr. Gilpin of Bourne presiding. The business was to consider the resignation of the club chairman, Mr. C. W. Pennell, and Mr. J. R. Richardson, one of the committee, who, having formed a company for manufacturing motors, and holding principal positions in the company, considered it necessary to resign from the chairmanship and committee respectively, as, on the present understanding in the club, members in the trade cannot hold office.

One section of the meeting was for the committee being open to the trade but not the principal officials; another was for the committee and principal officials being open to the trade; while still another section was for the entirely amateur nature of the club being maintained, and the trade being kept, as now, off the committee, etc. It was stated that desirable men had been kept off because of their trade connection, and it was felt that Mr. Pennell's popularity made the situation a delicate one, for while it might be desired to retain him, it was not fair to admit him and debar others. It was thought that he might be allowed on the committee, while not remaining chairman, so that it could not be said that, as chairman, he was using the club for trade. Ultimately the many proposals and amendments were withdrawn in favour of a proposal to adjourn the whole matter to a meeting at Lincoln some early Thursday to discuss a proposal by Dr. Crompton to the effect that it is not desirable that gentlemen connected with the trade shall hold office. This clears the air, settles the question of the trade bar, and as members absent from the meeting may vote by post, the views of the whole of the members will be obtained.

The first makers of autocars to construct a testing track on their own ground are, we believe, the Wolseley Tool and Motor Car Co. At the present time they are laying out a large plot of ground opposite their factory at Adderley Park. This area is nearly eight acres in extent, and has been purchased with a view to erecting additions to the works. Until it is actually covered by the new building, the company intend to use it as a testing track. It has all kinds of gradients, one short one being as steep as one in five. The complete circuit will give two laps to the mile. The track should be very handy for owners fetching away new machines and wishing to get a little accustomed to them before going on to the road, and it will also be utilised for teaching their servants to drive.

THE 1903 NEW YORK AUTOMOBILE EXHIBITION.

By Hugh Dolnar.

(*Continued from page 225*).

The "Moya"—the name being an Indian word meaning "swiftly going"—a very fine $5,000 four-cylinder tonneau body, is taking a good lot of orders, seventeen having been written during the first two days of the show.

As for the moderately-priced vehicles, their makers no longer take any particular interest in this 1903 exhibition, because they have orders for more machines than they can build this year. The makers of the Jeffrey Rambler ($850) have not another carriage to sell to anybody of the 1903 pattern, and a very few Ramblers of last season's production are all that are open to purchase.

Other New Vehicles.

The Cleveland—a new vehicle at a moderate cost, in two styles, one-cylinder horizontal or two opposed horizontal cylinders—is shown in a very attractive line of cars, and the firm are taking orders with sublime confidence in the producing powers of the contracting establishments where these vehicles are expected to be built. No one knows where the Middle West will find automobiles to buy this year, as the whole probable 1903 output appears to be now written off to Eastern purchasers.

As to types of motive agents, the steam boilers, except the White, are tamely uniform in appearance, the drawn steel shell—one head integral and the other cupped and riveted in, and this shell stuffed full of ½in. diameter copper tubes, 13in. or 14in. long—having come to be accepted as the correct thing. The wire-wound boiler of Stanley Bros.' is not shown, as these makers are the only producers of this reinforced boiler, and are not exhibitors at the show, though personally present.

The White boiler does not follow this regulation practice, but uses a distinctive steam generator which will stand feeding with water carrying a little oil without detrimental priming, and so can use the White surface condenser without the difficulties which are caused by priming when condensers are used with small vertical fire tubes crowded closely together in the "regulation" boiler just particularised. The Reading Meteor—known as the Reading in England—steam car has the boiler placed in front, which seems to be the best location for it, because this permits the gauges and water cocks to be arranged on the rear of the dashboard, directly fronting the driver, where everything can be readily observed and conveniently manipulated.

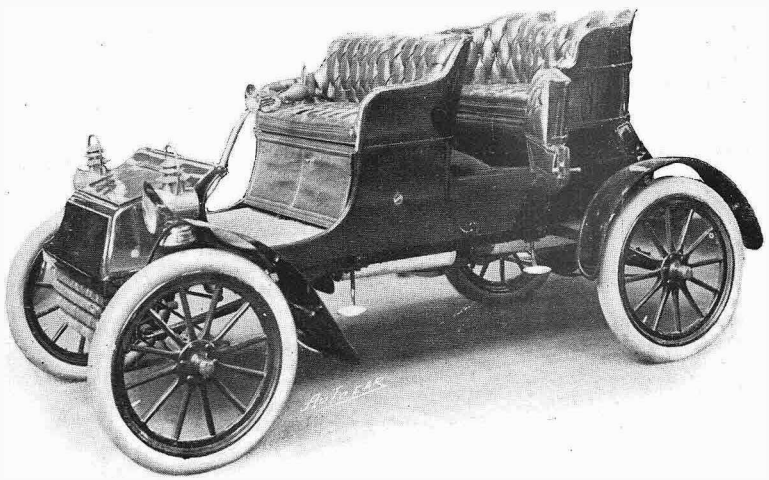
The Condenser Question.

The success of the White condenser has roused the other steam car makers to a full sense of the importance of that adjunct, and the man who can produce a condenser that will take the lubricating oil out of the exhaust steam, and so enable the regulation boiler to use condensed steam feed water, can find plenty of purchasers for his product.

An effective condenser would reduce the small steam vehicle safe water tank capacity from the forty gallons now needed to, say, ten gallons, which would save about 250 lbs. of non-paying load, and, what is a great deal more, would avoid that constant anxiety about water supply, which is now the bane of the steam carriage driver's existence. With thoroughly effective condensers, the steam waggons, with their flexibility and certainty of action, could push the cylinder-fired vehicles for first place, but the condenser will not do if it makes the boiler foam, or "prime." There is not much oil in exhaust steam, but a little oil in the boiler feed water can make a lot of trouble. The steam engines continue to be almost exclusively vertical, though Grout Bros., in their fine large new cars, use horizontal steam engine, slide valve, and link motion, and also discard all ball bearings in favour of plain steel and bronze combinations.

The Types of Petrol Cars.

As to the forms of the cylinder-fired motors, every conceivable shape is shown, except a single horizontal cylinder set crosswise of the vehicle body. Single horizontal cylinders invariably work fore and aft. Opposed pairs of horizontal cylinders are placed horizontally both crosswise and lengthwise of the vehicle. Pairs of vertical cylinders, shaft lengthwise, are very common, and four vertical cylinders, air-cooled, shaft crosswise of the car, are shown. A single cylinder is placed in front of the front axle and also in the rear of the rear axle. The favourite type, however, is the two-cylinder or four-cylinder vertical motor, shaft lengthwise of the car, motor in front; the front-placed motor offers many advantages in the way of balance and accessibility, and with a hood hinged to the dashboard to turn up instantly, as shown in the Foster, is certainly a very convenient arrangement.



The new Oldsmobile 8 h.p. touring car.

(To be continued.)

MOTOR CARS AS FEEDERS TO RAILWAYS.*

BY THE HON. J. SCOTT MONTAGU.

In this paper I propose to deal with motor cars as feeders for railways from two points of view—firstly that of passenger traffic, secondly goods traffic.

Under the former heading we must consider what manner of man the passenger is. He may be divided roughly into two classes, the regular passenger and the occasional passenger. The former are the class out of which the railway company makes a large portion of its profit, for this class travel in more or less the same numbers and at the same time, and already their value has been recognised in various ways, as the establishment of special trains to suit their convenience to and from stations near centres of industry. We will now consider the regular passenger. With him every minute is precious, and he has to reckon his journey in the time taken from his house to his office. He does not use the expression, "I live so many *miles* from town," but "I live so many *minutes* from town," and to reduce the number of these minutes great efforts must be continually made by the railway companies. To do this entails much serious inconvenience to ordinary working, and great expense in the widening of lines near towns, so as to meet this diurnal rush of traffic for not more than an hour or two over a system very often more than adequate for the demands of the rest of the ordinary traffic of the day.

Some Examples.

Mr. Montagu then gave some examples in connection with the following stations, all of them about fifty miles from London—Brighton, Basingstoke, Didcot, Bletchley, and Bedford—and supposing the terminus to which the passenger goes is fairly close to his business, he will probably reach his office from door to door in the space of about one hour and a quarter. If the same man lives within a twenty-five miles radius, say at such places as Woking or Bishop's Stortford, and is about four miles from the station, he has to allow half an hour for the road portion of the journey, and is therefore approximately in the same position as the man living double the distance by rail. Other instances more striking could be taken of places much nearer the metropolis, even within a fifteen miles radius, such as Epsom, St. Albans, and the Crystal Palace district. In these cases I think railway companies should collect their passengers by motor car as they now collect goods by vans and horses.

A great amount of time, energy, and money is spent in canvassing for goods parcels for particular lines. The four trunk lines which run to the North employ for this purpose agents and canvassers in every principal town in the kingdom, who absorb a large proportion of the profit. While all this trouble is taken that a parcel of soap or a packet of nails may go by a particular line, why should not the same trouble be taken to secure parcels of humanity? A well-filled passenger train pays the railway company equally well as—some experts think better than—a goods train; and while the companies will send a van to fetch a hat-box, and be responsible for its delivery, charging an inclusive rate, they will not collect my body or assist me in getting to the terminal station at this end, or deliver me when I arrive at my destination. For families railway omnibuses can be hired, but arrangements have to be made long beforehand. Supposing that the average Londoner is turning over in his mind whether he shall go for a day's excursion to the seaside, the company which will send a motor car and collect him at his door and convey him to the terminal station from which he departs will undoubtedly secure his fare.

Country Services.

Mr. Montagu went on to instance the non-paying character of branch lines for small groups of population and their consequent geographical isolation. He maintained that the connection of small centres of population with stations by motor cars would enable more people to live in the country, and if suitable fast trains were arranged, say two in the morning and two in the evening, in connection with the motor car services, a great increase in the number of persons travelling between these stations and big centres would almost immediately take place.

Intelligent railway critics at once ask, "But what would one do with the motor car during the rest of the day?" If built on suitable lines, it could be used for light parcel traffic when all the space was not required for passengers. Business men would soon accommodate themselves to the two or three motor car and fast train services in the morning and evening. The development of this idea might well be considered by railway and motor car experts.

I will now pass on to the occasional traveller. Under this heading I include most long-distance travellers, who travel for pleasure or for business, but not at fixed times, and not on given days. For the use of such people there might be a motor car service running in connection with express trains stopping at principal stations, and distributing and collecting the passengers to and from villages and small towns which at present are badly served by branch lines.

Neglected Opportunities.

To take instances of principal stations, all of them about 100 miles from London—Bournemouth, Templecombe, Bath, Rugby, Leicester, Grantham, and Norwich. These are large centres at which nearly every fast train stops, and in some cases the stations so named have few passengers as regards their own immediate locality, but are merely centres to which branch lines converge, and a suitable timetable to fit all trains is difficult to manage and expensive in train mileage. To take one instance, the Great Northern has an excellent service of trains to Peterborough. Some thirteen miles from this station lies Stamford—a considerable place with a large residential area, now served by a Great Northern branch line, *viâ* Essendine, the Midland service from Peterborough direct being carefully arranged to miss King's Cross connections. Although there are one or two trains which slip carriages at Essendine, the means of communication are nothing like so good as might be expected when considering the proximity of a first-class station like Peterborough. The Great Northern in this case might improve the service of Stamford by a motor car service from Peterborough direct. Until the present absurd law is altered twelve miles an hour is held by some magistrates to be the utmost speed limit of a motor car, but in daily practice I am told that this is exceeded, and before long Parliament will permit a higher rate of speed. There is no reason why a motor car service, averaging twenty miles an hour, should not be established between Peterborough and Stamford, serving not only Stamford but intermediate districts.

In the same way the Great Eastern might collect passengers from Dunmow on one side and from the Hertford villages on the other, to a centre like Bishop's Stortford. On the South-Western there is the instance of Shaftesbury, from which passengers have to go some five or six miles to Semley or Gillingham and Wantage, on the Great Western, now served by Wantage Road or Steventon. In none of these instances could a branch line be built on sound financial principles. Then there are large areas of country which could be collected from the outskirts of such towns as Cambridge, Thetford, Ipswich, and Colchester. In the case of comparatively large towns such as Stamford, a service three or four times a day each way would probably be found necessary, but in more rural districts the car might work three days a week in one direction and three days in the other, thus giving travelling facilities to villages hitherto untapped.

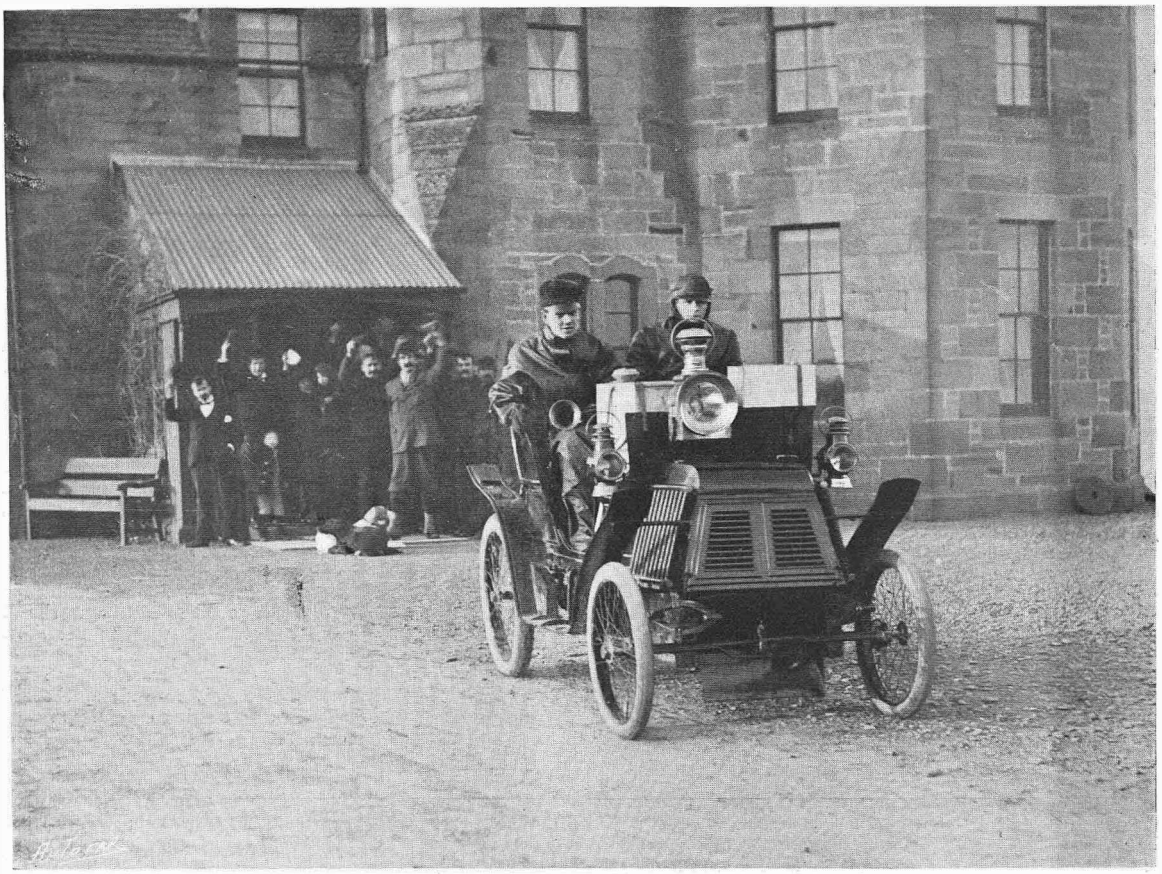
To go further afield, there are many important places in Scotland that have as yet no railway communication owing to different causes. In this case the motor cars could be suspended, or partially suspended, during the winter months, or else their activity shifted to another sphere.

(To be continued.)

* A paper read at the Automobile Club on February 13th, 1903

Mr. Alfred Harmsworth has suggested that a testimonial should be presented to Mr. Claude Johnson on his retirement from the secretaryship of the Automobile Club. He has also expressed his desire to contribute fifty guineas towards it.

JOHN-O'-GROAT'S TO IPSWICH.

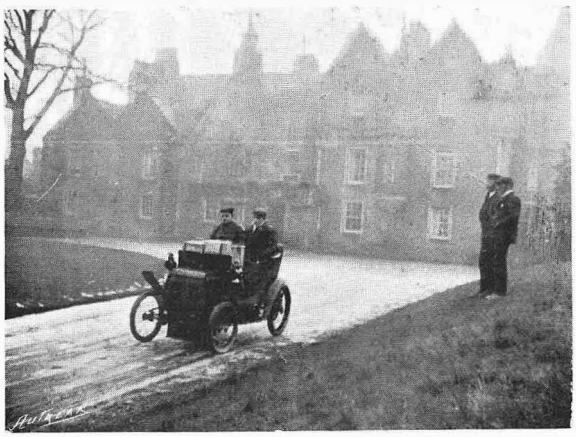


The start from John-o'-Groat's House, with plenty of spare petrol on board.

On the 15th of last month, Mr. Reginald Egerton, of Botwood and Egerton, Ipswich, who are agents for the Primus and Gobron-Brillié cars, started from John-o'-Groat's House for the South. He could scarcely have picked a worst period of the winter, as the weather was bitterly cold, and snow lay on the ground, though most of it had been blown away in the extreme north. He and his mechanician—Warren—found miles upon miles of newly-laid stones—in fact, he reckons that the Clipper Continentals ran over one hundred miles of unrolled metal before they struck the flints of Suffolk. After a puncture and missing their way, they found the snow getting deeper as they struck the Highlands, and beyond Kingussie their troubles commenced in earnest. At last things got so bad that they could only force their way down-hill through the snow on the low gear, and they found out that they were passing over or through the heaviest fall for twenty years in that part of the Highlands. After spending the night in a hospitable cottage, the situation was reviewed, and it was found impossible to go further south, but with the low gear in and four men pushing, the car was got out of the drift, and forced its way back to Inverness. Here they heard the coast road was good, so it was decided to go round by Aberdeen and avoid the snow-bound Highlands, in which all wheel traffic was temporarily suspended. The drive was continued in the dark, and somewhere after Nairn an unlighted level crossing gate was charged. Luckily, the damage was slight—in fact, the gate apparently got much the worst of the encounter. Mr. Egerton thinks that the wheels must have hit the gate absolutely square. So far, they had found the roads free from snow, but they missed their way and got into the Highlands again. Then while they stopped to enquire their way, the radiator froze, and the petrol pipe damaged by the collision with the gate was also leaking badly. The car was worked down the hill, and breakfast was taken at a farm. Fortified thus, the leaky pipes were bandaged up with rubber tape and solution, and temporary repairs made. It was found impossible to continue on this road, and a return to Keith had to be made, the leaky radiator giving trouble all the time. At Turriff the motorists sighted the Commercial Hotel, where they put up for the night. This was Saturday, and the last time they had slept in a bed was at John-o'-Groat's on Thursday. Turriff was left at noon on Sunday in heavy rain, which made the roads extremely treacherous, frost and snow bound as they were. At Stonehaven the night was spent. On Monday the journey was continued through Montrose and Arbroath to Dundee. The ferry was crossed to Tayport, and the Fifeshire roads were found to be in a shocking state owing to the heavy snow. A stop was made

at "Balfour," near Markinch. The radiator damaged in the collision was leaking so badly that it was not deemed safe to proceed till it was repaired, and great difficulty was found in getting it done, so it was Wednesday afternoon before the run was resumed. The ferry was crossed at Burnt Island, and the road taken from Edinburgh, Haddington, Dunbar, and Berwick, as Mr. Egerton had decided that having once departed from the historical John-o'-Groat's to Land's End road, owing to the Highlands being impassable, he would content himself by running straight through to Ipswich. The roads became very bad again, and near Morpeth they were so slippery that the wheels would

Snowed up near Daviot.



Leaving "Balfour," near Markinch, Fife.

not bite on a steep hill, and the car began to slide backwards with the driving wheels revolving forward. There was no help for it but to spend the night where they were, and the straw of a stack yard was the best couch the motorists could find. In the morning a horse and pony were requisitioned to get the car up the ice-bound hill, and then Morpeth, Newcastle, and Durham were soon left behind. Once more only one radiator was available (it will be remembered that there is a radiator on each side of the Primus bonnet), as the old leaks had broken out again. It was patched up in Durham, where a good night's rest was indulged in. On Friday the journey was continued through Darlington, Northallerton, Thirsk, Easingwold, and York to Selby. At Doncaster dinner was taken, and just after Mr. Egerton was horrified to hear that his car was on fire in the yard. He remembered the thirty-gallon spare tank of petrol, and rushed out, expecting to find the car ruined. It seems that Warren had taken a lamp to look at the belt case, having previously turned off the tap which admitted the petrol from the big spare tank into the running tank, and some being spilled caught fire. Two men standing by dashed two buckets of water straight into the flames; and, strangely enough, extinguished the fire, though the upholstery was badly scorched, the paint in places blackened, and the belt case partly demolished, the belt being

As far north as possible. On the beach at John-o'-Groat's.

Climbing Berriedale Hill.

burnt half-way through. A new piece was obtained and inserted in place of the damaged portion, and a start made about midnight. Sleep soon overcame the driver, and a stop had to be made at Retford. On Saturday the last stage of the journey was made through Newark, Grantham, Peterborough, and thence over very bad roads to March, Ely, and Newmarket, and by still worse roads through Bury to Ipswich. Mr. Egerton estimates the distance at about 870 miles, though we do not quite see how this total is arrived at, as John-o'-Groat's to Land's End is only ten miles more, though, of course, some long deviations were made in the North. During the run every kind of road was traversed, and every sort of weather experienced

except thunder. It was certainly a good test for the little 7 h.p. belt-driven Primus, which was never cleaned once from start to finish. Mr. Egerton speaks highly of his Castle accumulator, which sparked the engine through the entire trip, though a spare one was carried. The drive as a whole is a remarkable demonstration of the fact that an autocar can be driven over any roads on which horse-hauled traffic can be conducted, as, of course, the slippery hill which required the assistance of the horse and pony could have been negotiated by the car alone had some form of non-slipping tyre been fitted. It is also a proof that, save under very exceptional circumstances, it is useless to attempt a quick End to End drive in mid-winter.

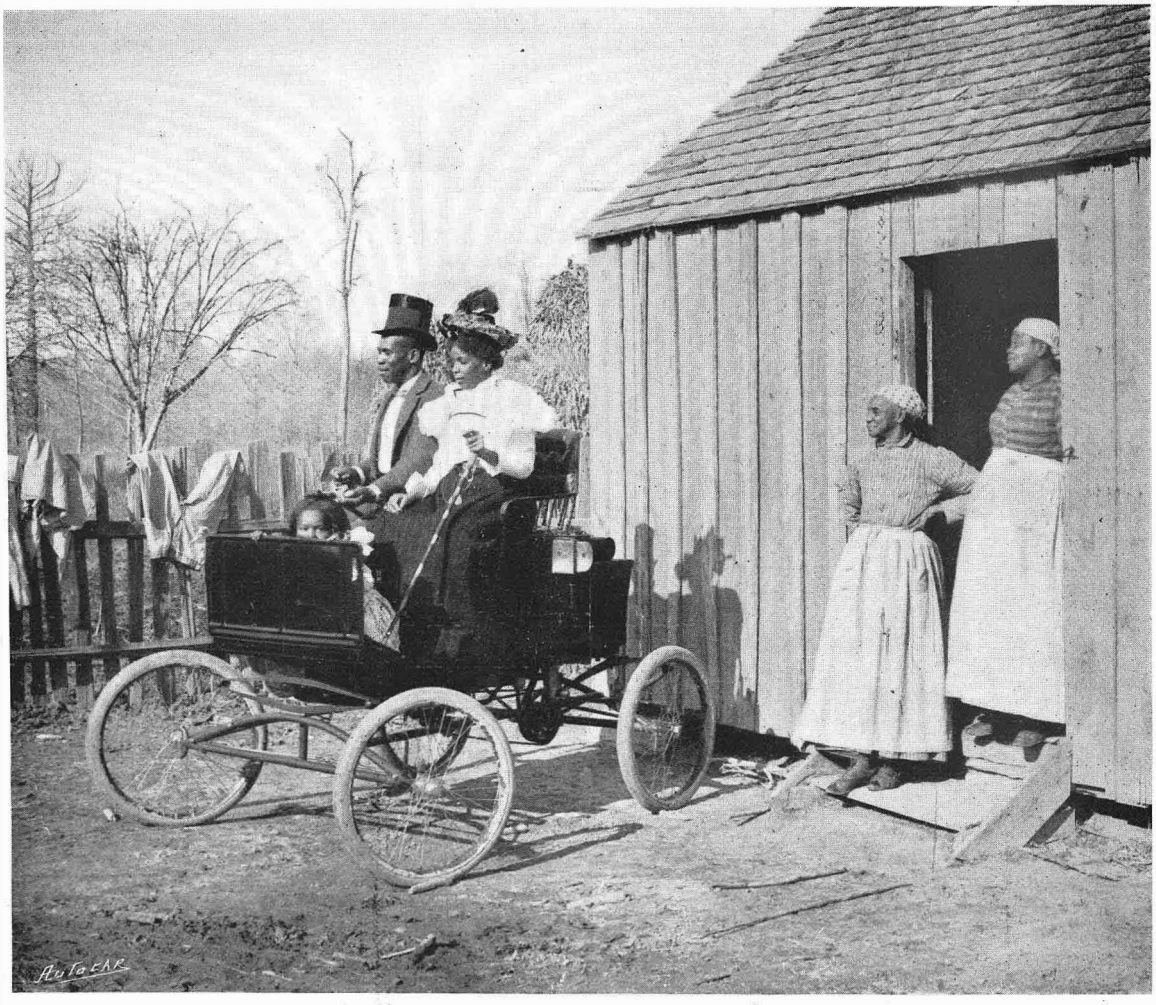
TO CORRESPONDENTS.

This week the following correspondents have been, or will be, replied to by post:

E. A. Bartlett.
T. K. and F., Ltd.
H. R. Brown.
G. Martin.
E. Watson.
A. S. Wylie.
J. B. Geake.
C. Watson.
G. Martin.
S. L. Cocks.
H. Haynes (Bridgport).
E. Chivers.
R. De La Mayne (Eastbourne).
H. A. Taylor.
W. Reynolds.
M. Tench.
V. P. Smith.
H. T. Viney.
J. W. Hall (Sabarmati).
G. P. Danforth (Penn., U.S.A.)
J. W. Hall (Sabarniati)
B. V. Roche.
G. H. P.
H. A. Patten.
F. Hughes.
W. Graham.
W. S. Talbot.
Kings Lynn.
F. Gingold.
H. Ray.
E. E. Nicholl.
Ware (Philadelphia).
J. F. Mastin.
G. G. Herbertson (Aldershot).
C. Kenyon
Rupert Henstridge.
Tom Browne.
Thos. Fenning (Blackwater).
H. Dewey.
A. J. Williams
E. Tyndall (Trowbridge).
T. Elson.
F. Allenbury (Uttoxeter).
A. A. Smythe.
C. I. S. Baker.
A. Hermon Sykes.
J. Hymes.
B. H. W. Claridge.
E. A. Momber.

Our thanks are due to the following correspondents for letters, items of news, various topics of interest, or photographs. These will be dealt with in due course, and, when possible, published. In the meantime the senders will kindly regard this as an acknowledgment: C. E. Abbott, J. F. M. W., J. Simkiss, J. T. H.

P. L. KIRHU REGNIER (Mannheim).—Your letter has been forwarded to Messrs. Charron, Girardot, and Voigt, at 38, Long Acre, W.C.



Big Swamp coons on a Locomobile. This is one of an entertaining series of pictures which are very popular in the United States. Each one is embellished with remarks from the proud grand maternal parent, and the series has created quite a lot of amusement in American automobile circles.