

## New Patents.

This department is conducted by Mr. G. Douglas Leechman, consulting engineer and registered patent agent, 18, Hertford Street, Coventry; 32, York Street, Dublin; and 9, Exchange Chambers, New Street, Birmingham; from whom any further information respecting patents, designs, and trade marks may be obtained.

The following printed specifications were published on 27th November, 1902. All notices of opposition to the granting of patents on the several applications should be filed not later than 12th January, 1903.

1901.

17,520.—H. T. Edge. Gas or oil turbine operated by Berthelot's explosive wave.

22,143.—M. Halaubek. A section tyre fits over a cushion in a section rim, the rim and tyre being sometimes articulated.

22,479.—F. Morriss. Removable Daimler "three-speed" gear wheels.

23,281.—E. Perks and F. Birch. The Singer chain-driven motor bicycle.

23,417.—Rudge-Whitworth, Ltd., and J. V. Pagh. Cable brakes operated by a short reversed hand lever.

23,913.—J. G. Accles and F. H. de Veuille. The A.V. cycle motor.

24,149.—M. J. P. O'Gorman. Contact breaker with a rocking block on the trembler or cam.

24,665.—P. T. Reid and W. Shepherd. Device for starting engines with dynamo electric ignition.

24,968.—J. W. Adams and Humber, Ltd. Controlling by means of a cable actuated by a rotating handle or ring.

26,711.—J. Mitchell.

1902.

452.—C. D. Abel (La Société Anonyme des Anciens Etablissements Panhard et Levassor). Electrical ignition distributing device for multi-cylinder motors.

673.—C. D. Abel (La Société Anonyme des Anciens Etablissements Panhard et Levassor). Motor with separate cylinders and thin water-jackets.

2,578.—J. Hillenbrand. Friction clutch with elastic connection to the transmission-shaft.

4,999.—F. H. Hadfield. Device for protecting ignition plugs against short circuiting by accumulation of moisture.

17,994.—L. G. Nilson. Interrupter with divided armature for sparking induction coils.

17,995.—L. G. Nilson. Electric car having the driving mechanism arranged between the body-supporting springs.

17,996.—L. G. Nilson. Braced steering axle having the wheel spindles in the line of transverse centres of the springs.

17,997.—L. G. Nilson. Motor controller for electric vehicles.

17,998.—L. G. Nilson. Cars are driven by a gasoline motor through a dynamo and electric motor with an equalising storage battery.

18,064.—R. Hennig. Pedal propelling for luggage vans and other vehicles.

19,245.—E. J. Braddock. Iron or steel tyre with gripping surface of softer metal.

20,710.—H. Frenay. Float feed spray carburetter in which a conoidal-ended extension of the inlet tube forms the pulveriser.

## POLICE TRAPS.

Roads leading into Shoreham, Southwick, and Fishergate. On the Lower Shoreham Road between Southwick and Fishergate.

At Kingston-by-Sea.

On the Stillorgan Road between Booterstown Avenue, near Kingstown, Ireland.

Brighton Road, from the London side of Handcross to the School House.

At Elwell.

On the Great North Road, each side of Buckden.

North of Northallerton.

On the Woodstock road, five miles out of Oxford.

Ripley Road, one mile from Guildford.

Road between Guildford and Portsmouth.

## HORSE ACCIDENTS REPORTED IN NOVEMBER.

1,250 accidents in 96 days - 172 persons killed and 1,022 injured.

No of accidents.		Persons injured.	Killed.
781	Brought forward from <i>The Autocar</i> of November 1st	661	99
131	Week ending November 1st	104	14
87	" " November 8th	96	9
67	" " November 15th	42	15
112	" " November 22nd	75	18
72	" " November 29th	44	17
1,250		1,022	172

## NOTICES.

### SUBSCRIPTIONS.

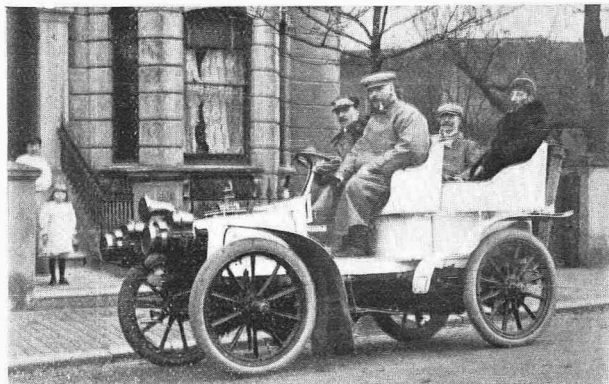
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The illustration on the left shows Messrs. Bennett, Emberton, and Ryan starting for a drive in a 10-h.p. Panhard from Brighton. The other picture portrays their fate. They were caught in a police trap at Crawley. They were accused of accomplishing thirty miles an hour, though as a matter of fact their speed was about fifteen miles per hour.

# THE AUTOCAR

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### COLONIAL AND FOREIGN EDITION.

IN ADDITION TO THE USUAL EDITION OF "THE AUTOCAR," A SPECIAL THIN EDITION IS PUBLISHED EACH WEEK FOR CIRCULATION ABROAD. THE ENGLISH AND FOREIGN RATES WILL BE FOUND ON THE LAST PAGE. ORDERS WITH REMITTANCE SHOULD BE ADDRESSED "THE AUTOCAR," COVENTRY.

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FRANCE: Nice, Levant, and Chevalier, 50, Quai St. Jean Baptiste.

UNITED STATES: The International News Agency, New York.

### Notes.

#### The Numbering Proposals.

On the 3rd inst. a conference was held at the Automobile Club between the legislative committee and the club committee with reference to the Bill placed before Parliament by the Hon. Scott Montagu, and drafted in conformity with the recommendations of the legislative committee of the club. The

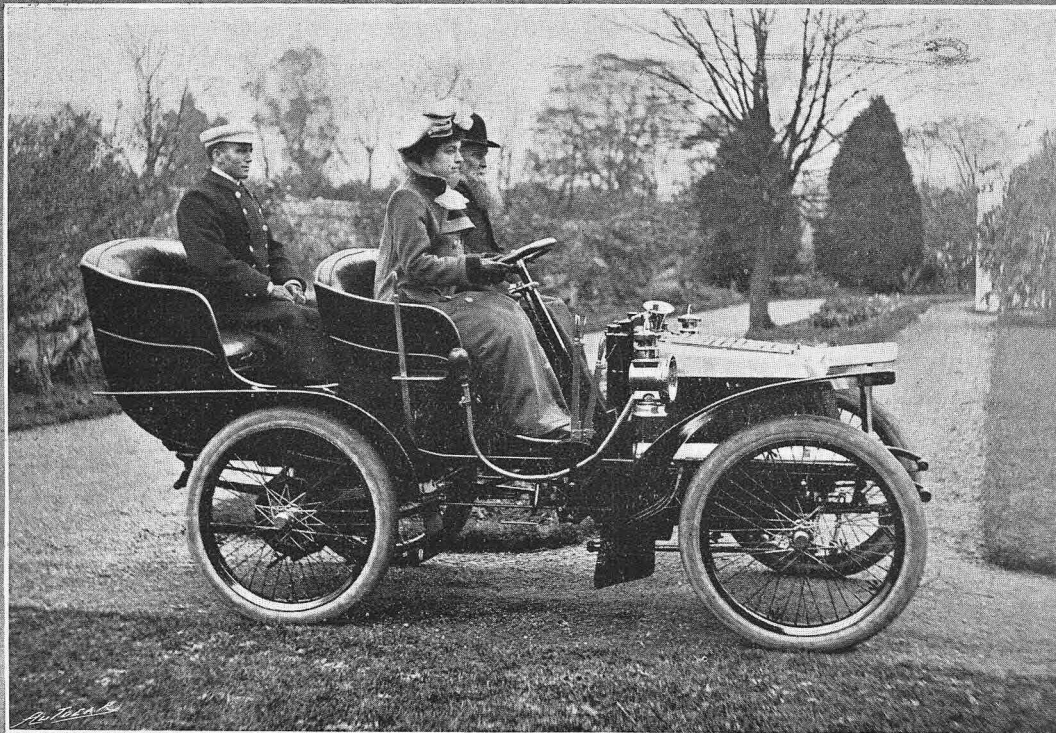
club has issued the following report of the conference: "After discussion it was unanimously resolved, 'That this meeting hereby confirms the action of the legislative committee in accepting the principle of the identification of motor cars coupled with the abolition of the speed limit, but considers that, before the formal assent or approval of the club is expressed, some assurance should be obtained that such regulations will be made as will, as far as possible, minimise the risks to automobilists which might arise from abuses of identification.' A resolution was passed asking the Hon. Scott Montagu to insert, if possible, in his Bill a provision that the speed of the motor car, irrespective of the circumstances of the case, need not necessarily constitute 'furious driving.' The arguments used in connection with these decisions were that if every motor car be identified, a driver who might be driving, for instance, from London to Liverpool, with moderation and conformity to the law, might, a fortnight after the completion of his journey, receive a summons for alleged furious driving said to have taken place in a village quite unknown to him by name. The summons might arise from a complaint lodged by some cantankerous person having a strong antipathy to any means of road locomotion except horse-drawn vehicles. The driver of the vehicle would probably have no knowledge as to the precise portion of the road alluded to in the charge, inasmuch as the name of a certain district only might be mentioned, which might extend for some six miles of the road. He would, naturally, have a very poor recollection of the traffic and other circumstances existing on that portion of the road at the time he passed over it, and he would have no opportunity of finding the names and addresses of persons who witnessed his passage. He would therefore not be in a position to defend himself against any accusation, however preposterous or vexatious it might be. It was suggested in the course of the discussion that the Act, or regulations made under the Act, might provide that the method of identification should not be made use of unless the driver could be charged with having driven to the danger of other passengers then on the highway, or with having failed to stop when called upon to do so by a police constable or the driver of a restive horse. If every driver of a motor car is to be at the mercy of every other passenger on the highway who may see fit to charge him with furious driving the life of a careful driver of a motor car may be unendurable, as it is at present under the twelve-mile-an-hour limit. It is therefore suggested that the new Act should incorporate a provision which will make it impossible for a motorist to be prosecuted for furious driving in circumstances under which a speed considerably in excess of the

speed of horse drawn traffic might be legitimate; for instance, on a portion of open straight high-road with no cross roads, no houses, and which is unoccupied by horse-drawn vehicles. It was agreed that there is no reason why, under such circumstances, the speed of a motor car should be confined to the speed of a horse-drawn vehicle: on the other hand, it is recognised by automobilists that it is only right and proper that the drivers who propel motor vehicles at high speeds through villages, past cross roads, and round corners, might be, and should very properly be, prosecuted for furious driving." This is the official summary of the club's new attitude towards the Bill as disclosed at the conference.

#### An Attempt to Improve the Bill.

It will be seen from the above that the additions which are now suggested by the club put a very different complexion on the Bill as compared with the one which has been placed before Parliament with the unqualified approval of the legislative committee. As the Bill stands, and without the additions now suggested, it merely provides for abolition of the speed limit and the numbering of cars, reference also being made to a method of facilitating an appeal from magisterial decisions to a superior court. The points brought up in the discussion, and mentioned above, show that the opposition with which the Bill has been received by

the bulk of automobilists has had partial recognition, and that many of the arguments used by its opponents have been taken to heart, particularly in the attempt to limit the abuse which would arise from improper use of the identification facilities offered by numbering. These additions to the Bill, if they are practical and possible—and this is a point we are not prepared to discuss at the moment, though, as we have frequently shown, there is a great risk of some clauses being accepted, and others (and perhaps more vital ones) thrown out when it comes before the House—undoubtedly greatly improve it; but it is necessary to bear in mind that but for the fortunate fact Parliament could not consider the Bill in the present session it would have been passed in its original and very imperfect state. We think the changes which are now suggested are another argument in favour of our suggestion—that for the time being it is far better to leave the law alone, and not to bring forward this or any measure till such time as it is practically forced upon automobilists. The discussion at the club showed that the club committee were very much more fully aware of the objections to the Bill in its original state than were the legislative committee, and it is more than probable that when the opportunity promised later for general discussion of the subject by the club is given the membership at large will be found even more opposed to it than the club committee. The statement made



Mr. J. B. Dunlop, the inventor of the pneumatic tyre, driven by Miss Dunlop on their new 12 h.p. Argyll.

on behalf of the club, that the majority of sober-minded men believe in the Bill as originally drafted, is an entirely mistaken one, and it is necessary to remember that less than two years ago the club was absolutely opposed to numbering propositions of any kind, and in its then attitude was backed up practically by the whole of the British automobile world. However, now the matter has been brought forward, the best course is to discuss it fully, but the presentation of any bill should be postponed as long as possible; if it can be two or three years hence, so much the better. As the matter stands, automobilists throughout the country have to thank the congested state of Parliamentary business for their escape from a measure which has been shown by the position now taken by the club to have been imperfect. Had it passed into law as drafted, the last state of the automobilist would have been very much worse than the first, and this has been patent all along to almost everybody except the members of the legislative committee. We recognise very fully the good which the Automobile Club has done and is endeavouring to do on behalf of the movement, but we feel in this matter a very grave mistake has only been most narrowly averted. Automobilmism has escaped a great damage merely by a piece of good luck, as only circumstances altogether outside the control of the legislative committee have prevented the incomplete and dangerous Bill they have fathered from becoming law.

### Mails by Motor.

Although the Post Office authorities have been experimenting at different times with motor vehicles, they do not, so far as London is concerned, appear to have taken up the matter with anything like thoroughness. In fact, it would appear that they are not by any means favourably impressed with the motor, as it was stated in the *Daily Mail* last week—in reference to the accident to the Brighton horse mail coach which had part of its load taken to its destination by the motor mail van which runs between London and Redhill—that the Post Office authorities explained that only a few mail hampers were taken up by the motor van, and, further, that no motor vehicle had been found which could carry heavy weights; and, consequently, the authorities were not departing to any extent from the older method of horse draught. Whether this is an official statement from the Post Office chiefs or merely the opinion of subordinate officials does not really matter very much, as the policy of the Post Office with regard to motor vans is ample proof that no really serious attempt has been made up to the present time to supersede the horse-drawn mails, except, of course, in instances like the Liverpool and Manchester motor service; but, then, as we stated a moment since, we are dealing with the London policy. All our older readers know that from time to time we have recorded experimental runs by the Post Office authorities from London to Redhill, and, further, that they have referred to at least three different makes of motor vans, but, despite this, the authorities have, with the exception of a few trifling loads, stuck to the horse. The reason for this is not difficult to find. The Post Office requirements are altogether of a special character—quite different from

those of any other user of heavy traction—but the authorities expect to get the exact type of vans they want practically without paying for them. The manufacturers may design and make as many different types as they like, and the Post Office, in certain cases, will consent to try these vehicles and even to pay for their hire, but they take an isolated machine, and if it should fail once, that is practically the end of the matter, and the unfortunate maker, who may have spent anything between £2,000 and £5,000 in endeavouring to secure their contract, is left with some unwieldy machine on his hands, which is neither a heavy tractor nor a light delivery van, and which can hardly be transformed into a *char-à-banc*, and is, consequently, more or less useless. If the Post Office had any real desire to take up motor traction it would decide to spend a little money on the matter. As it does not do this, it may have to wait some years, and then, as all sorts of commercial motor vehicles will have been made, it is quite likely that with the multiplication of models and types, there will be one or two which, by comparatively small modification, can be made to meet the requirements of the Post Office. It is a strange thing, however, that, despite the accidents which happen too frequently to the Brighton horse-hauled mail, nothing is said about relinquishing that archaic method of conveying His Majesty's mails.

### Prevention of Side-slip.

Probably no competition organised by the Automobile Club will be of wider service to automobilists generally than the trials which are being organised of devices to prevent side-slipping. Already one very promising method has been tried, and has met with the most satisfactory results. We cannot at present give a description of the arrangement, but it is one which can be attached and detached in a few minutes to or from any existing tyre, whether pneumatic or solid. It has been tested upon two cars of absolutely different build and weight distribution belonging to members of the Automobile Club, and has proved completely reliable. The first trial was made on a very wet night from Queen Victoria Street, along the Embankment, over Westminster Bridge, down the Kennington Road, and up Brixton Hill to Streatham, the roads being in an exceedingly treacherous condition. The car was driven with great freedom, and intentional swoops and curves were made, and, in fact, a serpentine was steered in and out of the greasy tram-lines without any side-slip whatever. Trials were also made over asphalt and, in fact, every description of road surface. When the brakes were jammed on suddenly the car could be pulled up without deviation, and in taking bends or corners it seemed to follow its true course without any slip. The arrangement has also been tried on an ordinary pedal bicycle, and with conspicuous success. So far as we can gather, there is no doubtful element about the arrangement, except, possibly, the effect it may have on the tyre. We do not think it will damage it, though we can scarcely regard this as proved at the moment. It is not likely that it will have any appreciable slowing effect on a car, at any rate. This may possibly be apparent on a bicycle, though even if it is it will be due to outside causes



rather than to any inherent defect of the device itself.

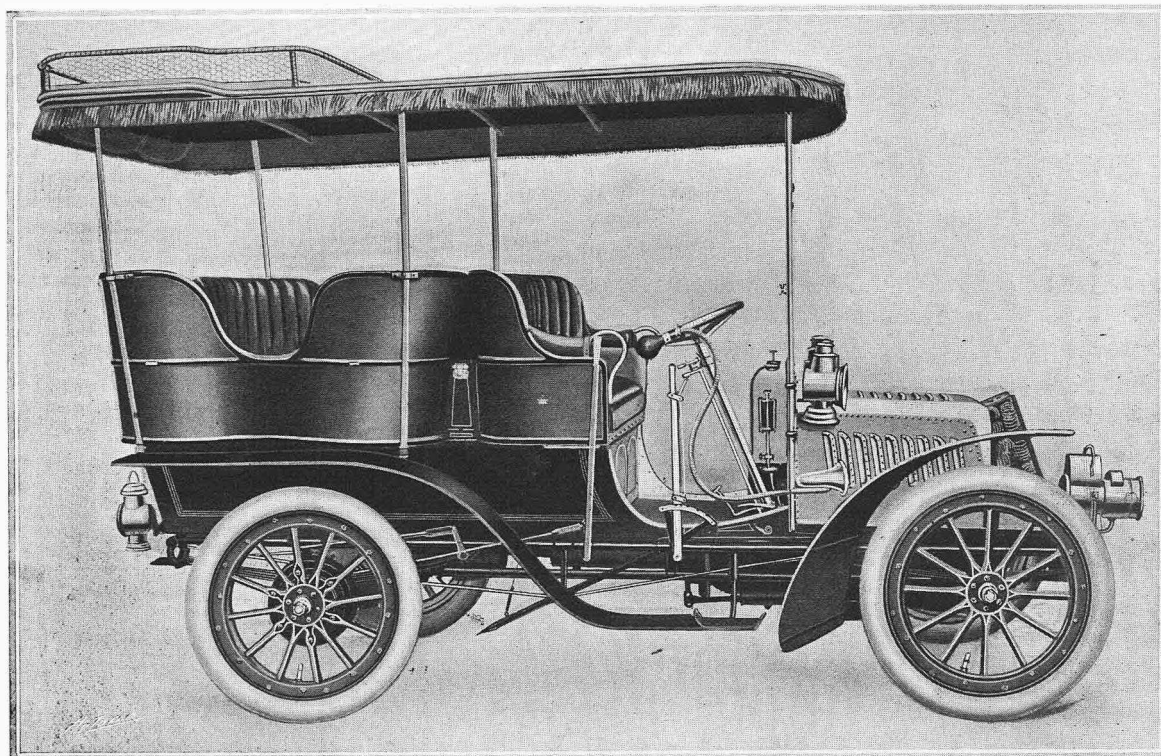
### The Gordon-Bennett Cup.

Last week we referred to the nomination of two Napier cars by the Automobile Club to defend the Gordon-Bennett cup for England, and also mentioned that an eliminating race would be run to decide which make should be the third car to represent this country, three being the maximum number of machines allowed to each competing nation. In addition to the Wolseley and Star vehicles which are being built to take part in the eliminating race, we hear that cars of nominally 40 h.p. are being constructed by the Dennis Co. of Guildford and by the Rex Co. of Coventry. (The latter will be completed in seven or eight weeks.) Further than this, a Napier will take part in the eliminating contest, and in the event of it beating the other vehicles, there will be three Napiers in the race proper, as, of course, the one intent of the eliminating test is that the best vehicle shall be selected. The participation of a Napier in the test will undoubtedly add interest to it, as it will enable some sort of idea to be formed of the capabilities of the two other cup defenders of the same make. In any case, if no further competitors are found for the eliminating trial in April, it will be exceedingly interesting, as there will be at least four specially-built racing cars taking part in the trial. The Napier cars are being

built suitable either for racing in Ireland or for the picked roads of France, as, of course, it is still doubtful where the race will be run next year, though the probabilities point to France. Since the above was written we have been informed that the Wolseley Co.'s proposition to put in a car for the race has been withdrawn so far as the Gordon-Bennett contest is concerned, though the company will enter Wolseley vehicles for races on the Continent during the year.

### The 1903 Reliability Trials.

It will be seen from the conference reported elsewhere that the regulations for next year's reliability trials embody many of the practical improvements which we and others have suggested from time to time. These trials will unquestionably be the most interesting which have ever been held by the club, as nothing whatever will be permitted to be done to the cars except during their running time and while actually on the road. Even the operation of filling up the tanks with petrol and water will have to be performed after the cars have been officially started on their day's run. At the same time, it will be necessary to take some special precautions to prevent abuse of the replenishment rules. If this is not done, some competitors may obtain a misleading advance on others, and stops for refilling should be recorded entirely separately from those for repair or adjustment of the machine.



Lord Pirbright's 12 h.p. Dennis car. This is one of Messrs. Dennis Brothers' new models, and is known as the Pirbright pattern. It has been built to the order of Lord Pirbright, and is driven by a 12-14 h.p. two cylinder engine. The gear-box is large, and big wearing surfaces are provided, and the drive is direct when running in the top gear. The power is transmitted from the change speed gear to the rear live axle through universally jointed arborshaft and bevel gear. The bevel gearing is also specially large to provide against wear. The car has five brakes, three of which are operated by two pedals, while the two back wheel brakes are worked from the side lever as usual. The tyres are Goodyears. The body is built throughout of aluminium, and is painted and upholstered in Lord Pirbright's colours. The car is very quiet and smooth in running, this feature being largely due to the new Dennis governor. In appearance, as will be seen from the illustration, it is a decidedly handsome vehicle. It was driven in the Oxford run of the Automobile Club recently, and was one of the three cars of the same make which earned non-stop diplomas.

## USEFUL HINTS AND TIPS.

Referring to the compression relief device illustrated in *The Autocar* of November 29th, page 548, a correspondent (Mr. R. Lord) suggests that an improvement might be made in this. The idea is to cut a slot down the side of the screw valve B, making this the vent in place of the hole C. To carry out this idea would necessitate the fitting being made much larger, as the diameter of the screw would have to be enlarged considerably to leave it sufficient strength after the slot had been cut. We give our correspondent's idea to our readers as we are aware that many of them are having this or a similar device fitted to their engines.

Happily, steering gears are not now so prone to give way as they were a few years ago, but should any of our readers be so unfortunate as to have a distance rod of the steering gear come adrift, the following tip may be of use: Failing any temporary repairs, the car should be turned round by manual aid, and the front wheel which is not connected to the steering wheel should be lashed up to prevent its turning athwart the car. The vehicle may now be driven slowly backward, steering by the one wheel, which now becomes a trailer. This method is, of course, bad for the tyre of the hind wheel, and should only be resorted to when a repair can be effected within a couple of miles or so.

The necessity for sufficient lubrication and frequent washing out of a new engine is so impressed upon beginners by the maker or agent who sells them their first car that some are inclined to overdo the thing. For the first 500 miles or so it is desirable to introduce a fresh charge of oil into the crank chamber every forty or fifty miles or so, or according to circumstances, having previously drained off the old oil. It is also advisable to wash out the crank chamber with petrol or paraffin after running about 150 miles. If paraffin is injected into the cylinder for cleaning purposes it is as well to use a little petrol afterwards to clear away the paraffin, otherwise some difficulty may be experienced in starting up, and a carbon deposit will be formed by the remaining paraffin. For these reasons it is as well, perhaps, to use petrol alone for cylinder clearing purposes, confining the heavier oil to uses within the crank chamber.

The owner of a new vehicle should be most careful to examine closely the nuts and bolts all round the car, either before going out or after returning from a run. No matter how firmly the nuts and bolts may be tightened up at the time of erecting the car, the vibration met with upon the road will be almost certain to loosen some of them, and if these are not attended to an accident may easily occur. We have on more than one occasion noticed a curious fact in connection with this. In cases where two or more pieces of metal have been bolted up together by one or more bolts—the nuts of which have been pinned—it has been found that, after some few miles have been covered, these bolts have been loosened sufficiently to be capable of being given an eighth of an inch turn before they

are tight again. There are, of course, circumstances which would explain this, but they are beyond the scope of this page.

Owners who put their autocars away for the winter should make a point of removing the tyres from the wheels, cleaning away from the rims any rust that may have formed, and varnishing the rims with a good hard drying varnish free from oil. It will be found good policy to have the tyres overhauled and put into apple-pie order at once, so that any repairs which may be found necessary will have plenty of time to season whilst the car is at rest. The covers should be thoroughly scrubbed free of all dirt, and after being dried should be examined for traces of wear or cutting. If the repairs necessary are beyond the skill of the amateur repairer, it is a good plan to send the tyres to their makers with an intimation that they are not required back in any hurry; the makers will then give more deliberate attention and more careful treatment to the requisite repairs than if they supposed that the utmost celerity was desired in returning the tyres to the owner. Tyres that are not in any need of repair should be thoroughly scrubbed with water, and after being dried inside and out, the covers should be coated inside with blacklead or French chalk and hung up in a dark place. A cool storage is better than a hot dry place for indiarubber. Air-tubes having been examined for possible flaws, and, if necessary, repaired, are best preserved by being inflated just sufficiently to make them assume perfect rotundity; they should then be hung up in that inflated condition. Spare tubes should be unpacked and similarly treated.

Loss of compression is occasionally a source of considerable worry to the amateur automobilist. In a solid-headed cylinder he will, of course, at once look first to his sparking plugs, porcelains, and copper washers to see if the leak is there, and next to his valves. The latter may either be stuck up or require grinding in, although gradual and not sudden loss of compression will signal the necessity for the last-named operation. The turning of piston rings so that cuts are in line may account for loss of compression, and if this be the case, cylinder or cylinder head must come off in order that the rings may be turned so as to break joint with each other. Should attention be given to all these points, and the loss of compression continue, it would be well to do as did a man suffering in this wise only the other day. He scraped the carbon deposit off the top of his piston, and found that the crown thereof was cracked. Many piston rings, however, are prevented from turning in their grooves by having a hole drilled through them at the slit; into this a stud screwed into the piston engages. This arrangement does not in any way affect the action of the ring.

The provincial council of Chieti has unanimously adopted a project of automobiles for transport, railways in the province of the Abruzzes being very few and far between.

## THE DE DION - BOUTON THREE - SPEED GEAR.

The accompanying lettered drawings, illustrations, and description describe the method by which Messrs. De Dion-Bouton obtain three forward speeds and a reverse, while still retaining their now well-known duplex expanding clutch, which, providing two speeds and a reverse, has hitherto been fitted to all their cars from  $4\frac{1}{2}$  h.p. upwards. The present three-speed gear is fitted to the cars of 8 h.p., but the gear case in which it is enclosed occupies a similar space to that of its predecessor.

The gear combination is easily comprehended, by reason of its simplicity and freedom from complications. On the mainshaft A, fig. 1, which is connected to the engineshaft, and rotates at the same speed, are carried the two toothed pinions K K and

with the internally cut teeth on the right-hand and smaller ring  $B^1 B^1$  of the loose gear wheel K K.

The three speeds and the reverse are obtained by the actuation of the horizontal clutch lever common to De Dion cars and by the manipulation of a smaller lever moving on a three-notch sector placed on the steering column below the steering wheel.

First speed. The operations to obtain the first speed are as follow: Move the small lever just mentioned to the first notch, that on the extreme right, and push the gear lever forward. These movements cause the pinion B to mesh with the toothed ring  $C^1 C^1$  on the clutch box C C, and to expand the clutch within the box, so that the countershaft E E is driven thereby.

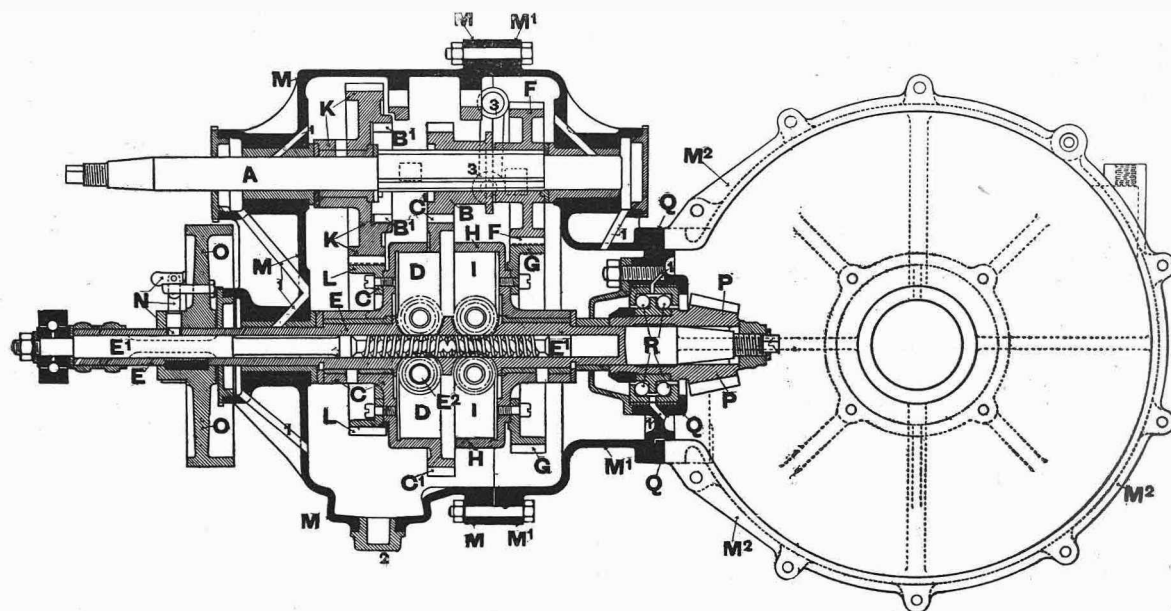


Fig. 1.—Longitudinal vertical section of the De Dion three-speed gear.

- A, mainshaft rotating at the same speed as engine-shaft.  
 B, sliding sleeve toothed pinion shown engaged with toothed ring  $C^1 C^1$  on countershaft, clutch box C C giving first or low speed.  
 $B^1 B^1$ , internally toothed ring part of toothed wheel K K.  
 C C, third (fast), first (low), and reverse speed clutch box.  
 $C^1 C^1$ , toothed ring on clutch box C C.  
 D D, expanding clutch conveying drive from clutch box C C to countershaft E E.  
 E E, hollow countershaft.  
 $E^1 E^1$ , change speed rack within the hollow countershaft, and serving by in and out rectilinear movement to expand and withdraw clutches D D in a manner so that when D D is expanded I I is withdrawn, and vice versa.  
 F F, toothed pinion fast on mainshaft A, and meshing with toothed ring G G on clutch box H H giving second speed.  
 H H, second speed clutch box.  
 I I, expanding clutch conveying drive from clutch box H H to countershaft E E.

FF, as in the two-speed gear, save that K K runs loosely on the shaft A, while FF is fast thereto. Between these two toothed wheels is a sliding sleeve pinion B, which revolves as one with the shaft A by means of three feathers thereon. By means of a striking fork 3 3, figs. 1 and 2, actuated from the steering-pillar by the driver, this sliding pinion B can be moved to three positions on the shaft A—(1) in which it is thrown into mesh with  $C^1 C^1$ , the toothed ring on outside of the clutch box C C; (2) when it is moved to the left until it stands clear between the wheels  $C^1 C^1$  and K K; (3) when moved still further to the left until its teeth are engaged

- K K, toothed wheel loose on mainshaft A, but when clutched to same by introduction of sliding pinion B into teeth of internally toothed ring on toothed wheel K K serves to convey drive from mainshaft A to clutch box C C through toothed ring L L on clutch box.  
 L L, toothed ring bolted to clutch box C C, and forming with  $B^1 B^1$  and K K the third or high speed train.  
 M M M, forward portion of gear box.  
 $M^1 M^1 M^1$ , rear portion of gear box.  
 $M^2 M^2 M^2$ , differential gear case.  
 N, plunger bolt to prevent change speed rack  $E^1$  turning in countershaft.  
 P P, bevel pinion on end of countershaft E E; driving bevel wheel on differential gear box, not shown.  
 Q Q, disc carrying double ball bearing.  
 R, double ball bearing carrying tail end of countershaft E E.  
 1, lubricating oil channels.

Second speed. The small lever is allowed to remain in whichever notch it may be, and the clutch lever is drawn back, so as to expand the clutch I I in the clutch box H H. The drive from the mainshaft A is then conveyed to the countershaft E E through the toothed wheel F F, which meshes with the toothed ring G G, firmly bolted to the clutch box H H. As the expansion of one clutch contracts the other, the clutch D D in the clutch box C C is withdrawn from contact with it, and as the sliding pinion B on the mainshaft A only drives the gear connected with the left-hand clutch box, its position can be disregarded when

the clutch lever is drawn right back by the driver.

Third speed. The small lever is moved to No. 3 notch (extreme left), which causes the sliding pinion B to engage as a positive clutch with the internally-toothed ring B<sup>1</sup> B<sup>1</sup> on wheel K K, so that K K is caused to rotate at the same speed as the mainshaft A. Then the clutch lever being pushed forward, the clutch D D is expanded until the countershaft E E is driven thereby through the pinion K K, positively clutched to shaft A, and the toothed ring L L, bolted to left of clutch box C C, the teeth of which ring mesh with the teeth of pinion K K.

The reverse. The clutch lever is moved to its middle position, when neither expanding clutch is

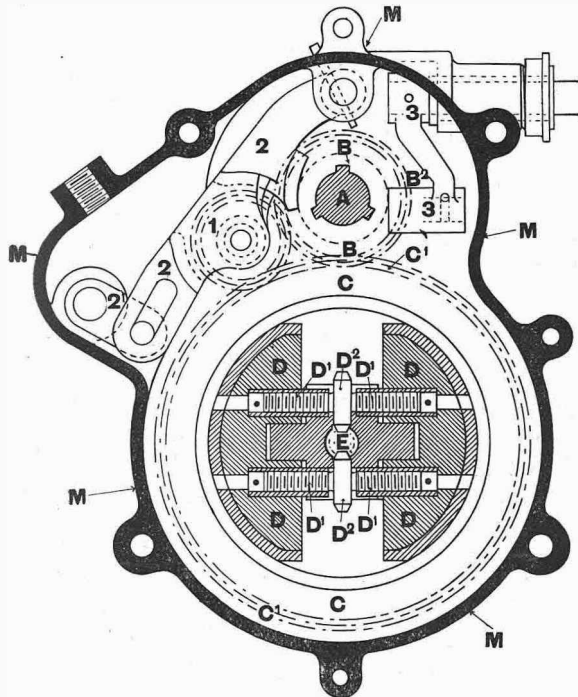


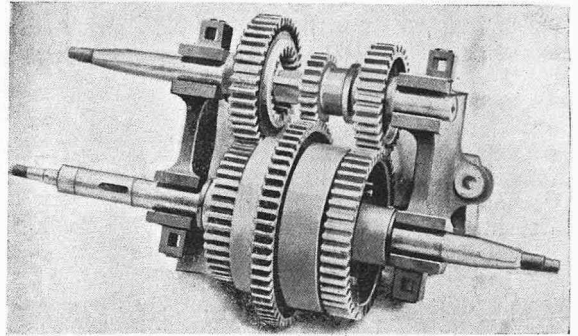
Fig. 2—Transverse section of the De Dion three-speed gear.

- A, mainshaft with three pinions.
- B, pinion and sleeve sliding on A.
- B<sup>1</sup>, flange on sleeve of sliding pinion B held between slot in central piece of boss end of lever 33.
- C C, third (high), first (low), and reverse speed clutch box.
- C<sup>1</sup> C<sup>2</sup>, toothed ring on clutch box C C.
- D D D, expanding clutches conveying drive from clutch box C C.
- D<sup>1</sup> D<sup>2</sup> D<sup>3</sup>, screwed spindles expanding and withdrawing clutches D D D.
- D<sup>2</sup> D<sup>3</sup>, toothed pinions rotating spindles D<sup>1</sup> D<sup>2</sup> D<sup>3</sup>.
- E, change speed rack rotating pinions D<sup>2</sup> D<sup>3</sup>.
- M M M M, gear box.
- 1, reversing pinion thrown into mesh with sliding pinion B and toothed ring C<sup>1</sup> C<sup>2</sup> (see fig. 1), by actuation of levers 2 and 2<sup>1</sup>, and giving reverse speed.
- 33, lever with slotted rotating centre piece in bossed end, by which sliding pinion B is moved laterally on mainshaft A.

in contact with its box, and the small lever is then moved to the No. 2 or central position in its sector. This causes the sliding pinion B to slide on the shaft A to a position between the wheels C<sup>1</sup> C<sup>1</sup> and K K, but neither meshing with the former nor clutching with the latter. Upon the reversing lever being turned over, the double width pinion 1, fig. 2, rotating freely on a stud on the rocking arm 2, by the movement of the lever arm 2<sup>1</sup>, with which the reversing lever is connected, is caused to engage with both the pinion B and the toothed ring C<sup>1</sup> C<sup>1</sup> on clutch box C C, so that when the clutch

D D is expanded by the forward movement of the clutch lever the countershaft E E is rotated in a direction opposite to that in which it has been driven by the three first-described combinations, and the car is driven backwards.

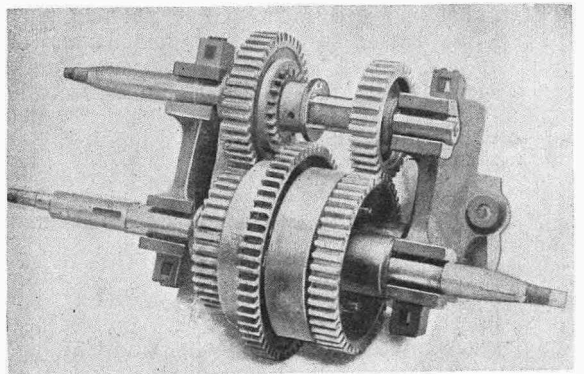
This arrangement of the De Dion gear enables the driver, when driving on his second speed, to



The position of the gear on the slow speed. Note the internal teeth on the left wheel on the top shaft.

prepare for the speed upon which he desires subsequently to drive the car. Thus, presuming the car is running on its second speed, the driver can move the small lever to notch 1 if he finds that he must presently come down to his first, or to notch 3 if he perceives that his third speed can next be taken. Again, being stopped in a block of the traffic, he can move the small lever to notch 2 on the sector and turn over the reversing lever, and he is ready to go astern immediately by thrusting the clutch lever forward; or to go forward on his second speed by drawing the clutch lever towards him.

The positions of the clutch lever with this new three-speed gear have the following effects: Drawn back, the drive passes through the second speed gearing; thrust forward, the drive passes through the first speed or the third speed, according to whether the small lever is in notch 1 or 3 of its



The high speed in operation. The slow speed pinion is entered into the left wheel on the top shaft

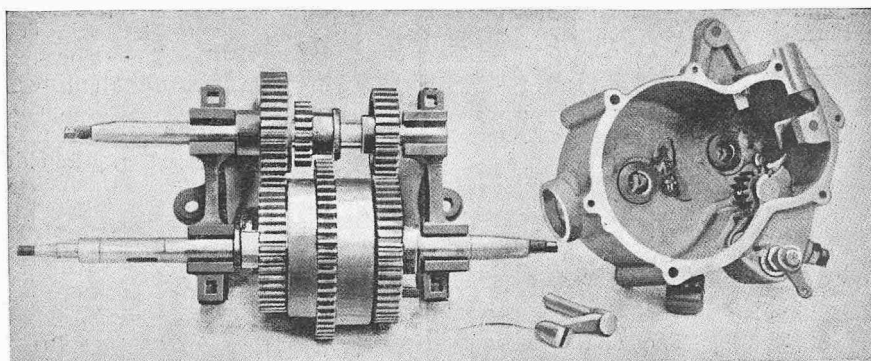
sector; and through the reversing gear when the small lever is in notch 2, and the reversing lever is turned over.

Turning again to fig. 1, it will be seen that the countershaft E E is hollow, and is so made to provide for the accommodation of E<sup>1</sup> E<sup>1</sup>, the change speed rack which is connected by suitable means to the clutch lever referred to above, and thereby

moved in and out of the gear case, so that the coarse-pitched square thread marked  $E^1 E^1$  thereon serves as a rack to rotate the pinions, shown by circles, in mesh with same, and also when rotated itself to adjust one or other or both the expanding clutches DD II in relation to the inner surfaces of their respective clutch boxes. In order to prevent the change speed rack  $E^1 E^1$  from rotating when in use, two slots are formed on opposite sides thereof, as shown by dotted lines, and into whichever of these slots is uppermost the locking-bolt N drops. The bolt N can be raised clear of the slot with which it is engaged by the pivoted lifting trigger at its upper end, whenever it is necessary to rotate the change speed rack  $E^1 E^1$  for the adjustment of the clutches.

It will further be seen that the gear box  $MM^1 M^1$  is in two parts, which are flanged and bolted together. The differential gear case  $M^2$  is with  $M^1$  also flanged and bolted together, but the bolts are not shown in either of the figures presented.

The right-hand end of the hollow countershaft  $E E$  runs in the double ball bearing R, and beyond this bearing carries the driving bevel pinion P, which is drilled taper, and is secured to the tapered



General arrangement of the De Dion three-speed gear and reverse. The reversing pinion is seen in the gear-box to the right. The middle gear is in operation.

end of the countershaft by the large nut shown. Feathers formed on the tapered end of the shaft prevent the pinion from turning thereon.

The double ball bearing R is carried in a circular-shaped disc Q Q, the exterior flange of which is secured between the flanges of the right half of the gear box  $M^1 M^1$  and the differential gear case  $M^2 M^2$ .

By the above description and the accompanying diagrams with their lettered references, we trust we have been able to make clear to the non-technical the simple yet ingenious and effective means by which Messrs. De Dion-Bouton have added a third speed to their well-known two-speed expanding clutch device, which has done such good service and been so thoroughly appreciated in connection with their lower-powered cars.

### A BALLOON HUNT.

An interesting experiment, organised by the Aero Club, took place on Saturday afternoon, to test the ability of motor cars to follow the flight of a balloon. An ascent was made from Prospect Park, Reading, at one o'clock, with twelve cars in attendance, which immediately started in pursuit. The balloon disappeared speedily in the clouds, and on attaining a height of 4,500 feet the aeronauts—Mr. Butler, Mr. Bucknall, and the Hon. C. S. Rolls—found themselves in brilliant sunshine and genial warmth. There was a clear, deep blue sky, and some magnificent effects were photographed as the balloon soared above the clouds. But during the passage through the clouds  $14^{\circ}$  of frost were registered, and the ropes of the car became frozen. Finally, at three o'clock, the balloon came down near Pewsey, on the borders of Salisbury Plain, eight miles from Salisbury. Two cars were present near the descent, those of Messrs. Mayhew and Clift, and their occupants reached the balloon with considerable difficulty, being compelled to run across ploughed fields and ditches, and also to negotiate a quantity of barbed wire. Seeing that the balloon was above the clouds for over an hour, its capture must be accounted a capital bit of work, and the prize of fourteen guineas was awarded to Mr. Mayhew, who drove a 24 h.p. Pascal. The majority of the other cars which had participated in the competition went to Marlborough and Devizes.

In connection with this event, Mr. A. H. East's 9 h.p. Speedwell car performed exceptionally well,

especially when compared with the larger vehicles which joined in the chase. In fact, Mr. East's car was the smallest one competing. He ran with the others to Newbury, but, noting the direction of the wind, he calculated the balloon would settle near Amesbury, on Salisbury Plain, which afterwards proved correct. He therefore made for Amesbury, and arrived before 3.30, and reconnoitred the district, hoping to see something of the quarry. It eventually transpired that the balloon settled five miles away. Mr. C. W. Bersey, with his 12 h.p. Panhard, joined Mr. East at Amesbury, having passed the spot where the balloon alighted. Mr. A. J. Dew, managing director of the Speedwell Motor and Engineering Co., drove Mr. East's car.

Last week we stated that in future Messrs. Lea and Francis, of Piccadilly, W., would act as Mr. Charles R. Base's West End agents. We are now given to understand that other arrangements have been made.

\* \* \*

The Chevalier René de Knyff is very much impressed with the absolute fairness of the judges and other officials in the recent reliability trials, as the awards have proved to him that the English judges performed their duties without allowing themselves to be influenced by considerations of friendship or nationality, and simply regarded each car upon its merits and actual performances in the trials.



## THE TIMKEN ROLLER BEARINGS.

When new, well made, and well fitted, it is known that for automobile work roller bearings are everything that is desirable, and nothing has stood in their way hitherto save the impossibility of adjusting them when their containing collars, or races, or the rollers themselves become worn. From the other side of the Atlantic, however, there comes to us, through the Automotor Accessories Co., of 23, Southampton Row, High Holborn, W.C., a specially-constructed bearing of this character, known in the States as the Timken roller bearing. The design of this bearing as applied to the hubs of steering wheels is clearly shown by figs. 1 and 2 given herewith. Referring first to fig. 1, which is a partly sectional elevation of the steering wheel hub, on the inner end of the steering axle H, which is machined from the solid bar, case-hardened and ground, is fast fitted the roller race D, while at the outer end the roller race E for the outer set of rollers is made a tight sliding fit over end of steering axle. The cases, or outer roller races, are formed by the coned portions of the axle box A A. The inner flange B and the outer flange C, forming the nave of the wheel for the reception of the spokes, are stamped from steel plate B, being brazed to the axle box A A and C made a tight fit over reduced outer diameter of same, and bolted up to B by the bolts shown. The use of these stamped flanges produces a light strong hub. The

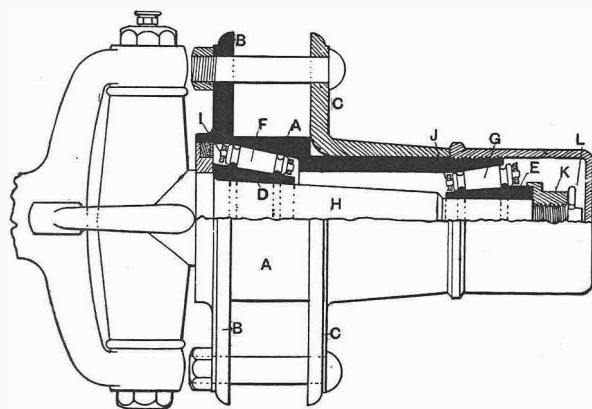


Fig. 1.

- |   |  |
|---|--|
| A A, axle-box, upper portion, in section. | G, outer tapered and collared rollers. |
| B B, inner flange.                        | H, steering axle.                      |
| C C, outer flange.                        | I, distance rings to inner rollers.    |
| D, inner fixed bearing cone.              | J, distance rings to outer rollers.    |
| E, outer adjusting bearing cone.          | K, adjusting nut.                      |
| F, inner tapered and collared rollers.    | L, cotter-pin.                         |

outer end of the hub is sealed against the ingress of dust and grip by a dust cap screwing on to the axle box A A. The inner end of the box is also made dust and grit-proof and oil-retaining by a closing ring carrying a felt washer. The tapered, grooved, headed, and titted rollers F and G are held in position with relation to each other by the dividing ring cages I and J. The tits (or pins) in the ends of each roller rotate in holes drilled in the rings, which the rollers carry round with them as they rotate on their cones. These rings serve to keep the rollers true and prevent all wedging. When wear takes place, the adjusting nut K is screwed up

against the outer adjusting bearing cone E, and the slack, if any, is thereby taken up equally between the two sets of rollers. The bearing cannot be adjusted too tightly, as the adjusting nut K screws up hard against the shoulder of the steering axle H. When further adjustment is required, a thin steel washer is inserted with the recessed face of the nut, and thus the farther necessary inward travel of the adjusting bearing cone E is obtained. The cotter-pin L, inserted through a slotted hole in the end of the steering axle, locks the adjusting nut L into desired position.

In fig. 2 the method of placing the rollers is more clearly shown, particularly the rings as at I and J, which, it will be noticed, are distanced by studs placed between the rollers.

The above description will allow the adaptation of the Timken rollers to the bearings of live axles to be grasped without further remarks. We understand that these bearings have been taken up by the London General Omnibus Co., and if they work successfully on their heavy vehicles they should be particularly well adapted for autocar work.

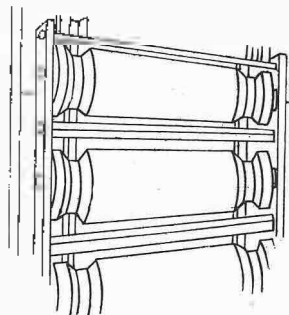


Fig. 2. Showing the method of caging the rollers.

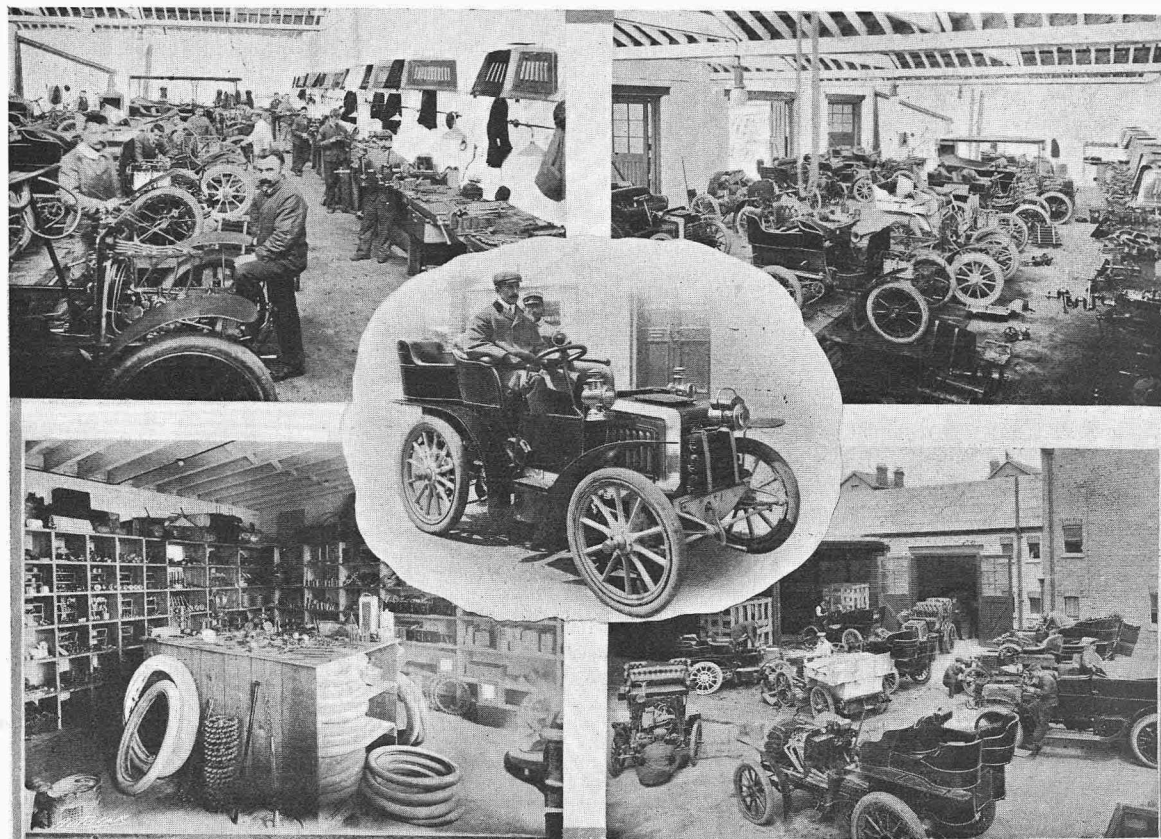
## PROPOSED TRIAL OF LIGHT DELIVERY VANS.

On the 4th inst., at the Automobile Club, under the chairmanship of Mr. Roger Wallace, K.C., a conference was held between users and prospective users of motor delivery vans, and motor manufacturers who are supplying or who are contemplating supplying such vehicles. Among the firms who are users or probable users of motor vans the following were represented: Bryant and May, Debenham and Co., Haymarket Civil Service Stores, J. J. Coleman, Spicer Bros., Ltd., Star Newspaper Co., Morning Leader, Norfolk News Co., Ltd., Swan and Edgar, W. H. Smith and Son, Whiteleys, Ltd., Road Carrying Co., and General Post Office. It will be seen from this that a number of important firms are very much interested in the question. The representatives of several spoke of their satisfactory experiences with motor vans. After they had recited their experiences and requirements it was proposed by Mr. Edge that the trials should take place over a period of not less than three months at the end of 1903 or at the beginning of 1904. This period was suggested partly to give the manufacturers plenty of time to make their vehicles, and also to demonstrate to prospective users that the vans could be run in the worst of weather. Mr. Burford pointed out that if the trials were carried out by vans being used by various commercial houses it would be difficult to make it a fair one, as one user might try his cars much less severely than another. Mr. Shrapnell Smith proposed, and it was unanimously resolved, that it is desirable to hold a trial of motor delivery vans, and that there should be four classes:

- (1) Vehicles designed to carry 5 cwt. or under.
- (2) Vehicles designed to carry  $\frac{1}{2}$  ton or under.
- (3) Vehicles designed to carry 1 ton or under.
- (4) Vehicles designed to carry 2 tons or under.

We understand from Messrs. Milnes, Daimler, Ltd., that the Mercedes Simplex car will only be manufactured for 1903 in three powers—18 h.p., 28 h.p., and 60 h.p. They tell us the 40 h.p. and 20 h.p. will be dropped, and that the 8 h.p. four-cylinder car is no longer being built.

## THE PANHARD-LEVASSOR REPAIR WORKS.



The fitting shop.

Mr. W. A. Turpin, the works manager, and his foreman, testing a 7 h.p. Panhard.

A corner of the stores.

The erecting shop.

Final adjustments in the garage yard.

When Messrs. Panhard and Levassor (London) set about importing the famous cars of the equally famous French firm whose name they bear, they resolved that their English clients should be at the least possible trouble for repairs or replacements to their vehicles when they require attention.

Accordingly, some particularly suitable and accessible premises have been acquired in the Kimberley Road, Willesden Lane, which is a turning out of the Edgware Road between the London and North Western Railway's Kilburn and the North London Co.'s Brondesbury Stations, both of which are near. Frequent omnibuses from the Marble Arch pass the end of Willesden Lane, Kimberley Road being but a few steps down the former. The repair shops, which are substantial, well-lighted, brick buildings of the usual factory type, already occupy an area of 10,000 square feet, and are provided with a long pit (over which a score or so of large cars can stand at a time) running the whole length of the building. The premises are lighted throughout with electric light produced on the premises, portable torches being provided for the pit work. Four superior American lathes (two fitted with millimetre screw-cutting gear), several drilling machines of the best class, and other machinery specially selected for the work done here are installed. Along the walls run benches equipped

with the usual vices. A particular system is adopted with relation to each vehicle as it enters the extensive yard. First, a numbered inventory card of all the car contains or carries is made out, and this is as carefully checked through when the vehicle is returned to its owner. A repair card setting forth exactly what is required to be done is then attached to the car for reference and checking again at the end of the job. No Panhard owner can appeal in vain at Kimberley Road for a part for his car, no matter the date or pattern of the vehicle, and this an examination of the stock room amply assured us. Parts were there stored from engines and gears to the smallest item to the value of over £5,000.

Matters were a trifle slack at the time of our call, it being made on a Friday, but even then fifteen cars were in hand for various repairs. The noted 70 h.p. Panhard which Mr. Jarrott drove to victory was at the time in for a fresh clutch leather, and the re-examination of this leviathan of the road lent interest to our visit. During the past year from 800 to 900 cars have been into these works for some purpose or other, and the energetic works' manager, Mr. Turpin, assured us that in connection with them some very heavy jobs, such as taking down engines and replacing gears, had been effected.

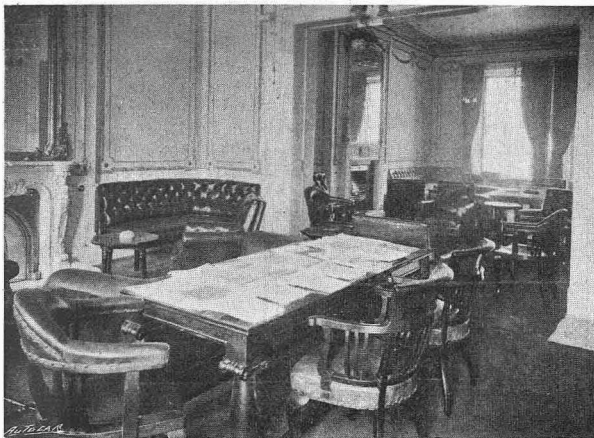
An extensive fully-equipped and well-arranged

charging room occupies one corner of the works, and the automobilist may have his accumulators charged here with the utmost despatch.

So great has been the press of work that an extension of the present shops to cover an area of another 12,000 square feet is almost completed, and

in the new portion coach work, painting, and wheel making will be carried on. The work done here is not confined to Panhard cars, the large Anglo-French staff employed numbering men well acquainted with all the leading systems of automobile construction.

### THE AUTOMOBILE CLUBHOUSE.



*Campbell & Gray, Photos,*

The reading room.



The writing room.

17, Cheapside E.C.

Last week we gave an illustration of the dining-room at the new premises of the Automobile Club, 119, Piccadilly. The clubhouse, which was taken over last spring,



The vestibule.

was at one time the residence of the widow of the fourth Earl and first Marquis of Cholmondeley, and has at a considerable expenditure been converted into a clubhouse. It not only provides comfortable headquarters for the members, but also accommodates the large clerical staff which is required to carry on the work of the club. Large livery stables have been acquired at the back of the premises, and several thousand pounds will be spent in adapting them for the storage of the cars of members; and in these buildings bath-rooms, dressing-rooms, a small gymnasium and mess rooms for members' mechanics, as well as a workshop and inspection pits will be installed. Herewith we give three more illustrations of the interior of the clubhouse.

The writing-room, which is a most cheerful, convenient, and luxuriously-appointed apartment, like the smoking-room, overlooks Piccadilly and the Green Park from two windows, is panelled as to the walls in white and gold, has heavy green pile drugget on floor, and is furnished with four fully-equipped morocco leather-topped writing tables. Here members can conduct any correspondence they may have in comfort and seclusion. The vestibule, with glazed telephone closet under main staircase, strikes the keynote of this establishment as it is entered from the outer hall. From it the main staircase leading to the upper rooms is gained, and the dining-room and ground floor lavatory entered. It is provided with a handsome and comfortable lounge, oak chairs, etc. The smoking and reading-room, with its three large windows and balcony giving on Piccadilly and the Green Park, is, as it should be, the best room in the house. It stretches from back to front of the building, is beautifully panelled in white and gold, its floor is covered with a heavy pile carpet and most comfortable lounges, and arm-chairs abound. It has a special still room off the passage at the back from which teas and drinks are served, and is, of course, provided with the automobile literature of the world. Its walls still await the hanging of many valuable automobile pictures, the gifts of Sir David Salomons and other members.

Incidentally, it may be interesting to mention that the Automobile Club is now the largest motor car club in the world, the total number of members being 2,180.

## Correspondence.

### THE A.V. WORM DRIVE.

[2699].—We notice in last week's *Autocar* on page 575 a short description with reference to our motor bicycle. I think it unfair to make a definite statement of what is not true, as it is distinctly stated that the "*Accles-Veuille worm drive having been found impracticable*," etc. The worm motor bicycle has been running from Coventry to Birmingham several times—in fact, it is now in my possession, and I can prove by demonstration that it will be a success. It would take too long to explain in writing what is keeping it back for the moment. Representatives of two of the largest firms in Coventry have seen it on the road. You have also excluded my name as one of the patentees.

WM. STARLEY.

### MECHANICALLY-OPERATED INLET VALVES.

[2700].—Mr. Edge is incorrect when stating cylinder heads must be made heavier for M.O.V.: again, one cam-shaft only is necessary for both exhaust and inlets. Additional cams and moving parts become unavoidable, but against this disadvantage we may balance certainty of action, which in all A.O.V. is a matter of considerable variation with the M.O.V. Necessity for delicate adjustment of spring to that proper compromise between two wrongs is dispensed with; weakening effects of exposure to heat—which, if the engine does happen to run hot through accident or pump failure, quite upsets proper tension—are eliminated; sluggish working of valves through oil or other foreign matter round the stem clogging same or valve seating is overcome; and refusal to act after engine has ceased running and cooled down is impossible.

The Napier three-port valve I believe to be the most efficient A.O.V. when working perfectly, on account of lightness of moving parts and area of aperture combined with short lift; but it possesses a distinct disadvantage also. Suppose one tends to stick or stay behind from any cause. (We are entitled to suppose this with any A.O.V.) Immediately suction draws the two others from their seating; suction itself is relieved from that which hangs; the two working valves lose their short lift, unless provided with stop; and badly working valve probably gets worse, or remains wrong for an indefinite time.

Mr. Edge states that the puffs are caused by the rebound. This is only true in a very small degree. That part of the puff arising from this cause is in itself so inappreciable that only a slight pulsatory movement is given the smoke from an extinguished taper. The puff back from a late closing valve (and we have yet to determine whether an A.O.V. with spring correctly set is not such) is sufficient to extinguish flame and blow the smoke completely away. This is caused, I contend, solely through piston speed being greater than speed of valve travel, and consequent ejection of a certain quantity of the mixture. Experiment shows this cannot be avoided, using A.O.V. without loss of power following, too strong a spring being necessary. With M.O.V. the case is different; actual timing can take place at correct moment, and is the cause of increased power.

"Valves," in speaking of the M.O.V., is, I think, unintentionally misleading. Compared with the A.O.V., the M.O.V. does require lead, but in relation to moment of piston passing dead centre, it requires lap, the latter being the usual method of determination. If "Valves" means lead on that basis, he is wrong. The crux of the matter lies in so timing the rapid opening valve to fall so that the action shall commence the moment the unexpelled result of combustion shall have on the down stroke arrived at the normal atmospheric pressure, with exhaust closing at end of stroke and ejection. By rapidly moving piston some pressure will be manifest; only on reduction of this to atmosphere during suction stroke must valve open, or, as Mr. Morris points out, carburetted mixture in suction pipes and carburettor will be ejected, and negative work will be necessary in closing. The M.O.V. should rapidly seat from fall the very moment the inrushing gas overcomes the partial vacuum caused by the retreating but now returning piston, and endeavour to pass the valve port. Both the points are late in relation to dead points, but

not quite so late as with A.O.V. With the one we have little control, and can adjust only to a mean. While clean and working well, the A.O.V. is little inferior in power development to the M.O.V. With the other, we have a spring, the closing rate of which is greater than piston travel, which can be opened and closed with a properly devised cam to obtain very best results and certainty of action, though the valve may tend to stick. The best points for opening and closing vary somewhat according to rate. Against the M.O.V. we have additional parts certainly. The chief point seems objection on account of liability to derangement. There is one opening only. Additional weight may be neglected. Whether any real advantage is to be gained by adding M.O.V. to very small motors is questionable. Other points arise, which, with the editor's permission, I will mention later; otherwise, the small addition to actuate valve is less imposing than some state; and, after all, we have had in the past much less trouble, as motorists, with our actuated exhaust than our varying and somewhat troublesome—not to mention slightly less effective—automatic inlet.

Mr. J. W. Roebuck points out that some motors were constructed with M.O.V. in the early nineties, "so that recent discovery (?) of increased efficiency is rather late in the day"; and then goes on to state they were discarded through want of efficiency—a contradiction certainly—and had they proper cams?

W. J. TWIGG.

[2701].—Now that motors for bicycles with mechanically-operated valves are being supplied by me in large quantities, I should have been content to let the discussion about the theoretical advantages or otherwise alone until the trade and the public had had the opportunity of judging by practical experience, but that I feel Mr. Edge's letter requires a reply.

Foremost, I would make it clear that I am not qualified to enter into a controversy in regard to heavy horsepower engines, such as no doubt have been used by Mr. Napier in connection with his scientific researches, nor do I wish to take up your space by repeating the technical reasons which point to the advantage of the mechanically-operated inlet valve when used with small high-speed engines.

What I would like to emphasise is that the new device adopted on the 1903 2 h.p. standard Minerva has been subjected to the most exhaustive and comparative tests in the works and on the road; and before going to the great trouble and expense of redesigning our pattern, it was proved to our satisfaction that a material increase of power and of reliability in working was obtained by engines fitted with mechanically-operated inlet valve.

I should have thought that the manufacturers of the Minerva had already sufficiently shown that they understand their business, for Mr. Edge to await results before publishing a letter which might prejudice our new motor. Mr. Edge speaks of "the English trade being led away by possibly interested people." May I ask what other interest can have been in view, except an improvement in the engine? Talking of interested people, may I further ask whether it is not a fact that Mr. Edge is a director of a company handling a competing motor bicycle?

Finally, and although I had intended to have done with matches or challenges, I think Mr. Edge's criticism makes it interesting to compare the merits of motors for bicycles fitted with mechanically and automatically-operated inlet valve. I am, therefore, willing to match the 1903 2 h.p. Minerva 66 mm. by 70 mm. against any other motor of the same dimensions without mechanically-operated inlet valve; and as I do not want to restrict this challenge to motors having exactly the same dimensions, I am willing to meet motors of slightly smaller or larger bore and stroke, to be handicapped according to dimensions by recognised authorities. I am willing to agree to any stake up to £50, and to all reasonable conditions. One stipulation I would make. It is intended that this be a test of engines—not of motor bicycles, tyres, belts, etc.—therefore, all troubles arising from any cause except the engine would make the match void, and the result would only be counted after the competing engines had run the required distance without being stopped by outside troubles. This simply to prevent an interesting test being rendered inoperative by causes outside the apparatus than on its trial.

D. CITROEN.

[2702.]-I have read with interest the correspondence respecting the relative merits of mechanically-operated inlet valves v. automatic ditto, and am inclined to favour the former, but there are one or two points I should like to enquire about, viz.:

1. Does the M.O.V. allow more mixture to be sucked in, and if so, is it necessary?
2. Does the extra mixture enable the engine to give more power, seeing that with the extra charge there is more compression to be got over?
3. Assuming that more mixture is consumed, to what extent would it shorten a journey before extra petrol would be needed? and
4. What difference would there be in the cost of running, and would the extra power (if any) gained by a fuller charge by the M.O.V. compensate for any extra cost?

If one of your readers will kindly answer these queries, the information will be much esteemed by

J. WILLIAMS.

[2703.]-With these I have had some experience, and employed some interesting tests to arrive at their efficiency. On an 8 h.p. Benz single cylinder, by fitting the mechanical inlet and the Blake brush contact, I not only considerably increased the power but I made the motor in a way self-starting, even under very adverse conditions. With petrol at 700 s.g., I would set the mixture, etc., revolve the flywheel, place piston just on out stroke, then close mixture, and quite one hour after, with mixture replaced, I would start motor by simply switching on the spark. I did this in the presence of several witnesses, one of whom was the customer who bought it. I may add, these perfect results I never obtained with the automatic inlet. Upon other occasions, when I have had difficulty in starting the motor (before fitting mechanical inlet), I have frequently opened inlet by hand at curved point on out stroke, and it has started the first time. From these and other experiences I am of opinion that only such perfect results can be obtained with the mechanically-actuated inlet.

F. COVE.

#### KEEPING WARM.

[2704.]-I have found a fresh use for the motor car—to keep warm in cold weather. I believe I suffer more from cold than most people. It is quite painful for me to drive out when cold, and an east wind blowing. Some ten days ago it was very cold, with a bitter frost, and my wife suggested a motor drive. I was appalled, but inducements were held out and I succumbed. I put on a pair of shooting stockings and a pair of field boots, a pair of Dunhill's fur foot coverings, a Russian pony-skin coat, a cap with ears turned down, and goggles, and scarcely any part of my face was left bare; a pair of old dancing gloves, of elk calf, with hair outside over them, completed my costume. A fur rug, leaving my feet for the pedals, kept my knees warm. I came home warmer than I started, and all through this cold weather find that the motor is the warmest place except bed. The roads are lovely, and the country looks charming in the frost.

CALORIFER.

[The warm-blooded may smile, but we are convinced that a good many people would enjoy their motoring more and obtain still greater benefit from it if they followed our correspondent's example.—Ed.]

#### MOTOR CYCLE MATTERS.

[2705.]-In Mr. Wilson's valuable report in your issue of Dec. 6th, page 574, he considers our "large silencer wrongly placed where it will screen the engine from cooling."

In practice this does not occur, as the whole of the combustion head and half the diameter of the cylinder for its full depth are entirely exposed to the air draught, and in long test runs during the past six months we have never experienced the slightest tendency to overheating, although the cylinder is 70 mm. bore. Every detail of our engine has received much thought and exhaustive tests before adoption.

ROBINSON AND PRICE, LTD.

#### A BURST TYRE.

[2706.]-I have for the past three years driven cars with solid tyres, but am shortly to receive a car fitted with pneumatic tyres. A mishap which has recently occurred to a friend seems to give cause for some apprehension as to what may be to me the result of the change.

My friend was driving his Serpollet steam car fitted with Clipper-Michelin tyres, and had run down a hill, and was ascending a slight incline, when one of the front tyres burst with a considerable report. As the road was greasy, he feared to apply his brakes, lest the car should skid, but he shut off the steam, trusting that the incline would steady and stop the car. However, the car becoming unmanageable, ran into a telegraph post, upsetting the occupants on to the road siding, luckily without doing them serious injury. Now, an accident of this kind may, it would seem, happen to anyone, for the tyres referred to are, I take it, not more liable to burst than other pneumatic tyres. The tyre which burst had been transferred from a hind wheel to a front wheel. Possibly, it had lived its life. But the idea of such an accident occurring to one is unpleasant, and I would ask if any of your readers can suggest any way by which one could avert a catastrophe, and what way there is of knowing when a pneumatic tyre has arrived at that state when a burst is possible. I have ordered Collier tyres for my new car. Do they diminish the risk? ANXIOUS ENQUIRER.

[A tyre never bursts unless the air tube has been badly pinched in replacing it after taking off the cover, or unless the fabric or lining of the tyre is broken. The latter defect always makes itself apparent by irregularity in the shape of the cover, as when the strands commence to fail the cover becomes deformed. We are assuming, of course, that the tyres are reasonably suitable for their work, and are not, as has been the case frequently in the past, overloaded. When a back tyre bursts no difficulty in control is experienced, but unless driving at very high speeds on exceedingly treacherous roads no upset should take place if one of the steering tyres fails. In fact, we know of one extreme case in which the front wheel broke short off at the axle, and the car was stopped without an upset.—Ed.]

#### A DISCREDITABLE INCIDENT.

[2707.]-I am greatly in favour of motoring, both as a pleasure and as a useful means of transport of all kinds, and have endeavoured often to convert anti-motorists into my way of thinking on this subject. But how is the non-motoring community to look favourably on this means of locomotion when they read incidents of this sort in the papers.

Mr. Stevens, a veterinary surgeon, well known and respected in Reigate, where he lived, was riding on horseback from a professional visit, when he was met by a motor car, at which his horse shied, throwing its rider heavily to the ground. He was picked up by several persons, including the driver of the motor car, and carried into a house.

The motorist then rushed to his car, and, refusing to give his name and address, drove off in the direction of Brighton.

Now, sir, can anyone have a word to say in defence of this motorist's action in thus driving off, when he saw, as he must have done, that Mr. Stevens was dying?

How can motoring become popular with those who do not motor when such inhuman acts as the one I have described are practised? Is there nothing to be done? Surely this man cannot get off scot free, yet I do not see exactly how he is to be incriminated in any way even if he is caught.

The much-vaunted vigilance of the Surrey police in instances of offending or unoffending motorists coming in their way was not conspicuous on this occasion, when they might have done a certain amount of good by showing that the individual who is the cause of people's death, and then shirks the responsibility, cannot practise these tactics with impunity, in Surrey at least.

W. J. L.

#### SOLIDS V. PNEUMATICS.

[2708.]-In reply to "Blake's" query (2692) I beg to say that the solid tyres as fitted to my 10 h.p. Wolseley are 2in. Challiner.

A DEVON MEMBER A.C.



## A STEAM CAR IMPROVEMENT.

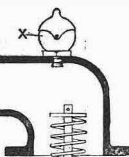
[2709.]—I have quite recently had Messrs. Strickland's superheater fitted to my Locomobile on the advice of Mr. Robert Cross, who kindly, in a letter published in your issue of about a month ago, recommended it. My car is not like the same now. It can average on good roads a speed of twenty miles an hour—and keep up full steam pressure at that—and the saving of both fuel and water is fully fifty per cent. There is absolutely no disadvantage with it; and I strongly recommend all users of the Locomobile to have it fitted.

C. C. YENDHAM.

## USEFUL HINTS AND TIPS.

[2710.]—This feature of *The Autocar* is certainly very useful to many amateurs. I would like to see a column or so devoted to suggestions by car users to manufacturers. There are many little details costing practically nothing, but which if added would be very convenient. For instance, take the lock nut which locks the platinum-pointed screw on the trembler coil. Why do not the makers put a thumbscrew about the size of a halfpenny instead of the lock nut, which needs a special thin spanner to get at it? I have a coil bought from the Myra people, and the contact is made in two parts, and when I want to unscrew it, the head screws off and leaves the stem. It has a small thin lock nut which cannot be got at without a special thin spanner. I have seen some coils fitted, as sketch, and they are very easy to adjust.

Another suggestion to makers of petrol motors: Where the inlet valve is covered with a dome, there should be provision for squirting petrol or paraffin on to the top of inlet valve. This would save the undoing of several joints and bolts in some cases. I saw a New Orleans two-cylinder car the other day on the roadside with one of its valves gummed up and stuck. To get at it necessitated undoing three joints on the inlet pipe, whereas, if there had been a small hole in the dome, petrol could have been squirted in and the valve stem pressed down with a nail or piece of thick wire. Of course, the suggestion is only for engines the valves of which are enclosed. I have fitted an Aster motor this way, and find it very convenient.



Petrol injector.  
helmet lubricator

An improved lock-nut.  
A A, nut in plan and section.

[In illustrating our correspondent's ideas, we have substituted a four-winged nut in the place of the milled thumbscrew he mentions. This is even a better form, as a better grip can be obtained with it than with an ordinary large diameter milled nut. Ed.]

WRENCH would be glad to have the experiences of any private owners of the 9 h.p. Progress car, particularly as to quality of material and reliability of changing system and general behaviour of the large single-cylinder engine.

A. BRYANT would be obliged if "Blake" or any other regular user of the Miesse car would give his experiences, particularly as to cost of upkeep, reliability, durability, simplicity, and range of car on one charge of water, and behaviour of burner.

S. A. SMITH expresses the opinion that the letter, "Some Hill-climbing Tests," published on November 22nd, page 525, is of little value, as no other car was tried against the 20 h.p. Wolseley.

C. JAMES notices that Wilkinson's treads appear to last very much longer with some users than with others, and asks for an explanation.

[In the letter signed "Blake" (2692) last week, the word Miesse in the last line should have been Morse.—Ed.]

We are compelled to hold over a number of letters through pressure on our space. Several answers to "Queries of General Interest" are also unavoidably withheld for the same reason.



A snap shot on an Irish tour of Mr. Frank Taylor driving his 6½ h.p. Weston steam car through the Scalp Pass, near Dublin.

Speaking at the annual meeting of the Dunlop Pneumatic Tyre Co., Ltd., on Wednesday, Mr. Harvey Du Cros, referring to the progress made by the company in the manufacture of tyres for automobiles, said the fastest piece of driving done by a motor car had been accomplished on tyres made by the company. It was very remarkable that the blue ribbon of automobilism—the Gordon-Bennett Cup—had been won on one set of tyres. Mr. Edge, of course, carried a spare set, but lost them in his "mad career," and had no tyres to replace those on his machine had anything gone wrong. A still more important trial was that organised by the Automobile Club of Great Britain—a contest for heavy cars extending over a distance of 3,000 miles. These trials extended over every imaginable kind of road in Great Britain. After finishing the 3,000 miles, the Automobile Club asked the competitors to continue another 1,000 miles. Of the six cars that finished, four were fitted with Dunlop tyres.

\* \* \*

A case was decided on November 20th at Newcastle-on-Tyne County Court which is of interest to automobilists and the motor trade, though relating to a horse-drawn vehicle. A coachbuilder lent a dogcart to a client while that gentleman's own vehicle was undergoing repairs. The coachman used the dogcart for his own purpose on one occasion without his master's consent, and allowed it to collide with a tramcar, causing damage to the extent of £22 18s. 6d. The coachbuilder sued the man to whom he lent the cart, but the judge gave a verdict against him on the ground that defendant's servant, in wrongfully taking the carriage out and damaging it, appeared to him to be doing a tortious act, in respect of which both plaintiff and the master had a right of action for damages. The Institute of British Carriage Manufacturers, who are advised that the judge has taken an erroneous view of the law, are seeking to appeal to a higher court. The council of the institute make a grant of twenty guineas towards this object, and appeal to the trade for further subscriptions. As very similar difficulties have happened, and will occur again, in connection with autocars, the appeal will be followed with interest.

## Flashes.

A report has been circulated to the effect that the Sultan of Morocco has forbidden the importation of motor cars into that territory owing to the fact that the car which he had met with an accident.

\* \* \*

Mr. S. F. Edge tells us there is no doubt whatever that Mr. Jarrott will drive a Napier car in the Gordon-Bennett race of 1903, provided he is fit and well, as he has already ordered his car for the cup contest.

\* \* \*

The Motor Cycling Club will run to Rickmansworth on the 14th inst., meeting at the Marble Arch at 10.30 a.m. The club will dine at the Restaurant Frascati on either January 13th or 14th, and the dinner will be followed by a discussion on motor subjects.

A New Zealand correspondent informs us that there are not many autocars in use in that colony yet, their prices and the cost of freight and duty (which is thirty per cent.) being much against their introduction.

\* \* \*

The Earl car, which is handled by the Great Central Garage, Ltd., of 300-306, Marylebone Road, London, W., recently made a non-stop run to Oxford, with its full complement of passengers on board, in 2h. 35m., the roads at the time being very heavy and muddy. We specially draw attention to this performance, as, owing to a clerical error in the announcement last week, a widely different impression would be conveyed.

\* \* \*

Last week the Portsmouth Bench distinguished themselves by fining a motorist for driving at twelve and threequarter miles an hour. To some extent they atoned for this achievement by dismissing a charge brought against Mr. J. A. Koosens, the pioneer motorist of the district, as although he was charged with driving at fifteen miles an hour, he was able to prove that he was not driving to the public danger, and had the car in perfect control. Incidentally, Mr. Koosens mentioned that he had, in his seven years' motoring, driven over 80,000 miles without an accident.

\* \* \*

The meeting which was called by Mr. E. G. Young, of Nottingham, to consider the advisability of forming a motor cycle club for the town and district was attended by a good number of motor cyclists, who decided that a club should be formed forthwith.

Messrs. Thévin and Houry, the editors of the "Annuaire de l'Automobile," will hold themselves at the disposition of any manufacturers or traders visiting the Paris Show. They are well known in French automobile circles, and are anxious to afford any information that may be required. Their address is 21, Rue du Louvre, Paris; telephone. 135-91; telegrams, "Automobile," Paris.

\* \* \*

On Boxing Day, the Sheffield and District Automobile Club will hold a paperchase. The hares will be given half an hour's law, and they and the hounds must keep within the legal limit, except just at the last moment, when, we presume, if the hare is in sight, no mortal breathing would be able to resist the temptation of putting the speed up to twelve and threequarter miles an hour to catch him. Entries should be sent in to Mr. J. R. Wade, hon. sec., 25, Storth Lane, Ranmoor, Sheffield, not later than December 18th.



A new British car. This machine, which belongs to Mr. W. A. Entwistle, C.E., is of 9 h.p., and was built by the Pitt Yorkshire Machine Tool Co., of Liversedge. The photograph was taken at the top of Standedge, one of the highest roads in Yorkshire over the Pennine range. Its owner informs us that it climbed to the summit at a speed very considerably above the legal limit with its full load of four passengers. The engine is nominally of 9 h.p., but has an ample reserve of power, and the mechanism generally is as accurately made and finished as the machine tools for which the Pitt Company are celebrated. It runs very silently, with little or no noise, and is very easy to control.

Great satisfaction is being expressed in Southport owing to the announcement that the spring speed trials of the Automobile Club will take place on the promenade of the Lancashire seaside resort. The Watch Committee have given their sanction to the use of the promenade, and will place every facility at the disposal of the club for carrying out their programme. Already Mr. Coop, a well-known local automobilist, has written to the *Southport Guardian* making practical suggestions in connection with the proposed trials. More than one north-western coast resort has been endeavouring to persuade the Automobile Club to patronise it for its spring meeting, but the Southport people say that all the rival claims have been gone into, and the suitability of its promenade has decided the question in its favour.

## THE SHOW QUESTION.

The following correspondence has passed between the secretary of the Automobile Club and the secretary of the Automobile Mutual Protection Association, Ltd.:

The Automobile Club, 119, Piccadilly, W.,

3rd December, 1902.

Dear Sir,—The Society of Motor Manufacturers and Traders have requested the committee of the Automobile Club to receive a deputation to discuss the show question. The committee in reply called the attention of the society to the following resolution made on Tuesday, April 29th last: "(18.) The committee of the club have been very anxious to assist the trade and the movement generally in this important matter of exhibitions, but they feel that they cannot with dignity continue to negotiate with a trade which is divided against itself."

The Society of Motor Manufacturers and Traders claim that they do represent the views and wishes of the trade as a whole, and that the trade cannot now be said to be in any way "divided against itself."

They claim that the society's exhibition at the Crystal Palace is supported by the entire trade.

Before further considering these representations, the committee would be glad if you would kindly favour them with your society's remarks on this statement and with the names of any companies or firms which are not associated with the Society of Motor Manufacturers and Traders, and which are not exhibiting at the society's exhibition at the Crystal Palace.

Yours, faithfully,

C. JOHNSON (Secretary).

Geo. R. Helmore, Esq.,  
Secretary Automobile Mutual Protection Association, Ltd.,  
88, Chancery Lane, W.C.

88, Chancery Lane, London, W.C.,

6th December, 1902.

Dear Sir,—I am in receipt of your letter of the 3rd inst., which I placed before the committee of this association at a meeting held here last evening. The committee desire me to say in reply that they regret that, in the matter of exhibitions, the trade is still in the same position as it was on the 29th April last, when the committee of the Automobile Club passed the resolution quoted by you in your letter. The position referred to consists of a

difference of opinion as to the date when and the place at which the automobile exhibition should be held. One section of the trade chose the month of January and the Crystal Palace, whilst the other section of the trade, which this association represents, chose the spring of the year and the Agricultural Hall. It has come about, therefore, that two principal exhibitions will be held. The committee of this association have no information with regard to the number of persons who will exhibit at the Crystal Palace exhibition, but what they do know is that over two hundred representative trade firms have taken space and will exhibit at the motor show to be held under the auspices of this association at the Agricultural Hall during the week from the 21st to 28th of March next.

Yours, faithfully,

GEO. R. HELMORE, Secretary

The Automobile Mutual Protection Association, Ltd.  
C. Johnson, Esq.,  
Secretary the Automobile Club, 119, Piccadilly, W.

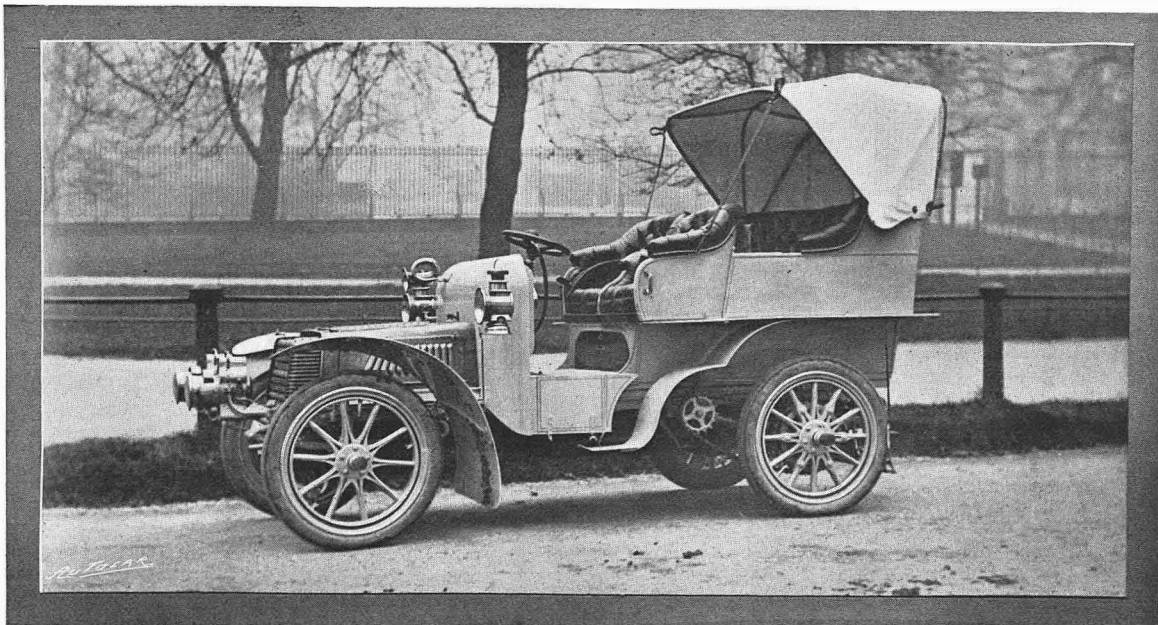
Mr. Mervyn O'Gorman has promised to read a paper on "Motor Cycles" during the winter session of the Automobile Club.

\* \* \*

In the Chancery Division, Mr. Justice Byrne on Tuesday made an order for the compulsory winding-up of the Monarch Motor Co.

\* \* \*

When we first saw the Baby Peugeot nearly twelve months ago, we were extremely pleased with the little machine, and expressed the opinion that it would meet the requirements of a large number of people who were looking out for a small side-by-side sociable at a comparatively low price, and after we had taken a drive upon it a few weeks later we were still more impressed with the possibilities of the car. We frequently have reports from users concerning the drives they compass, and the latest which has been brought to our notice is a run by a private owner, from Brighton to Scarborough, which was made without the slightest semblance of a breakdown.



This vehicle, a 12 h.p. Daimler, made by the Daimler Motor Co., and supplied through the Road Carrying Co. to Mr. Archibald Williamson, is probably the handsomest car which has yet issued from the Daimler works. It is fitted with an English Rothschild body of the tonneau de luxe type designed by Rothschild, of Paris, and with its light dust hood forms an extremely comfortable touring carriage.

## THE RELIABILITY TRIALS OF 1903.

Meeting of Manufacturers and Sellers at the Automobile Club.

The A.C.G.B. and I. invited the attendance of representatives of motor manufacturers and sellers at the clubhouse on the 9th inst., for the purpose of considering the recommendations of the special committee appointed to submit proposals concerning a big trial of motor vehicles in 1903.

Twenty-five representatives of firms interested were present, in addition to sundry members of the club. Mr. Paris-Singer was voted to the chair. The recommendations of the Special Committee were as follow: Items 1 to 7 were almost unanimously agreed to. Mr. Edge explained that the distance of 1,000 miles had been suggested, as that was a more impressive distance than 650 miles. The claims of London against Harrogate, and the Crystal Palace against the Alexandra Palace, had been carefully considered; and London and the Crystal Palace were decided on as preferable. A number of hill climbs had been suggested, with a view to eliminating the bad cars. Hill climbs enabled efficiency to be ascertained. In discussing Clause 3, Mr. Instone thought too many points should not be awarded for the hill climbs, as therein the lighter scored over the heavier cars without relation to durability. Clause 3 was ultimately passed with a recommendation to the committee to include marks for reliability, if possible. In relation to Clause 8, Mr. Edge proposed that marks should be awarded by the judges for appearance, Mr. Sturmev pointing out that this would shut out new and interesting vehicles that could not be finished in time. Mr. Edge further suggested that marks for appearance should be awarded before and after the trials. It was agreed that this recommendation as regards finished cars should be made to the committee. Mr. Joy's proposal that these marks should not be included in the total marks was lost.

In relation to No. 9, Mr. Edge suggested that the cars should not be washed from the start of the trials to the close, and after a lengthy discussion, this was carried, and Clause 9 altered, as shown below. Mr. Letts was of opinion that steam cars would be hit hard by the recommendation to the committee that the judges should take note of the ejection of visible vapour, but this was nevertheless supported by the meeting.

On Mr. Edge's suggestion, it was agreed that motor bicycles should not be included in the car trials of 1903, but that a meeting of motor bicycle manufacturers should be called during the second week in January to consider the subject of motor bicycle trials.

The recommendations, as given hereunder, are as they were amended by the meeting and approved. Consequently, all attention to the competing cars is to be done in running time. Nothing whatever may be effected until the word to go has been given.

- (1.) That the Automobile Club shall hold a trial (generally on the same lines as the 650 miles reliability trial of 1902) in the year 1903.
- (2.) That the Crystal Palace shall be the centre, and runs should be made to seaside places at which there are numbers of visitors, such as Brighton, Eastbourne, Folkestone, etc.
- (3.) That the trial shall include as many hill-climbing records as possible.
- (4.) That the trial shall take place early in September.
- (5.) That the total distance shall be 1,000 miles, comprised of eight runs of about 125 miles per day.
- (6.) That cars shall be required to be within the gates of the Crystal Palace by twelve noon on a Wednesday, the first run to take place on the Friday, and the trial to terminate on the following Saturday week.
- (7.) No manufacturer or seller to enter more than one car of a type in a class. No duplicates.
- (8.) That the public should be given to understand that the trial is a trial of trustworthiness—not appearance.
- (9.) No washing shall be allowed, but the car shall be driven straight into the storage building from which the public, the owners, drivers, mechanics, and everyone except the club's stewards shall be rigorously excluded. In the morning, when the

observer has taken charge of a car, the driver and mechanic may be admitted to the storage building, and the word will be given to start. Adjustments and repairs may then be made, but one mark will be deducted in respect of every minute during which the car is stopped, or during which the driver or mechanic leave their seats for the purpose of adjustment, washing, repairs, or replenishment.

- (10.) As the exclusion of the public from the storage building might interfere with opportunities of doing business, arrangements should, if possible, be made by which one exact duplicate of each car entered and running may be shown in the upper part of the Palace.

*Note.*—The Special Committee decided not to deal with details as to formula, etc., but to leave these for the consideration of the Trials Organisation Committee.

The meeting then proceeded to ballot for twelve members of the trade to act with twelve members of the club as the Trials Committee. This body was eighteen in number this year, but the meeting decided to increase it.

The ballot, for which Messrs. Buttemer, T. W. Browne, Foster Pedley, and Harry J. Swindley acted as scrutineers, resulted as follows: Messrs. Critchley (Brush Co.), S. F. Edge, Chas. Jarrott, W. J. Letts (Locomobile Co.), W. H. Astell (New Orleans Motor Co.), W. Austen (Wolseley Tool and Motor Co.), C. H. Burford (Milnes-Daimler), Basil Joy (Simms Mfg. Co.), Henry Sturmev (Duryea Co.), Ernest Instone (Daimler Co.), F. Lanchester (Lanchester Eng. Co.), and J. D. Siddeley (Siddeley Motor Co.)

Mr. C. W. Letts, of the Locomobile Company, sails for the States on the 14th inst.

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The editor of the *Edinburgh Evening Despatch* deserves the thanks of all Scottish automobilists for the able manner in which he has set forward the arguments against the numbering proposals.

\* \* \*

The monthly auction sale of the Bradford Motor Car Co. was held on Thursday of last week, and there was a good attendance and satisfactory selling considering the time of the year. Three new Clément cars—11 h.p., to seat four—were sold at an average of £285 each. A second-hand 6 h.p. Boyer, with tonneau body, Aster engine, and Michell tyres, was sold for £106. A second-hand 8 h.p. Darracq realised £186. Some smaller articles realised fair prices.

\* \* \*

The Helios paraffin head lamp which we described recently, after a very satisfactory trial, is undergoing certain alterations. The shape of the lamp has been greatly improved, and a very bold front cone is being fitted, and the sockets have been altered so that they will take the ordinary round lamp irons. It will be recollected that this lamp is made very much on the same principle as the brilliant paraffin head lights used on electric tram-cars, and is sold by Mr. E. Baedeker, 17, Newcastle Street, Farringdon Street, E.C.

\* \* \*

Mr. Henry Fairfax, of the London Motor Car Co., recently did a journey of 250 miles along the East Coast on his 2 h.p. Werner motor bicycle. During the ride he did not experience the slightest trouble, not even having occasion to touch either the engine or the bicycle. On his way he came across another motor bicycle and trailer in a disabled condition, and these he towed for about twelve miles, the machine taking the hills in splendid style. Altogether, Mr. Fairfax's bicycle has covered 6,000 miles, but it does not show the least signs of wear.

## THE SOCIETY OF MOTOR MANUFACTURERS AND TRADERS.

### Discussion on Reliability Trials and the Crystal Palace Show.

On Thursday, the 4th inst., the members of the above society dined together at the Hotel Cecil under the chairmanship of Mr. F. R. Simms, president. Amongst those present were Messrs. C. J. Jarrott, G. H. Burford, C. W. Letts, E. Hart, C. V. Pugh, H. M. Scott, Basil Joy, Stanley Spooner, R. G. Begbie, S. Heard, E. W. Lancaster, H. E. Perman, W. Solomons, G. H. Smith, W. Guttman, A. E. Cohen, Sydney Straker, Art. Brampton, E. H. Arnott, A. C. Hills, C. W. Allen, M. Goodman, F. O. Selbach, M. D. Rucker, Berne Nadall, W. Burgess, George Iden, W. H. Buckea, Harry J. Swindley, F. W. Baily, W. C. Munn, J. H. Stocks, H. Austin, H. Felcher, Secretary Woodfine, and others. The loyal toasts were duly honoured, after which the Chairman explained that the object of these dinners was the friendly discussion of automobile matters. Subjects for discussion were then proposed on slips of paper handed to the chairman, and voted upon for precedence. The two subjects upon which choice fell were "The Value of Reliability Trials as far as we know them," suggested by Mr. Jarrott, and "The Crystal Palace Show," suggested by Mr. Austin.

#### The Value of Reliability Trials.

In opening the discussion on the first subject, Mr. Jarrott expressed an opinion that when the last reliability trials were considered they proved to be more or less a farce. Most of the cars entered were much too highly powered for the pace allowed, and their only chance of scoring was in the hill trials. A large percentage of the cars entered were handicapped by the restrictions, and lost marks by pure mischances. The speed control was ridiculous. In one case a car had fifty yards to go in five minutes, and the observer was seen hanging over the side to see that the wheels did not cease to revolve. In future trials, time for cleaning only should be allowed, and no time for adjustments. Cars should not be washed, and the spectacular public might be disregarded. Thus were all Continental trials run. The question of reliability was not arrived at without a severer test, such as a straightaway race.

Mr. A. C. Hills suggested that cars should not lose marks for punctures and mistakes in driving. The vehicles should be dealt with in preparation only, as a novice would deal with them.

Mr. Letts differed from Mr. Jarrott. The public should be interested throughout. They looked for a car that required but little attention and adjustment. Sufficient time should be allowed in the morning for washing, in order that the cars might make a decent appearance.

Mr. Cohen agreed with Mr. Jarrott's views. As he understood the term reliability, it eliminated adjustments. Cars should be washed. Moving masses of mud would not impress the public.

Mr. Belcher opposed Mr. Jarrott's proposals, but said if adjustments were allowed they should be watched by qualified inspectors. Next year he hoped the brake trials would be more carefully carried out. The importance of these trials to the

total marks was not made known to competitors. Tests of brakes and steering should be carried out at end of trials. He thought the severer the trials the better. Cars whose gears could not be inspected should be penalised.

Mr. Austin was of opinion that the society should do all it could to dispense with the competitive element. In his opinion, trials were now unnecessary. A good car could easily run the 650 miles, while a driver's accident or carelessness proved very hard on the manufacturers. A race was of no utility as a proof of reliability. If reliability trials were held at all, they should be of a general nature. Rules could all be driven through. Speaking as a judge, he said his verdict was of very little value. The work was too gigantic to be done thoroughly.

Mr. Basil Joy held that observers should not be allowed to deduct marks, but merely to report. Judges should deduct marks on such reports.

Mr. Jarrott, in reply, said the question was whether they should have reliability trials or not. If yes, then the utmost means of elimination of inferior cars should be adopted. The competition should be made as difficult as possible. He agreed that the trials were run in the interests of the public, but the buying public looked at the results, and did not want to see beavies of pretty cars on the roads. The appearance of the cars that took part in this year's trials was nothing to boast of. Only three of the vehicles running were properly upholstered. In the matter of drivers, manufacturers must put up their best men.

#### The Show of 1903.

The discussion on this matter was opened by Mr. Austin. He thought every exhibitor should do his utmost to make the show as artistic as possible. One show was enough, and if the majority of the trade showed at the Palace next year there would be but one show in 1904.

Mr. Jarrott thought exhibitors should be allowed a free hand in staging their cars. Offices on the stands were desirable for business reasons. At the Paris Show exhibitors had a free hand in stand decoration, and the effect would be seen next week. If freedom in this matter was found undesirable, they could limit things next year. The Palace show promised to be more interesting than any previous shows anywhere, as it would contain the best and latest carriages of English, French, and American manufacturers, and also vehicles from Germany.

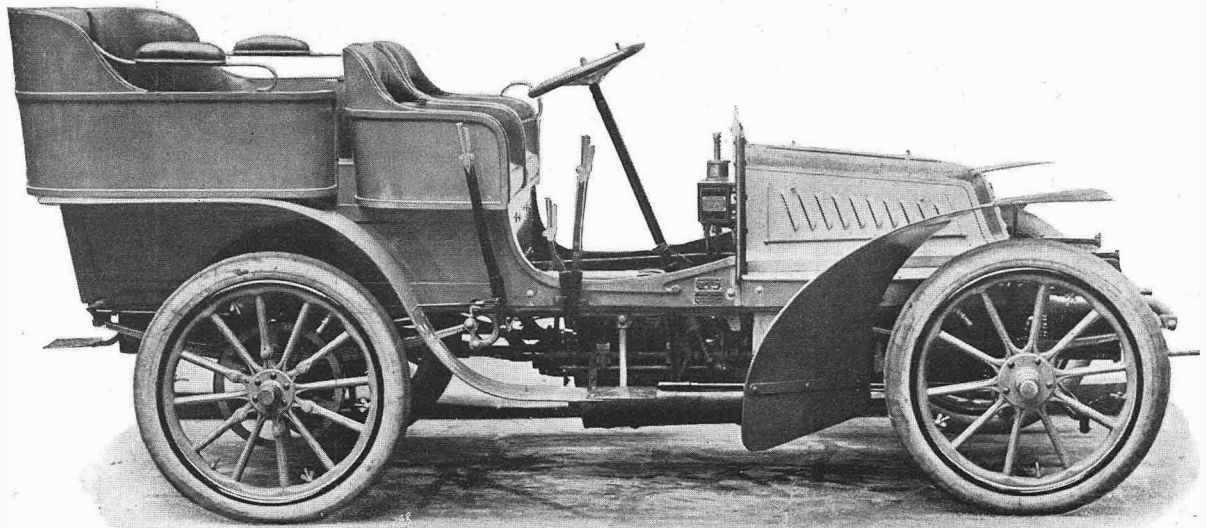
Mr. Cohen proposed that the show committee should urge upon the railway companies to arrange for special trains to convey cars to the Palace; also for special passenger facilities. He agreed that individuality would lend attraction to the show. He thought the committee should bar the posting of "Sold" cards on the exhibited vehicles.

Mr. Munn and Mr. G. H. Smith referred to plans for making the show widely known.

Mr. Baily, who supported Mr. Munn's suggestion that exhibitors should do everything possible to advertise the show, informed the society that 75,000 square feet had been let, and that the frontage of the stands would measure upwards of three and three-quarter miles. Only two fairly large spaces remained to be let, and he had been obliged to put the outfitters in the Gallery.



## A FORECAST OF THE PARIS SHOW.



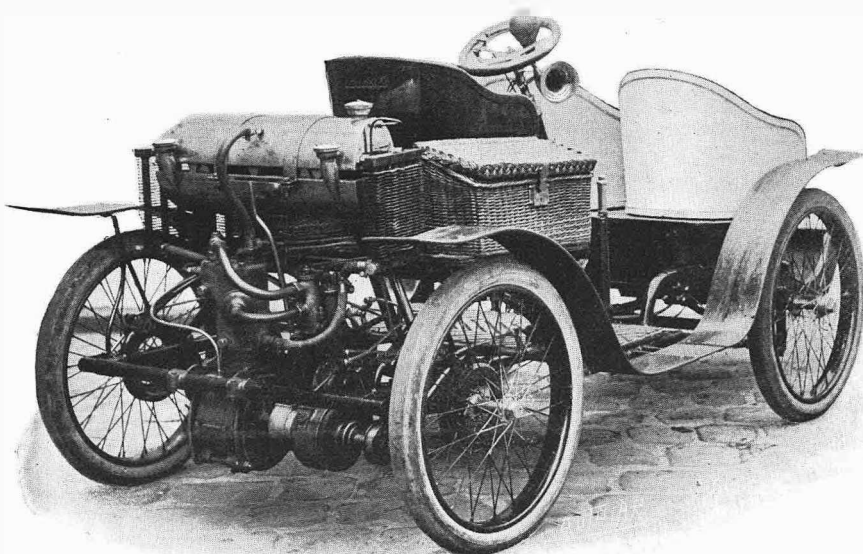
The 20 h.p. Georges Richard. One of the new designs in the Salon. To be described in our next issue.

In the following anticipatory notes upon the Salon de l'Automobile, which was opened in Paris on Wednesday, it is naturally impossible to offer anything like a complete account of the many novelties and new vehicles which are being exhibited; but by giving a brief description of some of the leading mechanisms, and pointing out where novelties are to be seen, we trust this article will prove of interest pending the publication of a fuller report of the show next week. It is all the more difficult to forecast accurately the character of the international exhibition, owing to the considerable number of new firms which are entering the industry, and the applications for space have indeed been so numerous that the committee have found the greatest difficulty in satisfying them all. It is no longer a purely French show, with a few foreign exhibits concealed somewhere under the galleries. Exhibitors have come from England, America, Germany, Belgium, Austria, and Italy, all of them with something which they think can compare favourably with the French cars. The Salon will prove something that has been wanting in previous exhibitions—that is to say, the universal vitality and thoroughly international character of the industry. It is impossible to say, therefore, what foreign manufacturers will be exhibiting, or what surprises they may have in store, though, as it is understood that the Daimler Motor Works, of Cannstatt, will not be exhibiting their 1903 models—which will only be ready for the Nice meeting—it is scarcely probable that the foreign section will offer anything of a sensational character. Among the French makers, the only means of ascertaining what they have to show is to look round the works, and as some manufacturers are very reticent about their novelties, and others are too far away to be interviewed, any preliminary article on the show is necessarily incomplete; but, nevertheless, sufficient

is known to convey a good general idea of what the show will be like.

### The Tendency to Follow 1902 Mercedes Practice.

The autocar is influenced a good deal by fashion, which is itself the logical outcome of improvements adopted during the year. A vehicle that has made its mark by constructional details, representing a distinct advance upon previous practice, becomes a standard for all other makers, who find that they cannot attain the same end by different means, and thus there is always a tendency towards similarity of design. A feature which stands out prominently in recent automobile construction is the mechanically-operated inlet valve. The success of the Mercedes has shown makers that the public require silent vehicles in which the motor can be slowed down, when the car is standing, until the running is scarcely audible. In our last issue we showed how Panhard et Levassor hope to do this with automatic valves, by means of the new Krebs carburettor, but the majority of other makers prefer to operate their induction valves mechanically. Nearly all the leading firms have them at the show, and so strong is opinion in favour of the mechanical valve that even some of the firms which exhibit motors with automatic valves are announcing that they are designing engines on the former system. In canvassing the opinions of makers, we do not learn that they claim any particular advantage for the mechanical inlet valve, beyond the facilities it offers for silent running. Some people object that this means increased complication of the motor, and so it does so far as concerns an augmentation in the number of parts; but as the valves are actuated positively, there is no complication in the true sense of the word, and, after all, any question of simplicity, when efficiency is not affected in any way, is of far less importance than the economy and convenience of being able to slow down the motor



The latest development of the quadricycle. The three-seated Boulet.

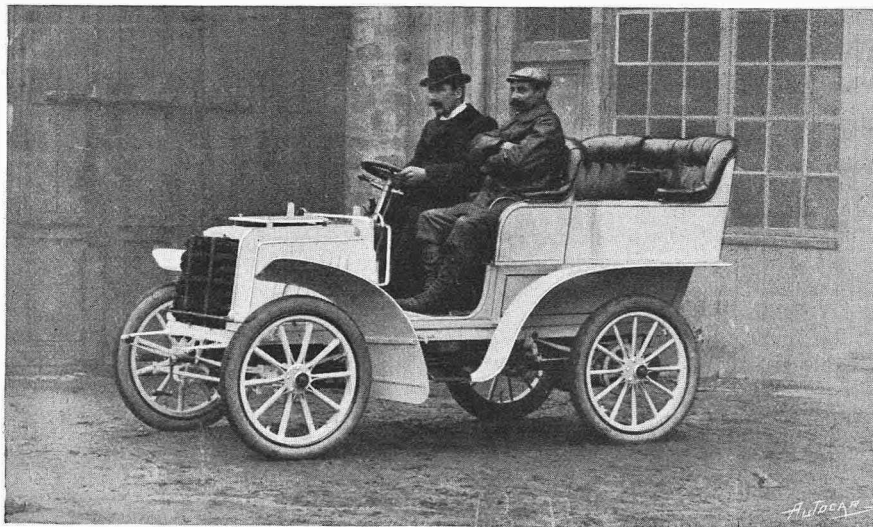
to almost any extent which is secured by the alleged increased complication. The new method of building underframes is also an interesting feature of the show. All-steel frames are coming into vogue, and are replacing the armoured wood frame on the ground that they are stronger and stiffer for a given weight. The side members of the frame are pressed out of steel plate C section, tapering towards the ends, and some makers have suppressed the secondary frame altogether. With improvements in the way of balancing motors, it is possible that this practice will become more general. At present opinion is greatly divided as to whether it is preferable, for the sake of reducing weight, to suppress the secondary frame.

#### Some Typical Exhibits.

As an illustration of the points of interest to be looked for at the show, we will deal briefly with some of the exhibits, leaving a more detailed description of the novelties for next week's show report. On the stand of the Société d'Automobiles Mors the new motors are of 11 h.p. and 18 h.p. The inlet and exhaust valves are on each side of the engine, and being of exactly the same dimensions, they are interchangeable. The inlet valves are actuated mechanically. This, of course, changes the aspect of the motor, which differs entirely in appearance from the older engines, and it must be confessed that as regards mere symmetry the valves on each side are a great improvement. The motor is throttled by a tubular regulator in the induction valve chamber, one tube revolving in the other,

and both having ports of the same dimensions. We notice also, the very simple and positive method adopted for advancing and retarding ignition with the magneto without affecting the travel of the rod, this being done by varying the time of contact with the cam. The change-speed gear is the same as that we have already illustrated and described (see *The Autocar*, 5th July, page 5, 1902), but another novelty is the frame made of steel plate stamped out U section, as mentioned before, and the same sections are also employed for the cross-bracing pieces. The frame is curved inwards to the front to give a wider range to the steering wheels. Another novelty is the water tank suggested by

the Mercedes design, which will be found on several other vehicles. It is made by a firm at Lyons. Instead of being pierced with tubes, the tank has a multitude of elongated cells, the sides of which are formed by thin, flat, hollow walls, through which the water circulates by means of a pump. Thus in each wall there is an extremely thin layer of water, which is exposed to the free passage of air, and this is further facilitated by a ventilator driven from the motorshaft behind. The lubricating oil is no longer fed under pressure of the exhaust, but of the warm water from the motor, which has the advantage of preventing the oil from freezing or getting thick during winter. The following dimensions of the 18 h.p. car will show the larger room available for the carriage body with the steel frame: Length, 8ft.; width, 4.59ft.; length of carriage body, 6.8ft.; width of carriage body, 2.78ft. The weight of frame and mechanism complete is 800 kilos. (15 cwt. 2 qrs. 24 lbs.) The new Mors is an



The new 12 h.p. two-cylinder Darracq with tonneau de luxe body.

interesting vehicle, which will well repay close study, for it embodies all the latest improvements in automobile practice.

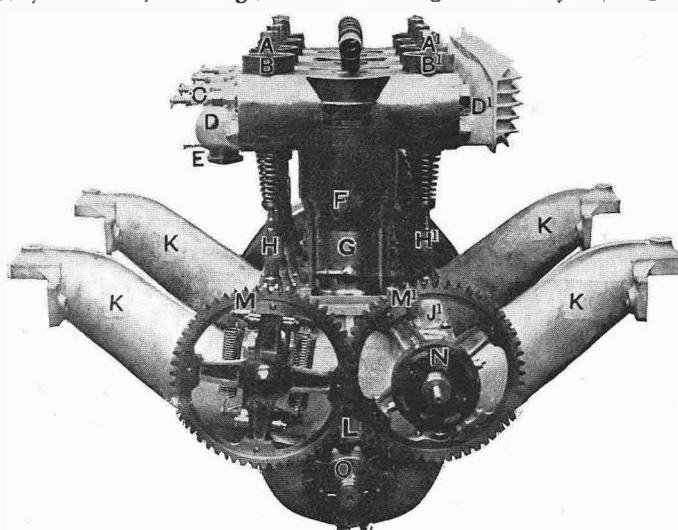
#### An Eight Cylinder Engine.

At the last show one of the stands which attracted a good deal of attention was that of Charon, Girardot, et Voigt, and with the great variety

is one with an eight-cylinder motor of 40 h.p., in which the cranks are set at  $45^\circ$ . This is apparently the outcome of the mechanical inlet valve, since the makers argue that if they can get a complete range of speed up to 1,600 revolutions they are able, with eight cylinders, to propel a vehicle at any speed without the intervention of change-speed gearing. The clutchshaft, in fact, gears direct on the countershaft without intermediate gearing of any kind. The idea merits consideration; and, indeed, it will need a good deal of thought and experiment before deciding whether it is worth while to suppress the change-speed gear by increasing the number of cylinders. The possibility of doing away with the change speed gear, moreover, is evidently one of the problems of the future. It is understood that Panhard et Levassor will be exhibiting vehicles with electrical transmissions on the Lohner-Porsche system, and if it comes to a question of choosing between the petrol-electric car and an eight-cylinder motor it is quite possible that preference will be given to the simpler mechanism, subject to its proving equally effective. An objection to the eight-cylinder motor at present seems to be that it takes up a good deal of space on the frame. However, visitors will have an excellent opportunity of seeing for themselves the possibilities of each.

#### Another Notable Exhibit.

On the Darracq stand will be seen the big vehicles now being turned out by this firm with motors of 20 h.p. Here we have all the latest improvements in construction, with mechanical inlet valves, steel frames, automatic throttling, and direct drive on the top speed. The engine develops 20 h.p. at about 800 revolutions, so that it is a good example of a type which

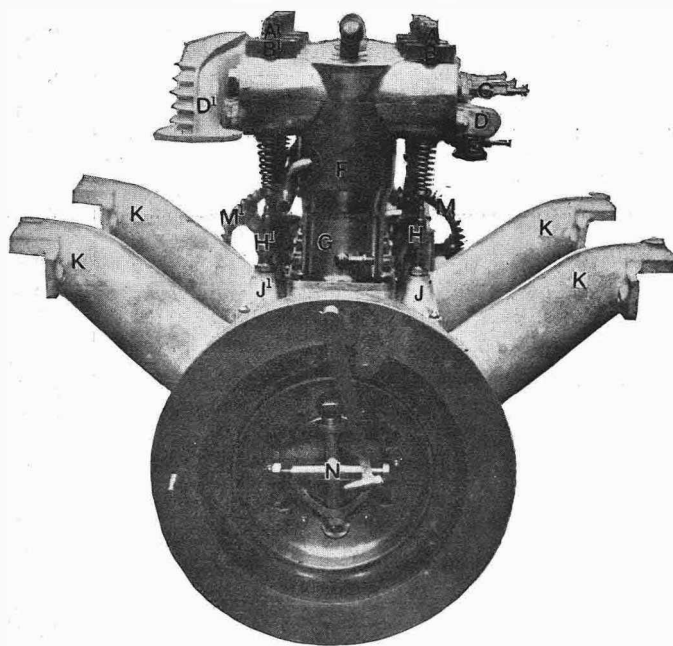


Front end of the C. G. V. engine, showing the valve gear.

- A, inlet valve bridges.
- A<sup>1</sup>, exhaust valve bridges.
- B, inlet valve caps.
- B<sup>1</sup>, exhaust valve caps.
- C, ignition plugs.
- D, inlet pipe.
- D<sup>1</sup>, exhaust pipe.
- E, throttle.
- F, sheet brass water jacket.
- G, steel cylinders.
- H, inlet valve lifters and guides.
- H<sup>1</sup>, exhaust valve lifters and guides.

- J, aluminium bosses for inlet valve guides.
- J<sup>1</sup>, aluminium bosses for exhaust valve guides.
- K (repeated), aluminium crank case arms.
- L, brass gear wheel on crankshaft.
- M, inlet valveshaft gear wheel.
- M<sup>1</sup>, exhaust valveshaft gear wheel.
- N, ignition cam.
- O, free-wheel starting device.

of novelties exhibited, their present display will doubtless once more prove a centre of attraction. They have a dozen vehicles of different types, including an armoured war vehicle with Hotchkiss gun. The cylinders of the 15 h.p., 20 h.p., and 40 h.p. motors are made of steel with thin copper water jackets. The induction valves are operated mechanically. Each valve is closed independently by a short trip; the cylinders are also independent, so that any part of the motor can be got at without touching anything else. The steel cylinder motor has been put to a very severe test on the racing cars during the past year, and the results are so entirely satisfactory that the firm intend to fit engines of this type to all their 1903 vehicles. Another improvement in the cars is the friction clutch, in which a band attached to the flywheel is made to tighten around a drum fixed to the clutchshaft. The firm state that they have overcome the objections formerly raised against this type of clutch on account of its violent action, and it is claimed that the engine is put in gear silently and gradually, and without undue strains on the shaft. The change-speed gear has been modified, and is designed for direct drive on the top speed. A specially interesting chassis, because entirely new and involving a principle which we believe no one has attempted to apply up to the present moment,

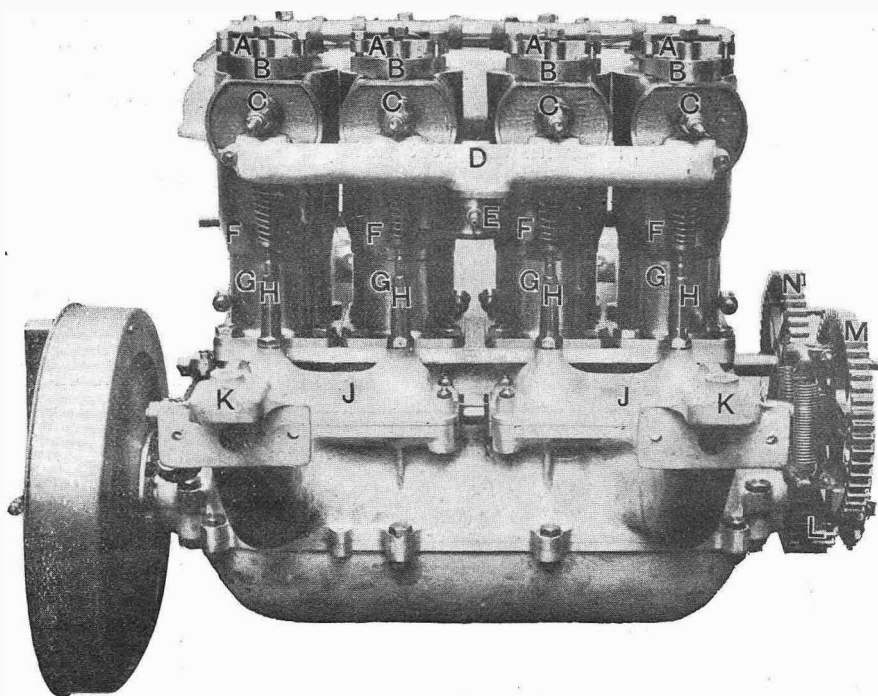


Rear view of the C. G. V. engine, showing the clutch and flywheel. For reference see the key beneath the front view above.

is finding increasing favour among automobile engineers who think that there is an advantage in using comparatively slow-running motors. The makers claim that their new engine is remarkably silent. There are many features about these vehicles which we shall deal with in our show report, but we may draw attention to the efficiency of the new cellular water tank and radiator of the type already described. We are informed that with ten litres of water the engine has run seven hours in a building without overheating. The other types of motors are of 8 h.p., 9 h.p., and 12 h.p., and on the smaller cars the frames are constructed of armoured wood. Notice may be drawn to the characteristically French finish of the motors at the show, where they are made to resemble gun-metal. Here also will be seen some greatly improved forms of tonneaux and other bodies, and, in fact, the designs and carriage-work all round promise to reach a very high standard of excellence. We may add further that nothing but the best workmanship and material are put into the Darracq vehicles, and during a visit to the Suresnes factory we were able to convince ourselves that quality is certainly not sacrificed to price in these excellent cars.

#### Accessibility of the Parts.

The horizontal motor has been abandoned for certain types of cars by one of the very few makers who have continued to adhere to this type of engine, and the Société des Automobiles Delahaye are now exhibiting vehicles with vertical engines of 12 h.p. and 24 h.p. They have not given up the horizontal engines altogether, however, for they are still fitting them to their larger types of vehicles, such as omnibuses and industrial cars, but fashion has proved too much for the horizontal motor in pleasure carriages, and the firm therefore have been obliged to follow the usual practice. The vertical motor has two or four cylinders. The cylinder and valve chambers are cast in one piece, and the head is formed of a plate which is removable to expose the pistons. The cylinder is water-jacketed down to about two-thirds of its length, and below this the air circulates around the motor, to be warmed before entering the carburetter. The cranks are set at 180°, and the engine is further balanced by dividing the weight of the flywheel on each end of the crankshaft. This allows of the engine being bolted direct to the steel frame. The stamped steel side members are of the section



Side view of the new 20 h.p. C.G.V. motor.

A, inlet valve bridges.  
A<sup>1</sup>, exhaust valve bridges.  
B, inlet valve caps.  
B<sup>1</sup>, exhaust valve caps.  
C, ignition plugs.  
D, inlet feed pipe.  
D<sup>1</sup>, exhaust pipe.  
E, throttle.  
F, sheet brass water jacket.  
G, steel cylinders.

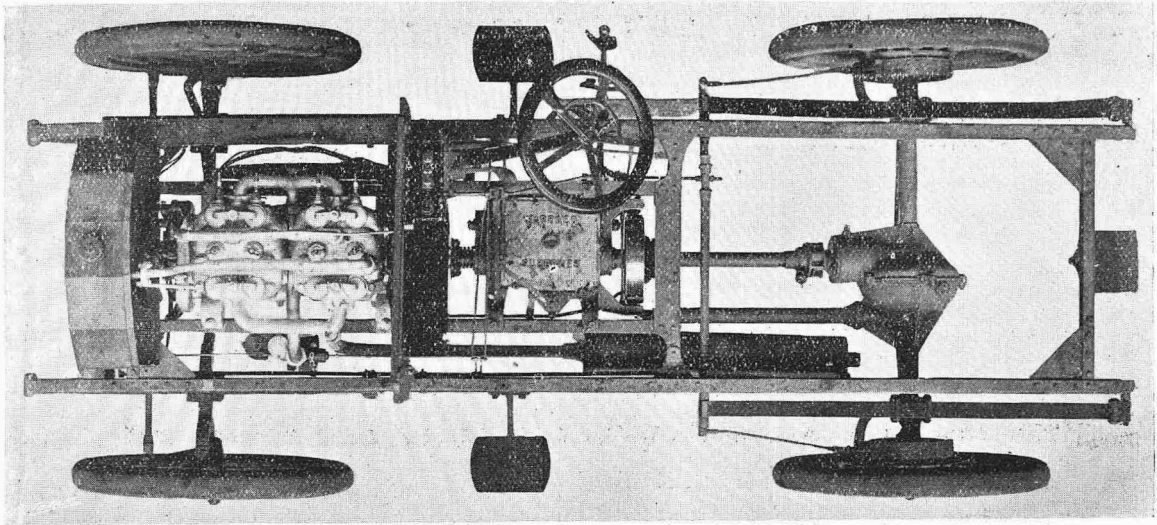
H, inlet valve lifters and guides.  
H<sup>1</sup>, exhaust valve lifters and guides.  
J, aluminium bosses for inlet valve guides.  
J<sup>1</sup>, aluminium bosses for exhaust valve guides.  
K (repeated), aluminium crank case arms.  
L, brass gear wheel on crankshaft.  
M, inlet valve gear wheel.  
M<sup>1</sup>, exhaust valve gear wheel.  
N, ignition cam.  
O, free-wheel starting device.

adopted by most of the makers. A feature to be noticed in this car is the independence of the motor, change speed gear, and differential, each of which may be removed without interfering with the other, and each is contained in a dustproof box. The countershaft carrying the differential is solidly bolted to the sides of the frame, and power is transmitted from the change speed gear to the differential by a short arbor rather than by a shaft. The ends of the countershaft are connected with the road driving wheels by chains. The belt, which has always been a prominent feature of the Delahaye cars, is thus dispensed with in the new vehicles, though it is still employed with the horizontal engines in the industrial vehicles. This is merely due to the situation of the motor, for the firm have still plenty of faith in their short belt, and have only suppressed it because the position of the engine necessitates a drive in the longitudinal axis of the car. The Société Delahaye will be showing some interesting industrial cars, including one built for public transport in Guadeloupe.

#### New Steam Vehicles.

Believers in steam—and there are many of them—will find much that is of interest in the exhibits of Gardner-Serpollet vehicles. These will comprise an entirely new type of 40 h.p. car for racing and touring, and also several improvements in the 1903 models of 6 h.p., 10 h.p., and 20 h.p. In these latter vehicles the form of the car has been improved by placing the water tank in front, thus giving to it something of the appearance of the



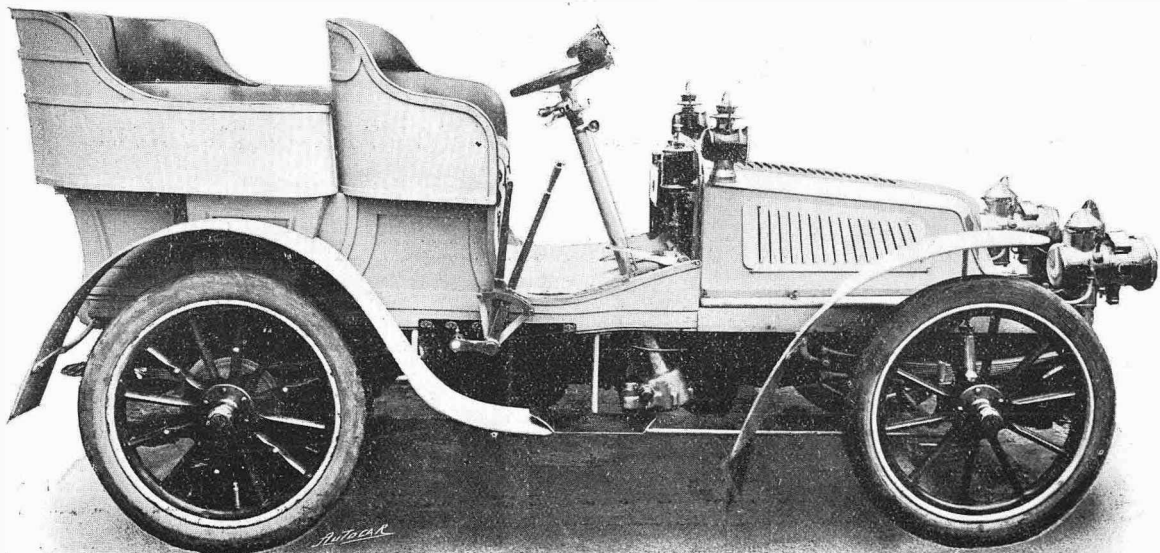


Plan view of the new 20 h.p. four cylinder Darracq, with body and wings removed.

petrol car to which we have become so much accustomed, and the aspect of the generator at the back has also been modified by finishing it off in more graceful lines, and rendering it less conspicuous. Besides the tubular condenser underneath the car there is another condenser in the form of a nest of radiators in front of the vehicle, which it is claimed will allow of the car running much longer distances without taking in supplies of water. All the cars, moreover, are now being fitted with a new type of burner, which will prevent the driver from sending too much paraffin to the burners, and will return any excess to the tank. This is a very important improvement, since it not only allows of a more perfect combustion, and consequently greater economy of fuel, but it avoids irregularity in the running of the car, due to the pumping of too much paraffin into the burners. The new device can be adapted to all the Serpollet cars, old or new, so that it is likely to interest all the users of these vehicles.

M. Serpollet will also be showing an omnibus of 20 h.p., which has been built for a school in Paris, and is capable of travelling at an average of thirty kiloms. an hour. In this vehicle the generator is placed in front. This new type is particularly interesting, since it enables M. Serpollet to supply the demand for large omnibuses and similar vehicles to which, up to the present, he has not been able to give adequate attention. The 40 h.p. chassis for racing and touring cars will be fully dealt with in our show report. Suffice it to say that everything in this vehicle is new, and we would draw attention particularly to the suppression of the pump cams, which have been replaced by a link motion similar to the Stephenson link, that has the advantage of giving every variety of travel to the pump plungers.

As another example of originality in autocar construction, we may direct attention to the vehicles of the Fabrique Nationale d'Armes de Guerre, of Herstal-les-Liège, who are showing carriages with



A 14 h.p. four cylinder Fabrique Nationale.



motors developing 14 h.p. at a speed of only 650 revolutions a minute. The motor has four cylinders, and each pair is cast in one piece, with an oval casing for the water jacket. The car is very silent and smooth in running, and in this respect compares favourably with any other vehicle. The change speed gear is novel, the drive being taken direct for the top speed, while the first and second speeds are obtained by pinions on two shafts each side of the central shaft, the former being carried by triangular plates swinging from the apices, so that one or other of the shafts is put in mesh sideways. An account of the many interesting features of this car will be given in our next week's report.

#### The British Exhibitors.

Special interest will be taken by British visitors—who bid fair to be more numerous than ever in the present show—to the exhibits of the Napier and Wolseley cars. These two are the first English cars which have yet been shown in a French automobile exhibition. In an exhibition it may be taken for granted that every exhibitor is staging his best, and it will no doubt be an opportunity which will not be neglected by English visitors of comparing the workmanship of the home-made cars with that of the French vehicles. We do not hesitate to say that the comparison will not be unfavourable to the English manufacturers, who have already won great commendation by having their stands ready for inspection sooner than many of the native manufacturers. Some of the Napier cars will be outside the Grand Palais, so that they can be tried, and the

smoothness and silence of their running compared with those of other exhibitors who are, some of them, arranging to have trial cars at work outside the exhibition during its continuance. Quite apart from the British exhibits, it is also important to remember that a large percentage of the cars shown are sold in this country by well-known houses. We have only to mention the Panhards and Cléments as an instance. In fact, all the machines referred to in this article, with one exception, are well known and largely used in this country, and in some cases the English agent has a stand of his own. This is the case with the Panhards.

The exhibition is also interesting as showing improvements in the design of carriage bodies, which are, on the whole, of a far more practical and comfortable character than we have seen at previous shows. Special attention has been given to providing plenty of room in tonneau bodies, and many ingenious methods have been devised to allow of passengers getting into the cars and seating themselves comfortably. The autocar has at length become a pleasure carriage, and the enjoyment of passengers is no longer to be measured by their ability to make light of discomforts.

Another addition has been sent us the ever-growing list of the United Motor Industries. This new portion deals with the new British-built "Castle" accumulators, recharging battery, and the newest Basse-Michel coils and commutators.

### MAIDENHEAD BRIDGE TOLLS.



The attempt to force Maidenhead Bridge and to assert the right of the public to pass over it toll free was made on Monday last. The intention had been publicly made known beforehand, and some five hundred persons assembled to witness the proceedings, which, however, were somewhat tame. Amongst those present were a large number of members of the Maidenhead Corporation who claim the right to levy the toll, and several local magistrates. The occupants of the car were Mr J. Taylor (a member of the Corporation, and who some time ago was instrumental in freeing Windsor Bridge), Mr. Cecil Howlett, and Mr. Joseph Fullbrooke. Mr. Taylor handed to the collector twopence, and demanded a receipt, which was given him. He then rose in his motor car and declared, "You must clearly understand that this toll is paid under protest, and the Court of King's Bench will avenge the King's highway." The gate was opened, and amid cheers and groans Mr. Taylor and his friends drove through. The party then alighted, entered a cab, and returned, again paying the toll under protest. There was no breach of the peace.

## THE DISCUSSION ON CAPTAIN LONGRIDGE'S PAPER.

Upon the conclusion of the reading of the paper Captain Longridge asked the meeting to give their particular attention to the special features of the paper, especially as he had no trade axe to grind, and in putting forward his views asked for their advice and guidance in the best interests of progress. He referred to motors having an impulse every revolution, and quoted largely from *The Autocar* with regard to two cycle engines. He thought that if they were to have high power water-jacketless motors steel tube cylinders must be used, and then some provision would have to be made for the reduction of internal heat. He suggested water, in the form of spray, injected into cylinder or carried there by gas charge. Every user of alcohol as a carburating agent used an appreciable amount of water, and explosion engines run by alcohol did not heat so rapidly as those driven by petrol. With high horse power jacketless motors he did not consider it safe to add the carburating material except at the moment of ignition. After touching upon better means of lubrication at high temperatures, Captain Longridge referred to the difficulty of obtaining good cylinder castings, and allotted the cause of the frequent blow holes to lack of consideration of the percentages of the components. The blow holes were due to the absorption of gases, and to avoid this it would be necessary to determine the density equations. Captain Longridge returned again to the question of cooling cylinders, and referred to the temperature of the gases that had to be cooled. He spoke also of the irregular fall of temperature in the cylinder, and was inclined to ascribe the differences to wave forms generated by the explosions of the gases.

Professor Turner (Birmingham) agreed that white hematite was unsuitable for cylinder casting, but the mixture as mentioned early on in the paper he thought would be found to run solid, could be easily cut, and would be dense. Silicon should be varied according to the thickness of the casting. The amount of phosphorus was a question of price, but it should not exceed that given. In reference to the use of steel for cylinders, if proper density could be obtained with low carbon steel—well and good. He thought fifteen per cent. carbon would afford all the wearing qualities required.

Mr. Fred Grover (Leeds), who referred to the question of internal heat, the chemical and mechanical effect of the exploded charges, and the slow diffusion of petrol vapour, was followed by Mr. Iden, of the Motor Manufacturing Co., Coventry, who gave the meeting the advantage of his three years' experience with horizontal motors, and the reasons why he had returned to vertical engines. He felt sure that with high-powered two cycle motors the exhaust valves would never be got to stand. He had tried everything, including steel, but was now using an exhaust valve with a pure nickel head, which gave every satisfaction.

At this point the discussion was adjourned until the 31st Oct., when Mr. Worby Beaumont was the first to mount the platform. Mr. Beaumont criticised the paper generally, suggesting at the outset that the title was somewhat inept. In the matter of horizontal v. vertical motors, while the former answered very well with gearing, etc., which suited, and position was perhaps after all largely a matter of fashion, in his opinion the vertical form would remain. *Appropos* of Captain Longridge's remarks upon different descriptions of motors, valve, gear, and other matters calculated to secure greater economy, he thought that economy was not the first and last consideration, but that motors must be considered on the whole with regard to their application. The simplest form, even if not the most economical, was better. Complicated engines were almost impracticable, except perhaps in the highest powered cars. Mr. Beaumont deprecated any idea of novelty in the engine Captain Longridge had outlined in the paper. It might not be a serious matter to leave a portion of the exhaust products in the cylinder, but recent practice had shown that economy was largely served by thorough scavenging. He preferred the four-cycle motor to the two-cycle motor with its additional complications of displacer and pump arrangement. Mr. Beaumont deprecated the use of white hematite for cylinder castings, and suggested that such castings would prove as brittle as glass in use. After reference to the subject of valve position, and a statement that the pre-ignition difficulties suggested by the author gave no sort of

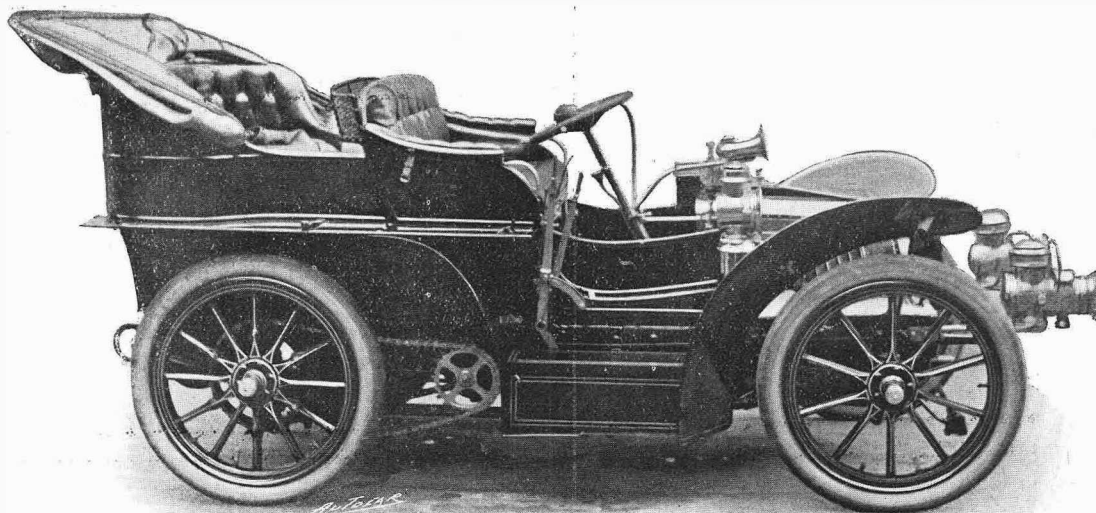
trouble with recent engines in which electrical ignition was found quite satisfactory. Mr. Beaumont concluded his remarks with the regret that Captain Longridge had not availed himself of the position he held with an important company to tell them something of the "Oil motors of 1902."

Mr. Chambers, who said he was thinking about manufacturing motor cars, thanked Captain Longridge for the advice and information given in the paper. He strongly supported the suggestion that the Council of the Institution should appoint a committee to inquire into the whole question of automobile propulsion. At present there was great danger of the whole matter getting into a groove. Two descriptions of cars were required, a *car de luxe* having high speed and costing about £400, and a humbler description, suitable for doctors and others, quite plain and simple, purchasable at from £200 to £250, and weighing, say, twelve to fourteen hundredweights. The latter kind should accommodate two passengers and some luggage. Cars of this description wanted standardising, and should not be built haphazard in order that their makers might sell spare parts. He would advise anyone starting the manufacture of such cars carefully to settle patterns, and then to put a 500 series in hand.

Professor Burstall, who admitted to doing a good deal of motoring, at least in being expected to put matters right on his friends' cars when out with them, expressed surprise at Mr. Beaumont's statement as to the perfection of electrical ignition. In thirty per cent. of the failures he came across it was the ignition that was at fault. Ignition required much care and watching. He preferred the magnets with rotating armature, which gave a short, stout spark. The objection to ignition by the Diesel method was the high compression required, about 600 lbs. per square inch, though this compression might be halved when petrol was employed. He did not like the partial retention of exhaust gases in the cylinder, as by so doing the incoming vapour was heated, and a full charge not obtained. If the cylinder was half full of exhaust it would greatly heat the charge, and the proper weight of air would not be obtained. The maximum weight of charge was required in the cylinder, therefore the walls and piston must be kept as cool as possible. He did not think that Captain Longridge's engine would prove very economical. He thought that double-acting engines might be used. There were many such gas engines running satisfactorily. The present engines appeared to him to necessitate very complicated castings. With regard to the position of valves it was becoming the practice to place the valves of gas engines in the back end of the cylinder, and he recommended this method to motor engineers. In automobile engines petrol or alcohol was the best fuel to consider. With petrol engines the ratio of pressure minimum to maximum was much lower than with gas, the reason being that with petrol the spirit was not all consumed. Petrol was composed of complex hydro-carbons, which did not all burn at the same temperature, and some undoubtedly passed away unconsumed.

Mr. Crowden said he thought it a simple matter for any engineer to build high-speed motors and gears, but not frames and wheels. In an automobile, rigidity and much flexibility were both required. They should follow on the lines of American locomotive building, and indeed make their frame as though it were a basket. After some severe strictures on carriage builders and axle makers, Mr. Crowden went on to say that pistons required water-jackets, for the overheated pistons caused back-fires. He preferred engines running at from 400 to 600 revolutions per minute, and the horizontal type when flywheel was set on centre line of engine. For light motors he had used steel cylinders with cast-iron pistons and cast-iron rings with great success, and had also obtained satisfactory results by placing the cylinders in the water tank. He pronounced in favour of side-chain to propeller-shaft drive, high tension current to magneto ignition, and said that the author's proposal to inject water into the cylinder had been done many years ago by Eustace Simonds, of Nottingham.

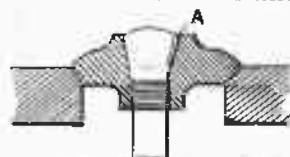
Professor Robinson disagreed with the author's suggestion to leave portion of exhaust products in cylinder, and referred to experiments made by Mr. Oliver, that showed better results were obtained with quite fresh mixtures. He thought that the injection of water into a gas engine was



The Right Hon. A. J. Balfour's latest car, a new four-cylinder 12 h.p. Napier. His new 16 h.p. of the same make is in the rough, and is just completing its road trials, through which it has passed very well, and will be exhibited at the Crystal Palace Show in February next.

objectionable, but not so with an oil engine. He had experimented with a 10 h.p. Priestman engine by adding a few drops of water to charge, with the result that the hard metallic thump was much reduced in intensity, and the engine ran steadier and cooler. Too much water, however, caused irregular ignition. In defence of the suggestion that automatic ignition could take place with water-cooled engine, he quoted experiments made by him with a Hornsby-Ackroyd engine which showed that this did occur. He thought the best speed for petrol engines was from 400 to 800 feet per minute piston travel. The temperature of the cylinder walls affected maximum efficiency, and he found with petrol engines that efficiency rose with temperature of cooling water until same reached boiling point.

Mr. Austen regretted that the major portion of the discussion had been so far irrelevant to the subject. He was pleased to think the horizontal engine had become popular, but it was not possible to say whether horizontal or vertical motors would ultimately prevail. It depended upon the system of transmission adopted. There was no difficulty in constructing a satisfactory motor either way. With a perfect system of transmission motors must be built to suit. He did not agree with the author *re* the double cylinder type of engine. He had built such engines and found that there were more parts than in simpler type. He saw no utility in doubling the number of connecting rods and flywheels. In the matter of using mild steel for cylinders, he must express surprise at what he had heard. He had always been taught to use metal with plenty of carbon because it gave the best surface. He shared the author's objections to solid headed cylinders. They might be ground out perfectly true when cold, but what shape did they take when hot? Everything depended upon the fit of piston and rings. He did not think it possible to cast a cylinder with solid head which would keep true. With regard to the question of the position and method of actuating valves he was of opinion that it did not matter just when the valve opened—the thing was to close it at the right time. If it closed late there was trouble, and if it opened before the piston was at the end of stroke there was more trouble, and even danger. It was simpler to use ordinary suction-actuated induction valves, which gave very good results. With regard to the material of which valves should be made, he had tried steel, nickel steel, and cast-



on to same with the tapered pin A inserted and riveted over.

To prevent the scoring of valve head on one side he thought it would be better to sink the valve seating, but in his latest practice he was placing a small baffle plate to protect the lip of the valve. Large valves were certainly to be recommended, but their size depended upon the shape of the cylinder head. Whatever might be said as to the crudity of the float-feed jet carburettor the fact remained that it got there, and proved perfectly satisfactory, and he thought that in the present state of the trade the fewer experiments the better. He was satisfied with accumulators and coil system of ignition. With a horizontal engine placed below water tank and radiator levels, if the pump failed, there were no immediate bad results.

(To be continued.)

## Answers to Correspondents.

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

J. G. Kirsted.	M. F. Johnson.
F. V. R.	H. Collison.
W. Payne.	C. Parker.
F. F. and Co.	G. Standley.
J. A. Wylie.	Devonshire.
C. Hayward.	J. (Lichfield).
J. T. H.	G. M.
H. F. Harding.	F. W. Baylis.
J. H. Sewart.	

Our thanks are due to the following for items of news and various topics of interest, which have been or will be dealt with: T. G. Parsons, W. Payne, J. Love, A. J. W. M., R. W. Hankinson (New Zealand), and H. S. Streatfield.

## NOTICES.

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# THE 10 H.P. STAR CAR.



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