

THE AUTOCAR

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

EDITED BY H. WALTER STANER.

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THE AUTOCAR.

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With every copy of this number is issued a supplement, "The 10 h.p. Star car." Readers are requested to notify the publishers should they not receive one.

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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Notes.

Highway Administration.

The Roads Improvement Association has for over two years been agitating for an inquiry into the present systems of highway administration, and having by persistent work obtained a substantial following in Parliament, it has addressed a letter to the Premier, begging that a Departmental Committee shall be appointed to collect information, and that subsequently a Royal Commission shall take up the subject and report upon it. In the letter to

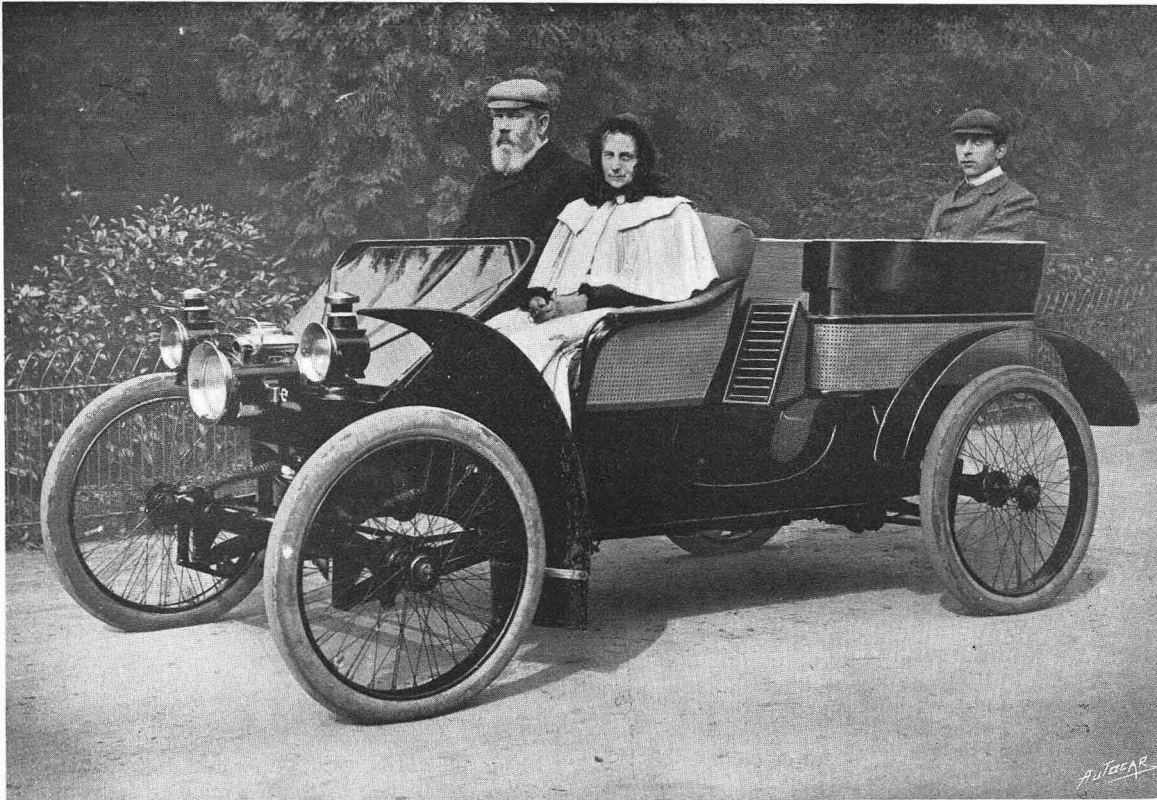
Mr. Balfour particular stress is laid upon the fact that towns are allowed to spread for miles along the sides of narrow arteries leading out of great centres of population, and that no attempt is made to ensure that the urban outlets shall be kept of a proper width. It is also pointed out that, despite the fact that the county councils have done much in many districts to improve the roads, their powers are greatly restricted by the existing systems of management, as there are many instances in which the main road in the course of twenty miles is administered by no less than ten separate authorities. Unfortunately, much of the harm has already been done, and towns have been allowed to develop into unwieldy and congested masses of buildings with no proper outlets, but as they are continuing to grow, it is not too much to ask that this reckless closing in shall be stopped and some system of proper arterial thoroughfares insisted on, so that still greater harm is not done. The question of loop roads is also brought up by the R.I.A., and we have no doubt these will come in time, and it will be possible for the automobilist to avoid many centres of population when he is performing a through journey. A number of places are already avoidable by those who know the roads of a locality well; and a comparatively little alteration of present roads would enable many towns to be entirely missed with but a slight addition to the length of the journey. In fact, some loop roads may be said to exist already, though they are quite useless to any but those who know the district very well, yet they only require properly providing with direction posts to become of service to all. The address of the honorary secretary of the Roads Improvement Association is 45, Parliament Street, S.W., and any information which will strengthen the hands of the association should be sent to him; while the names of those willing to help in collecting definite data regarding the highways in their district will be most welcome. Those who are prepared to help in this respect will be furnished with a series of questions to which answers are required. When the information is complete, it will be classified by the association and handed over to the Departmental Committee, which it is understood will be officially appointed by the Government within a very short period.

Modern Methods Necessary.

The English Roads Improvement Association has not been alone in its activity, for its sister association in Ireland has during recent years been doing much good work in the Emerald Isle, where the roads are much inferior to those of Great Britain. The Irish R.I.A. has just issued a very excellent pamphlet, entitled "Good Roads: How to Make and How to Maintain Them," which is the work of

Mr. Thos. Aitken, Assoc. M.Inst.C.E. This gentleman, who is a practical surveyor and an eminent authority on the subject of the efficient construction and maintenance of the highways, in summing up, dwells upon the benefits derived by maintaining roads by means of modern machinery, such as scarifiers and steam-rollers. A very important advantage obtained by modern methods, he says, is the absence of loose stones on the surface, which adds greatly to the comfort of travelling, and removes a great danger, especially when using the highways in the night-time. By reducing the amount of detritus in combination with the metalling on a rolled road, properly consolidated, an uniform surface at all times of the year is obtained. These methods also avoid the necessity of so frequently scraping mud

ideas in connection with the autocar, it is equally certain that they have never hesitated to copy what they considered to be a good thing, and the way in which so many of them are following German and British practice is a proof of their adaptability. It is just as well, therefore, when a prominent French house makes a notable step, that it should be pointed out whether the innovation is from this side of the Channel or the other. We refer to the three-cylinder Panhard which is attracting so much attention in the French Show, and it is interesting to record that, as far as can be gathered, the first three-cylinder internal combustion engine applied to a modern motor car was the Brooke, by Messrs. J. W. Brooke and Co., of Lowestoft. This engine also possesses the unique feature of the governor



Mr. and Mrs. Lanchester, senior, in their 10 h.p. Lanchester.

off the surface, a disadvantage inseparable from the old system of maintenance. There is no doubt, as Mr. Aitken points out, that these conditions all tend to reduce the expenditure, and when combined with the labour-saving appliances for procuring and manufacturing the metalling, efficient rolling, and the subsequent cleansing of the surface, conclusively prove, where these operations are practised as outlined, that the modern methods of maintaining roads should be adopted. Not only does this add to the efficiency of the roads themselves, but also to economy—two points of paramount importance to all those who are interested in road management.

The Three-cylinder Engine.

There is still a tendency to attribute every innovation in design to French manufacturers. While it is true that they have originated many excellent

worked by the exhaust pressure. Messrs. Brooke were closely followed by the Maudslay Motor Co., of Coventry, whose three-cylinder engine also possesses novel features introduced by Mr. Craig, its designer, conspicuous among them being the overhead valve shaft. A little later we had the 40 h.p. Wolseley racer, which is still a unique type with its three cylinders horizontally placed. There is also the American Duryea three-cylinder engine, and although this is carried across the car and in the centre, there is little doubt that it was the first to be applied to car propulsion. We should not have referred to this matter at any length but for the fact that we have heard so many unfavourable criticisms of the English three-cylinder designs, and in practically every case the only objection which has been urged against them was that none of the fashion setters in the motor world had used

anything but one, two, or four-cylinder engines, and that being so, the average critic seemed to regard the three-cylinder type as a more or less dangerous experiment. We do not at present propose to go into the pros and cons of the three and four-cylinder types; it will suffice to point out at the moment that three cylinders are the minimum number by which a thoroughly-balanced engine, so far as revolving and reciprocating parts are concerned, can be produced. The balancing of the explosions is of far less importance than is generally understood, though it is admitted at once that it can be more fully obtained by the four-cylinder

engine. The three-cylinder type is the intermediate or compromise between the two and the four-cylinder types. It is not so complicated or so costly as the four-cylinder engine, and is smoother in running than the best two-cylinder motor—in fact, so far as our experience goes, it is only the best four-cylinder engines which can be compared with the three-cylinder for smoothness of running, and we have no doubt whatever that, if the occupants of certain cars were not told, they would have no reason to suspect from the running of the three-cylinder engine that they were not being propelled by a well-balanced four-cylinder motor.

USEFUL HINTS AND TIPS.

On Buying a Second-hand Car.

In buying a second-hand autocar a very nice discrimination has to be used, for there are as many "points" about the second-hand automobile as there are about the jobber's horse. It is always best to obtain an expert's opinion before finally buying, unless the purchaser has already had sufficient experience to discriminate between a mechanism which has been fairly worn and one which has been torn about by bad driving and neglect. Never buy a car because of its outward appearance; a coat of paint will cover a multitude of blemishes, and it is not the finish which runs the car, but it frequently sells it to the novice. Often the result is that the owner pays for repairs in a few months a sum of money which, if added to the purchase price of the car, would have been sufficient to have bought a new car. At the same time, a second-hand machine may prove an excellent educator in motor mechanics, and if the buyer happens to get hold of a downright bad car, what he does not know about the details of a motor and its tributary mechanism inside six months is hardly worth knowing.

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Having met with an apparently satisfactory vehicle, after a general inspection, the carriage-work should be first of all subjected to a careful detailed examination. Many buyers are disposed to go for the motor and gearing alone, entirely neglecting the carriage-work, but as the latter has to carry the former, we always go into that part first, so that an opinion as to the engine's capabilities of moving the vehicle can be readily formed. The stability of the entire machine centres itself upon the wheels, for no matter how good the rest may be, the whole is weak, from a travelling point of view, if the wheels are not strong enough to do the work they will be called upon to perform. Therefore, the first thing to do is to examine the wheels and their axles. Supposing the wheels to be wood, the first tests should be for soundness generally. Grasp the rim of the wheel, and pull it towards and then push it forcibly away from you. If any give is felt or creaking heard, examine the wheel carefully to see that the spokes are tight at the hub, and at the felloe or rim. If the wheel happens to have been built of imperfectly-seasoned wood, a shrinkage will probably occur, resulting in a loosening of the spokes at the felloe. More frequently the spokes are strained by inconsiderate driving over

bad roads and unduly violent use of the brake many times repeated. Having tested all the wheels for soundness, next have them jacked up, and try them for wear in the bearings, and for truth in running both circumferentially and laterally. The chief test for axles is to find whether they have sunk or not; this is an easy test, for one has only to view the wheel edgewise and note if it is vertical or otherwise. If any doubt exists, a plumb line may be used. Pass a wheel which inclines outwards at its top edge, but instantly reject it if it inclines inward, despite any plausible explanations from the vendor.

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Next examine the springs and their fastenings both to frame and axle. There is a big strain upon the shackles around the axles, and signs of springing here should be looked for. This is indicated by a cracking of the joint and an unmistakable line at the point of movement. Note that the springs lie flat upon one another, particularly at the joints. If they are apt to gape, they have been badly strained and the plates set back; the plates are therefore not doing their full share of the work, the greater part of it devolving upon the principal member.

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Points of considerable wear unsuspected and unattended to by many experienced automobilists are the bolts by which the springs are connected to the frame, particularly the free or linked end of the spring. When the car is in motion there is constant friction upon the top and bottom halves of the respective link bolts. We ourselves have seen these bolts worn down by grooving $\frac{1}{8}$ in. below the original diameter, and that after about four months' use. Much may be done to reduce this wear if the bolts are regularly oiled around the links and the eye at the opposite end of the spring.

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The next part of the outfit to receive attention should be the steering-gear. Anyone who has ever ridden in an autocar and given its operation a thought will at once realise the importance of having this as perfect as possible. The first thing to notice is the amount of "backlash" or free motion of the steering-wheel or handle before the steering comes into operation. If this is found to be excessive, get someone to move the steering backward and forward between its free limits, and

notice where the play occurs. If the steering is of the worm and segment type, and the lost motion is found to be here, there is no radical cure for it beyond replacement. If it is on the combined screw, nut, rack and pinion type—that is, with a nut working on a screw on the steering column, the former having a rack on it engaging with a pinion—adjustment is possible by the lock-nuts at the bottom of the steering column. If the looseness is not here it will probably be found in the connection of the steering and distance rods. If these connections are made with cone screws they may be adjusted, but if plain bolts are used it means fitting new bolts, at least, to correct the error.

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Particular attention should be directed towards the braking arrangement, especially as to its adjustment, and to the range of the hand lever applying the back wheel brakes. Unless the brake-applying connections are correctly compensated both as to the equal application of power to the brake drums and to the relative movement between the carriage body and the back axle, it will be found that while the brake may be applied with sufficient force to stop the car while the body is *up* on the springs, yet when it is *down* the lever cannot be pushed down sufficiently to apply any appreciable power to the brake drums. This is because the wire cable connections slacken down, and the slackness has to be taken up first by the hand lever before the band is applied to the drum. Unless sufficient travel is provided on the notched quadrant, it will

be seen that with a heavy load the efficiency of the brakes is decreased under the very conditions at which it should be at its best. Sit in the car and put on the brake as hard as you can, and mark the notch in which the lever rests. Now load up the car and see how much further down the lever goes. Beyond this point there should be several notches, so as to make further application of the brake possible in contingencies. This latitude is noticeable in nearly every car fitted with cable-applied brakes, but is not so apparent in those using solid connecting rods. The pedal-applied countershaft band brake is not of so much importance, as it may be easily adjusted, and its conditions of use are not variable.

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Try the control handles, sparking advance, air to carburetter, and throttle, if fitted; see if these are performing their various duties correctly and without too much play. At the same time note the relative movement of each part and its lever; that is, make sure of the position of the lever when, say, the spark is retarded for starting. It is useful to know these little things when running the motor later on. It must always be remembered that a certain amount of wear has been had out of a second-hand car, and that absolutely perfect adjustment must not and need not be expected.

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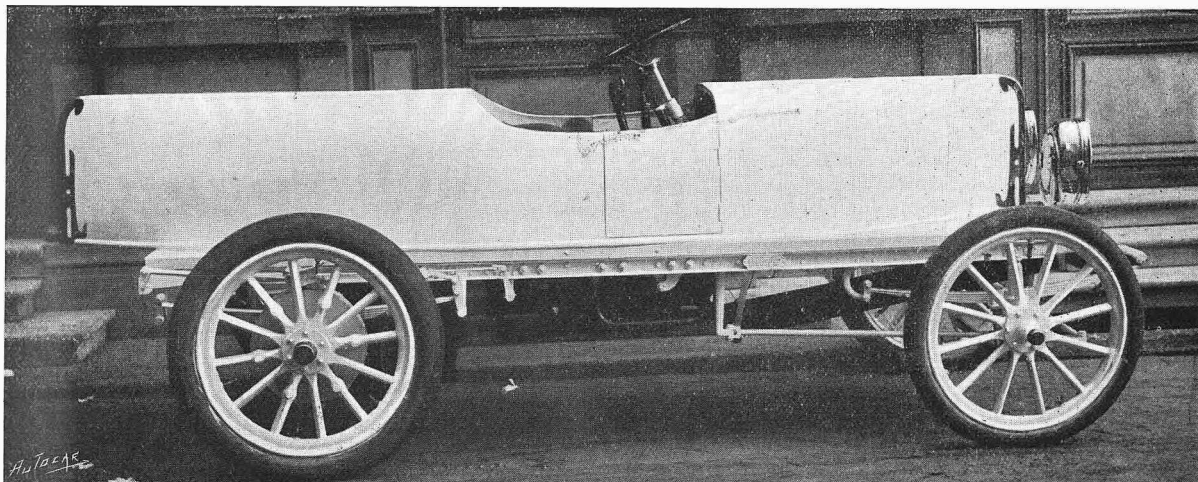
The further points for consideration and inspection in connection with this subject will be dealt with in successive issues of *The Autocar*.



One of the new Glasgow tip waggons. The vehicle is built by Messrs. Milnes-Daimler, Ltd., and with the exception of the body work and the apparatus for tipping the load it is the same as the ordinary 2½ ton Milnes lorry. The two-cylinder engine has a bore of 105 mm. and a stroke of 130 mm. Three tons are frequently carried. Our illustration is made from a photograph taken when the vehicle was undergoing its trials in Glasgow before the cleansing department of the Corporation.

THE PARIS AUTOCAR SHOW.

THE fifth annual show organised by the Automobile Club de France is undoubtedly the largest, the most successful, and the most brilliant that has yet been held. As no more area than is available can be utilised in the Grand Palais the organising committee have perforce been obliged to make the most of it by assigning a smaller space to each exhibitor and encroaching upon the centre of the hall, which was formerly laid out for purely decorative effect. Each maker therefore only exhibits just what is necessary for an interesting display of his mechanism and carriage types, and everything of a superfluous character has been entirely eliminated. The result is a compactness which adds considerably to the value of the Show as a means of illustrating the present condition of the autocar industry. The interest is further increased by the freedom with which makers exhibit chassis and parts, and fully explain the details of their propelling machinery. Another feature of the Show is the extremely artistic way in which the stands are laid out. As a result of the inducements offered by the organising committee the great majority of exhibitors in the main hall have gone to considerable expense in making their stands as artistic as possible, and while firms like Clément et Cie., De Dion-Bouton, Panhard, and many others have given the artist and decorator a free hand in the arrangement of carved wood signs, drapery, and pictorial effects, the stands facing the entrance are brilliantly illuminated at night with designs picked out in coloured electric lamps. The French have shown that art and industry are closely allied, and if they lead in many respects in autocar construction they can also teach valuable lessons in the way of highly decorative work, which attracts visitors who would otherwise scarcely interest themselves in the technical features of automobilism.



The new Serpollet racing car "Le Torpilleur" (see page 633).

THE SPECIAL FEATURES OF THE SHOW.

The show was inaugurated on Wednesday of last week by the President of the Republic, who took considerably more time than is usually devoted to functions of this kind in visiting the stands, and the committee found their carefully mapped out programme entirely upset by the way in which the President went from one stand to another, asking questions which showed that he was fully up with the progress of the autocar industry. The King of the Belgians also paid several visits during the week. The show is unusually interesting, and it would need a constant attendance to examine carefully all the new things exhibited. The more one sees of it the more there is to be seen. Nevertheless, it is easy enough to indicate the special features of the show, which may be summarised as follow: Frames of steel, usually lengthened for longer carriage bodies; the suppression of the

secondary frame and the bolting of the motor to the main members; two, three, and four-cylinder motors, the last with mechanically-operated inlet valves; disappearance of the air-cooled motor; throttling on the carburetter, in some cases with an extra automatic air inlet—a system which is destined to become general; direct drive on top speed; improvements in clutches, some of them with the male cones replaced by expanding sectors; internal brakes on the rear wheels, the brakes being in all cases more powerful than in the past; "honeycomb" cooling tanks; and, above all, a simplification of the mechanism. That these modifications have vastly improved the automobile is evident from the new vehicles which are occasionally met with in Paris. They travel with scarcely any more noise than the electric car, and there is no doubt that from the point of view of silent running and external appear-

ance—which is the only one that can make the autocar really popular—the automobile is now making more headway than it has done during the past two years. The Salon has also shown another thing—the remarkable vitality of the autocar movement in Paris. At times there are almost as many cars standing outside the Grand Palais as there are inside. Hundreds of them are ranged along the front of the Petit Palais, and extend some distance

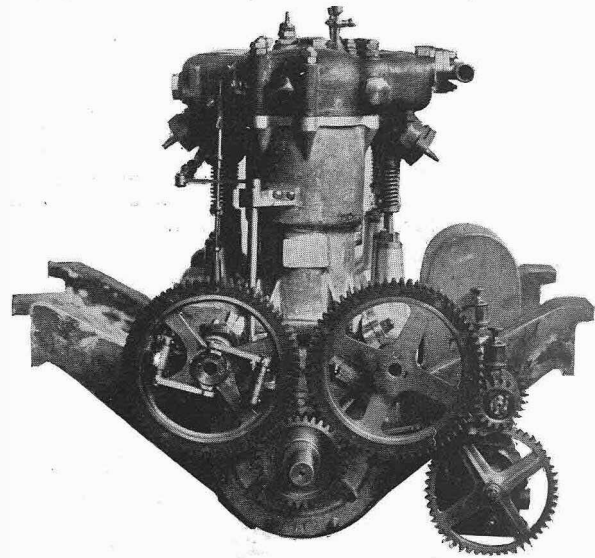
down the Champs Elysées, presenting a variety of vehicles such as one rarely sees brought together—from the little voiturette to the Thornycroft steam waggon, which has just made its appearance in Paris, and seems likely to stay.

In order to more clearly understand the features of the 1903 cars, we give the principal constructional details of two or three of the well-known makes of vehicles.

SOME OF THE LEADING EXHIBITS.

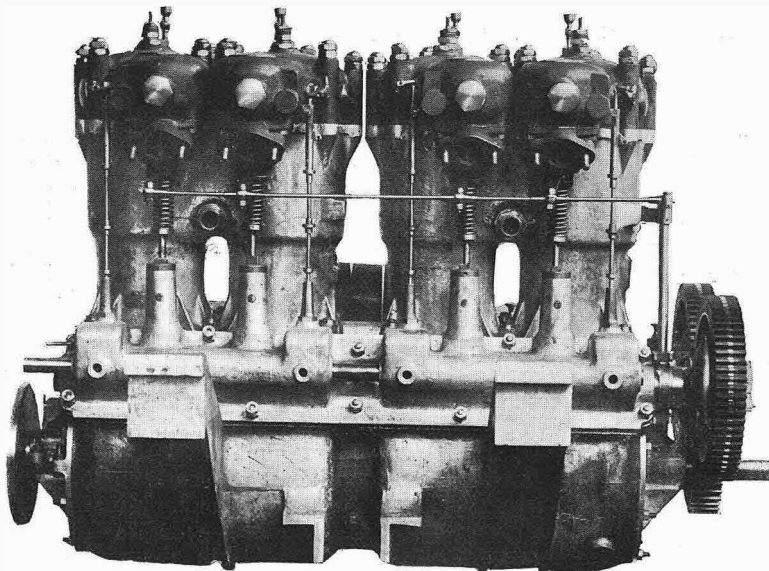
In their new type of car exhibited at the Salon, the Société d'Automobiles Mors, 48, Rue du Théâtre, show many interesting departures from their previous practice. The cars are made in two sizes, with motors of 11 and 18 nominal h.p., though developing about ten per cent. more. The four-cylinder vertical engine has an aluminium casing around the cylinders, and the water jacket extends round the cylinder ends and valves. The arrangement of the valves is entirely different from that seen on the older motors, as both the induction and exhaust valves are actuated mechanically, and, being exactly alike, they are interchangeable. Seen from the front of the car, the induction valves are on the left side of the motor and the exhaust valves on the right, and as the chambers have the same dimensions and the valves are operated in the same way the engine has a very symmetrical appearance. The half-speed shafts, with cams enclosed in casings, are driven from the motorshaft by hard fibre spur wheels. The motor is throttled by a tubular regulator in the induction valve chamber; in other words, there is a vertical extension above the valve with a number of ports, and inside this revolves a tube with corresponding ports, which is turned to increase or diminish the apertures, and thus vary the volume of gas admitted to the cylinder. The makers have still adhered to their magneto system of ignition, but they have adopted a new device for retarding ignition, which allows of the speed of the motor being reduced from the normal rate of 900 or 1,000 revolutions to 200 when the car is standing, at which speed the running of the motor is, of

course, scarcely audible. As regards the change speed gear already described, it may be pointed out that, apart from the undoubted advantage of a direct drive in high speed cars, the system of



Front end view of the Mors engine.

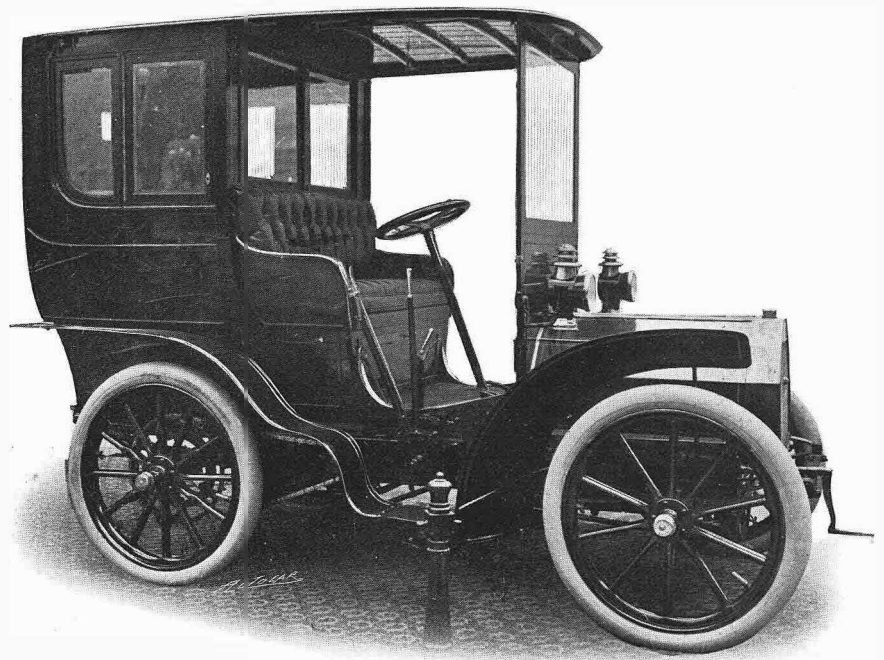
placing the two shafts side by side allows of a much flatter box, and at the same time the putting of the differential on the countershaft at the rear of the box, instead of in a more forward position as formerly, and arranging the brake as close as possible to the differential, seem to reduce any heavy torsional strains on this part of the mechanism. The bearings are ample, and are of phosphor bronze, and the countershaft runs in a long bronze sleeve forming an extension of the box opposite the brake side. The armoured wood frame has been abandoned in favour of plate steel stamped \square section, as experiments have so far shown this section to give the greatest strength and rigidity in proportion to weight. The same section is also employed for the cross bracing pieces. About two-thirds from the rear the frame is curved inwards, thus making the front narrower than the back. This is intended to give a wider movement to the steering wheels, which can now describe a much smaller curve than in the case of straight frames. The wheels are of the



The latest development of the Mors engine.

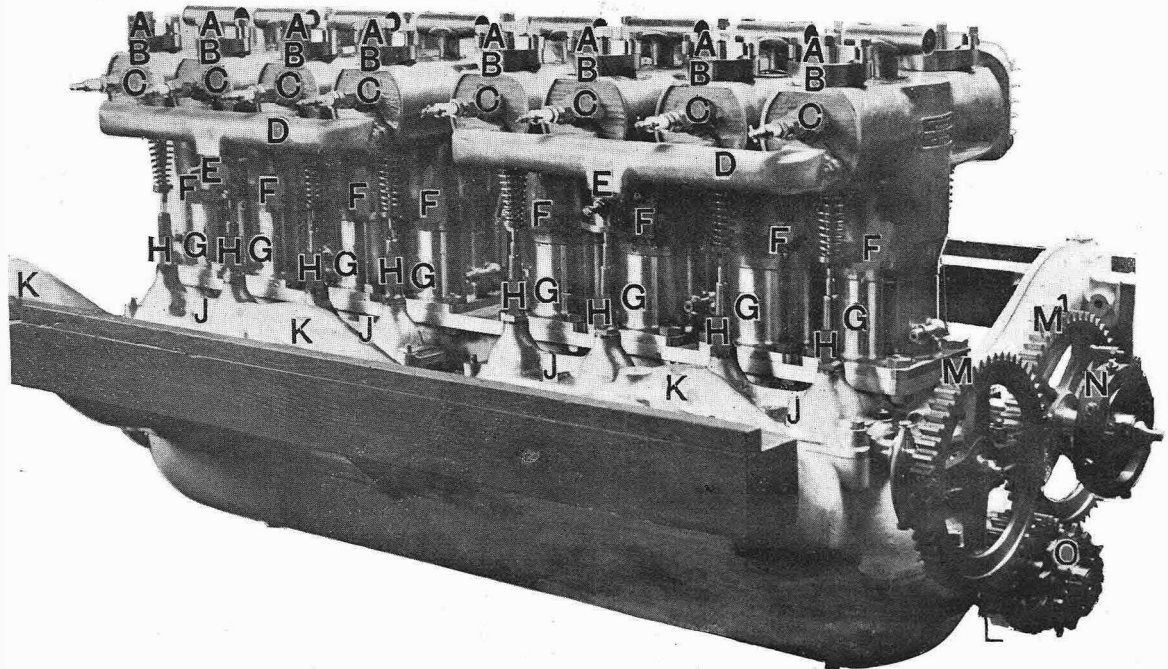
same diameter, and in the 18 h.p. car they are fitted with 910.90 mm. tyres. The "honeycomb" tank and other features of the new Mors were described last week, and from the accompanying illustration of the light 8 h.p. carriage it will be seen that the appearance of the car has been greatly changed by the new style of straight bonnet. The big cars on the stand differed little in external aspect from the old models, but some excellent examples of the new Mors vehicles with straight bonnets and "honeycomb" tanks will be found on the stand of the Société Parisienne.

MM. Charron, Girardot, et Voigt, 7, Rue Ampère, Suresnes, are continually striving after new and practical developments in motor construction, and these are taking the shape of some very interesting improvements in the utilisation of power. It will be remembered that the firm were among the first French makers to introduce steel cylinders, which were first employed upon the 40 h.p. racing machines, as before using them on the ordinary vehicles they preferred to thoroughly test them on the big speed cars. The



The Mors 8 h.p. Limousine.

results have been so entirely satisfactory that the 15 h.p. motors with cast cylinders will be replaced in 1903 with engines of the new type. The 20 h.p. engine has four cylinders bolted to the crank chamber, and this, instead of being carried on a secondary frame as formerly, is now fastened to the main frame. Experience with the racing cars has shown that this can be done with perfect safety. The



The new 40 h.p. C.G.V. motor, with eight cylinders, photographed on a rough wooden frame

- A, inlet valve bridges.
- B, inlet valve caps.
- C, ignition plugs.
- D, inlet feed pipes
- E, throttles.

- F, sheet brass water jackets.
- G, steel cylinders.
- H, inlet valve lifters and guides.
- J, aluminium cam cases for inlet valve cams.
- K, aluminium crank case arms.

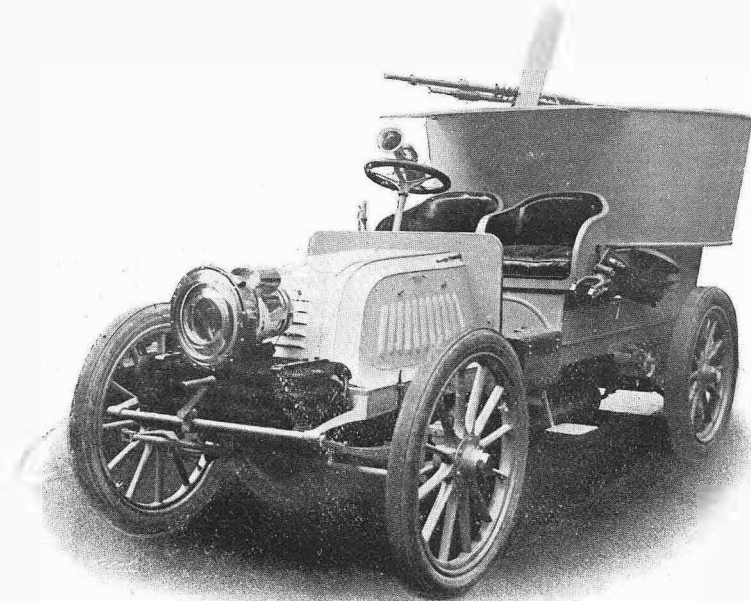
- L, brass gear on crankshaft.
- M, gear wheel for inlet valves.
- M', gear wheel for exhaust valves
- N, ignition cam.
- O free-wheel starting device.

crank chamber and arms are made of an alloy of aluminium possessing great resistance. The cylinder is bored and turned out of a solid block of steel, and the flat cylinder head is cast with valve chambers of identically the same dimensions on each side. The head, valves, and cylinder are surrounded with a thin copper casing for the water jacket. The motor may be described as having a section in the shape of a T, with the valves each side actuated mechanically from half-speed shafts driven from the engineshaft. The carburetter is of the constant level type, jacketed to receive the warm water as it passes from the engine to the radiator. Another improvement in the C.G.V. cars is the friction clutch, which was dealt with in our forecast of the show last week. The frame is of the firm's well-known system, with wood members forced into square tubes. The wheels are mounted on ball

and one which takes up considerable space on the frame. The innovation is at any rate a very interesting one. The eight-cylinder chassis is shown incomplete, with only the cylinders fitted. The firm exhibit several types of carriage bodies, which present interesting features, chiefly in the way of providing easier access to the back seats of the tonneau or double phaeton. They have also a military vehicle, with tonneau body, armoured with steel plate and equipped with a Hotchkiss gun. It is understood that this vehicle has been constructed specially for the French Minister of War. MM. Charron, Girardot, et Voigt are increasing their productive facilities in a remarkably enterprising manner. In less than six months they have laid down some hundreds of machine tools, and are now building new shops, which, we are assured, will enable them in 1903 to turn out cars at the rate of one a day.

More Details of the Darracq Designs.

The Société des Automobiles Darracq, Quai de Suresnes (Suresnes), exhibit a new type of 20 h.p. car (for illustration of the chassis, see *The Autocar* last week) which comprises all the latest improvements in automobile construction. The frame is made with side members of D section steel tapering at the ends, and the secondary frame is composed of a cross bracing of channel steel a third of the distance from the front end, and connected with the front member by two longitudinal steel angles. The length of the frame is 3m. 30 and the wheelbase 2m. 10. The wheels are of wood, with steel rims, and, as is usual in modern practice, are all of the same diameter. The motor also is entirely new, with the inlet valves actuated mechanically. The four cylinders are cast in pairs, and the shaft between each pair of cranks runs in a bearing. The engine develops 20 h.p. at a speed of about 800 revolutions a



The C.G.V. (Charron, Girardot, et Voigt) military car with Hotchkiss machine gun in armoured tonneau.

bearings, as the makers consider that these give no trouble on cars weighing less than a ton. The success of the firm in getting such a wide range of piston speed in their motors by the use of mechanical inlet valves has suggested the possibility of suppressing the change speed gear altogether. They have, therefore, constructed a vehicle with an eight-cylinder engine of 40 h.p., each cylinder being exactly the same as in the 20 h.p. car already described. The cranks are set at 45°, and between each pair the shaft runs in bearings. The clutch-shaft drives on to the differential on the countershaft without any intermediate gearing. The makers claim that as the engine will run at any speed up to 1,600 revolutions they get a very wide range of power; but so long as the impact on the piston is not increased with the diminishing piston speed it is evident that the change speed gear can only be suppressed by having a great reserve of power. It remains to be seen whether there is any advantage in doing away with the change speed gear at the expense of having a very powerful motor

minute. The engineshaft drives four spur wheels—two on the half-speed shafts, one for the pulley driving the radiator fan, and one for the pump. The ball governor on the end of the motor-shaft is enclosed—as indeed is practically everything—and throttles the admission of gas on the constant level carburetter, which is also, of course, regulated by hand. The motor is said to be very silent, and can be slowed down as much as required. The change speed gear is now arranged for direct drive on the top speed, the loose pinion being keyed in a very effective manner by wedge-shaped sleeves. The fixed and sliding trains of wheels are cut out of a solid piece of steel. The transmission-shaft has two joints—the usual cardan and a sliding joint, this latter being intended to provide for longitudinal movements of the back axle due to the play of the springs. The shaft runs in a large tube from the gear box to the differential box, and this is further supported by a second tubular stay fastened to the cross bracing piece of channel steel. The bevel pinion and the wheels of the differential are accu-

rately cut out of solid steel. The shaft runs in ball bearings with case-hardened cups and cones. The change speed lever is placed underneath the steering wheel, which also carries the lever for advancing and retarding ignition. The water tank is of the cell type, manufactured by a firm in Lyons, and offering very thin streams of water to the air circulation, which is facilitated by a fan behind the cellular tank. The brakes, we should add, are of large surface with bronze faces, and there is water circulation to the brake on the differential-shaft. The other types of motors are of 8 h.p., 9 h.p., and 12 h.p., and their design is practically the same as the one already described. The frames of these smaller cars are of armoured wood, and in the lighter vehicles steel-spoked wheels are employed. In carriage bodies, there are some noteworthy improvements, especially in the way of providing more roomy tonneau bodies, and the comfortable accommodation offered is not the least valuable feature in the Darracq vehicles. We understand that the firm are building a 60 h.p. car, which is to take part in the races next year.

The Société Lyonnaise de Construction d'Automobiles Rochet et Schneider, of Lyons, show very little change upon their well-known cars, which bear so close a resemblance to the Mercedes that they necessarily possess most of the features which mark the up-to-date vehicle.

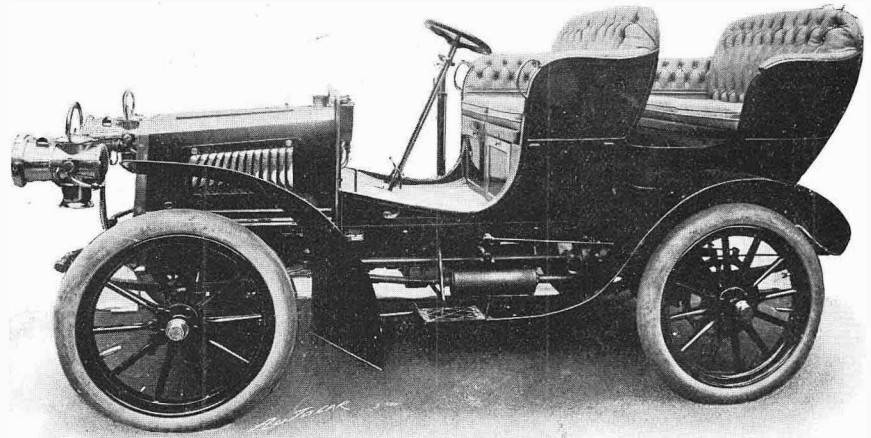
In the carriages of the Société des Automobiles Peugeot the motor with mechanically-operated inlet valves has also anticipated the practice which has now become general, and the only change noticeable is in the construction of the frame. This is now made of steel, and a special feature is the method of suspending the frame from the rear springs, by which it is claimed that the carriage body is far less liable to jolting than is the case when the frame is above the springs. The experience with the magneto ignition during the year has been so far satisfactory that the firm fit magnetos to all their new cars unless otherwise specified. They show some greatly improved tonneau bodies with a good deal of overhang, which not only increases the comfort of the passengers, but also undoubtedly adds to the appearance of the vehicles.

The Société d'Automobiles et de Traction (Système Bardon) have carried out some interesting modifications in their single-cylinder horizontal motor, in which the gases are exploded between two pistons. The induction valves are now operated mechanically, and, owing to the distance of the valves from the half-speed shaft, and also to their position, this is done by means of a sort of trip gear. The engine is now governed at the carburetter, as is usual in most of the cars. The firm also show a new type of light carriage, with steel frame,

and fitted with a 7 h.p. motor. In order to allow of the employment of shaft transmission, the position of the engine is changed. As is well known, power is transmitted from the two cranks by bevel gear to the primary shaft, which is parallel to the cylinder, and instead of being placed across the front of the car they are arranged longitudinally. The secondary shaft is below the primary shaft, and thence the drive is taken through the cardan shaft to the differential on the live axle. This is an entirely new departure in the Bardon vehicles, and the application of the system to light carriages seems a promising one.

A Benz Innovation.

Following the practice of most other firms who have identified themselves with horizontal motors in the past, Benz et Cie., of Mannheim, have abandoned this type of engine in favour of the vertical motor, and the change is all the more significant, since the Benz system has for years been adopted by makers in Germany and Austria, where the horizontal engine received a considerable amount

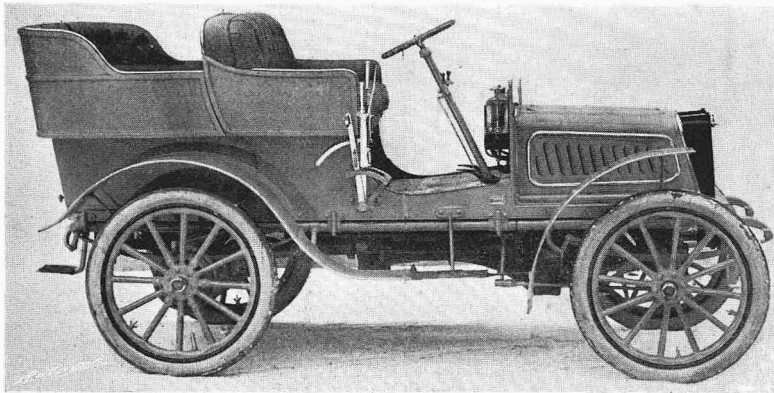


The latest Benz car.

of attention until it was eclipsed by the success of the Mercedes. The single-cylinder horizontal motor has been beaten in its greatest stronghold, though whether it has entirely lost its position in the automobile industry can only be ascertained by future developments. For the moment this type has certainly enormously declined in public favour on the Continent as a motive power for private carriages, whatever may be its possibilities for industrial vehicles. The chassis exhibited by the Benz Co. has a vertical two-cylinder motor developing 12 h.p., running at about 1,200 revolutions. The induction valves are automatic, and the throttle valve on the carburetter is regulated as usual by the governor and by hand. The spring of the friction clutch is inside the male cone; this system is now being largely employed to avoid thrust on the clutchshaft. The change speed gear has a sliding train of wheels for three speeds and reverse, and power is transmitted by a cardan shaft to the differential on the rear axle. The ignition is by magneto. The vehicles are constructed in three sizes, with engines of 12, 20, and 25 b.h.p., but we understand that the

mechanism exhibited does not represent the definite type of Benz vehicle, as the firm intend adopting many of the Mercedes features in their new motors and transmissions. The tonneau and double phaeton exhibited are well-constructed vehicles.

M. Tony Huber, 56, Rue du Vieux-Pont-de-Sèvres, Billancourt, makes his first appearance at the show with a number of vehicles in which there are several interesting features. The big motor is constructed with steel cylinders and cast heads, having a thin copper casing for the water jacket. It has a bore of 112 mm. and a stroke of 140 mm. Running normally at 700 revolutions, the four-cylinder engine develops 20 h.p., and it can be accelerated to 1,100 revolutions, at which it develops 30 h.p. The maker has adopted all sorts of simple and ingenious devices, the water pipes, for example, being attached to the jackets by strong wire connections, which can be unlocked instantaneously for removing the pipes by a pressure of the thumbs. The induction and exhaust valves are on the same side, and are actuated by the same camshaft. The throttle valve is on the carburetter, and is controlled by the governor. The change speed gear is composed of



The 20 h.p. Decauville

fixed and sliding trains of wheels, the latter being moved by a rack and sector, and power is transmitted by a universal-jointed shaft. There is a joint not only on the shaft, but also at each end of the live axle, this being employed to take stresses off the transmission gear due to the jolting of the wheels. The two-cylinder motor has cast cylinders with a bore of 100 mm. and a stroke of 140 mm., and develops 16 h.p. On this engine the induction valves are automatic. The engine is regulated on the exhaust by means of a *rampe helicoidale*, or a sort of spiral-faced cam terminating at its lower end in a pinion. This cam is given a complete turn by a rack operated by hand, so that the exhaust rod moves up the inclined face of the cam. By this means any variation of travel can be given to the exhaust valve with the greatest possible nicety. It will be remembered that during the recent trials of heavy vehicles in Paris, M. Huber carried off the first prize in one of the categories with his motor for economy and regularity.

The vehicles of the Société des Automobiles Decauville are a study in novelty. The firm have abandoned the tubular construction for sectional steel in the big cars, and, apparently, the advan-

tage they chiefly claim for this style of frame is the facility for fitting the carriage bodies, which certainly have a much neater appearance. The crank chamber and gear box are cast in one piece, with a deep well between them for the flywheel. This has a double advantage—first in accurately centring the crankshaft and clutchshaft, and again in protecting the flywheel from the mud. This one-piece construction also greatly facilitates the fitting. The four-cylinder motor developing 20 h.p. has the valves on each side of the cylinder, the induction valves being mechanically operated. The cylinders are cast with a web to divide the water jacket along the top, so that the water is obliged to circulate all round the engine and valves before returning to the radiator. The contact breaker is fixed to the side of the engine, where it is readily accessible. This is composed of two discs, the lower one being rigid and carrying the wires underneath, and as the contacts are on the upper disc, this part can be removed for cleaning or repair without touching the wires. Another novelty in this car is the method of applying power to the driving wheels. The differential box has tubular exten-

sions on each side, and these are connected with the frame. In each tube runs a shaft, one end being square to fit into the differential, and the other end has a disc with projections which fit into the hub of the wheel. They are locked into each other by a threaded thimble which is screwed on to the hub. The wheels therefore run free on the tubular shaft, and the drive is taken through the inside shaft on to the hub of the wheel, so that all thrust on the tubular shaft is avoided. The carriages exhibited were fitted with a dynamo for recharging the accumulators, and fitted with both voltmeter and automatic cut out.

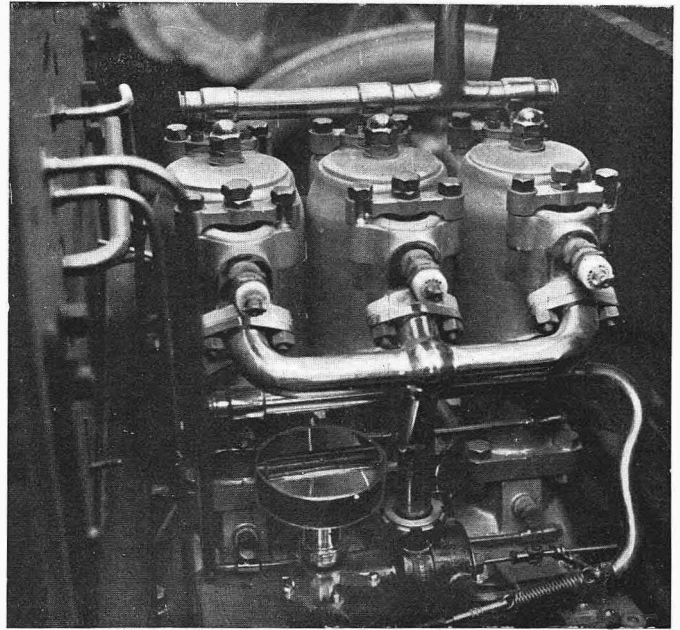
Exhibiting for the first time at the show, M. Berlier, 12, Chemin des Quatre-Maisons, Lyons, had only a chassis on view at the time of our visit, in which the characteristics are distinctly suggestive of the Mercedes. The four-cylinder motor has a bore of 125 mm. and a stroke of 140 mm., and running normally at 600 to 700 revolutions, develops 24 h.p. The change-speed gear, with two trains of sliding wheels, is arranged for direct drive on the top speed. In the friction clutch the ordinary male cone is replaced by an expanding clutch, the whole being enclosed. The chassis with sectional steel frame is a good piece of engineering work, and everything is of sound construction.

Panhard's Latest Practice.

Panhard et Levassor exhibit two types of vehicles, in both of which there are some interesting novelties. The big engine of 60 h.p. has steel cylinders with mechanically-operated inlet valves, and it is carried on two steel bars, which are fixed underneath the main side members by brackets. The bars simply pass through lugs on the crank chamber, so that there are no rigid connections,

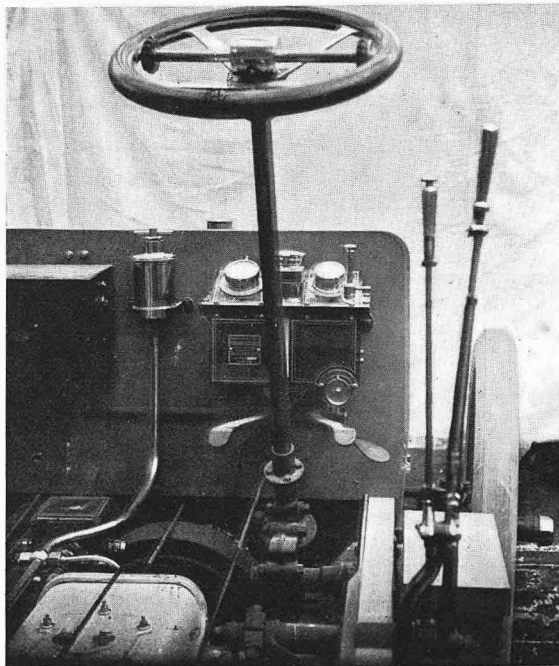
and this method of fitting is, in fact, adopted by many firms, who claim that it is preferable to avoid rigid connections with a view of preventing torsional strains due to any flexion of the frame. The employment of mechanical inlet valves has allowed of the use of a special form of expanding cam for holding up the valves more or less to facilitate the starting of the engine, and by this device the huge engines may be started as easily as the motor of a voiturette. The Krebs carburetter is one of the novelties of the show, and the way in which it allows of the engine running at low speed with scarcely any noise is demonstrated in the alcohol annexe, where the firm exhibit a new form of dynamometer for ascertaining the regularity in running and brake power. As the Krebs carburetter was fully illustrated and described in *The Autocar*, page 571, December 6th, it is unnecessary to deal with it here, beyond stating that it has proved itself to be a very efficient device, and the principle is likely to come into very extensive use. The firm also show a new form of tank and radiator, with square section tubes and ventilator, forming a projection of the flywheel behind the engine. It is objected that the ordinary form of fan immediately behind the radiator only creates a draught at the extremities of the "bees' nest" or honeycomb, as this type of radiator is called in France, the centrifugal force, of course, sending the air currents away from the centre, but by putting the ventilator behind the engine the air is collected forwards, after passing the motor, and the whole of the radiator is thus under the influence of the draught. The firm have introduced a new type of motor, which is intended to form a connecting link between the two and four-cylinder engine. It is, of course, impos-

sible to balance a two-cylinder engine in the same way as a four cylinder, and the smaller motor cannot therefore be made to run so smoothly and silently, but this is done in the new Panhard light carriage by means of a three-cylinder engine of



The three-cylinder Panhard engine. The new Krebs carburetter described on page 571, December 6th, will be noted.

8 h.p., with the cranks set at 120°. The motor is fitted with automatic induction valves, and the construction of the chassis naturally differs from the big vehicle, the motor being carried on a secondary frame. This light carriage is equipped with a honeycomb radiator and ventilator or fan on the flywheel. A dynamo is employed for re-charging the accumulators in the same way as was shown at the last Salon, and the device has evidently proved so satisfactory that it is being adopted to all the Panhard cars when required. Another thing noticeable about the new Panhard cars is the compactness of the controlling gear. The usual throttling and ignition levers are replaced by a couple of small hand wheels, which can be manipulated by the finger and thumb without taking the hands from the steering-wheel. A couple of brass tubes across the top of the steering-wheel terminate in small ebony hand wheels, and the opposite ends of the tubes engage in a toothed ring in the centre. To retard or advance ignition, one of these tubes is simply pulled away from the toothed ring, is turned as required, and on letting go the ebony wheel the tube springs back to the toothed ring, where it is held in the required position. An improved and very compact form of lubricator is employed with a distribution of oil under pressure of the exhaust, and on the top of the lubricator box is carried the pump pressure gauge and a voltmeter. Special attention is also given to the double-acting brakes, and, in fact, the chassis exhibited are admirable examples of simplicity, practicability, and strength, which are the features now being aimed at by the leading firms, this being, perhaps, the most noticeable tendency in the Salon as a whole.

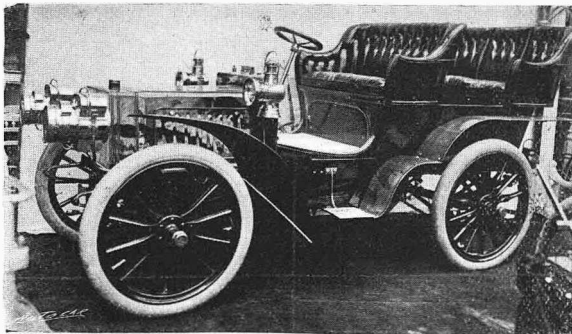


The Panhard throttle and ignition control from steering-wheel

The Two British Exhibitors.

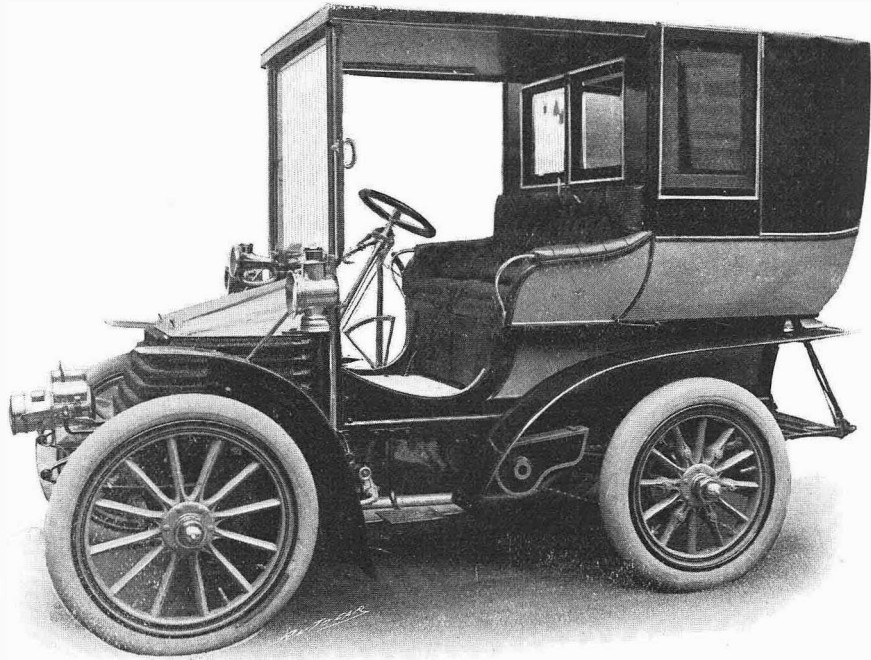
Comparing boldly and well with the finest productions of France, Messrs. S. F. Edge, Ltd., occupy with their 16 h.p. and 9 h.p. and 12 h.p. Napier chassis one of the best positions on the ground floor. The 12 h.p. tonneau body car, finished in green and light yellow—the standard finish of Napiers—compares with anything in the show, while the body of the 16 h.p., similarly finished, but most luxuriously upholstered, is an instance of what an Anglo-American desires in this regard for his comfort. The chassis of the 12 h.p. Napier is, of course, that to which all the French critics turn upon encountering this stand. Its details are now well known to our readers, so there is no necessity to reiterate them here; but by this exhibit our French friends have an opportunity of observing what the best English talent can produce, while attaining all that is necessary in solidity, lightness, and simplicity. We note that the Napiers are amongst the few cars staged at the exposition whereon the commutator is fitted to the rear face of the dashboard, and, moreover, so far as we could discover, are the only instances in which the primary wire terminals are a fixture, and are not set upon the rotating portion of the commutator. Every part of the cars is made in England, including the superbly-finished bodies, which attract great attention from the French makers. Mr. Jarrott is in evidence on this stand, whereat his numerous friends in the French world of automobilism are pleased to find him.

The Wolseley Motor and Tool Co., who also occupy a good position on the floor of the central hall, exhibit very beautifully-finished and upholstered specimens of the Wolseley 10 h.p. tonneau, the 7½ h.p. tonneau, a 10 h.p. landaulette, a 10 h.p. waggonette, and a 10 h.p. tonneau with canopy.



The F.I.A.T. car.

so distinct a system as that of the Wolseley no chassis is shown, for the exhibition of a Wolseley chassis would assuredly have attracted a vast amount of attention amongst French automobilists. In the matter of carriage and upholstery finish, to-



The 10 h.p. Wolseley landaulette

gether with special body design, these carriages leave nothing to be desired, and the absence of a chassis is all the more to be regretted. These cars are also of purely British origin, the axles, carriage-work, and every other portion being made in the Wolseley factory. We do not believe in publishing illustrations of stands in exhibitions in the ordinary way, as such are of little interest except to the exhibitors themselves; but we regard the Napier and Wolseley stands in the French Exhibition as of historic importance, and we therefore had each stand specially photographed, so as to have a pictorial record of the first two motor exhibits ever staged by British manufacturers in a French exhibition (see pages 640 and 641).

For the first time in the history of the Paris shows, Italian vehicles are exhibited by the Fabbrica Italiana di Automobili, more generally known as the F.I.A.T. of Turin. In the cars shown, the four-cylinder engines have automatic inlet valves, but a new type of motor is seen on the stand, with the induction valves operated mechanically. This is known in France as of the "square type"—that is to say, with the stroke and bore of the same dimensions, both being 110 mm. The power developed is 16 h.p. The engine runs normally at 800 revolutions. It has magneto ignition, with an ingenious centrifugal device for automatically advancing and retarding ignition, which we shall describe fully later on, together with the other novel devices of this interesting vehicle. There is a flexible connection between the clutchshaft and the primary shaft of the change speed gear, formed of a number of

teeth, on which are fixed a leather cone. On the cars exhibited the change speed wheels are always in mesh, and are keyed for the various speeds; but in next year's vehicles this system is to be replaced by the ordinary fixed and sliding trains of wheels. It will be remembered that the "Fiat" cars won the first automobile race recently held in Portugal, and that as the result of this excellent performance over particularly bad roads the Portuguese Minister of War ordered several cars from the Turin works. In the vehicle illustrated the carriagework is made by M. Alessio, of Turin.

We have so fully dealt with the new types of Georges Richard cars, of which the chassis was illustrated a fortnight ago, that it is unnecessary to refer to them in any detail here; but we may add that the firm make an interesting display of five vehicles, representing all their models from the small voiturette to the 40 h.p. racing car.

Cottureau et Cie., of Dijon, have greatly changed the general arrangement of their mechanism, as they now have the Mors system of change speed gear with direct drive on the top speed, and they also intend modifying their engines and fitting them with mechanically-operated induction valves. The radiator is of the Mercedes pattern.

The latest Clement Cars.

Clément et Cie. present some new types of 9 h.p., 12 h.p., and 16 h.p. cars, in which they have adopted all the latest improvements. The bigger vehicles have steel underframes, and the motors have mechanical inlet valves, both valves being on the same side of the engine, and actuated by the same camshaft. The four-cylinder motor of 12 h.p. has a bore of 75 mm. and a stroke of 120 mm., and it runs at 1,200 revolutions. In the other engine the dimensions are 85 mm. and 120 mm. The ignition is electro-magnetic. The engine is throttled at the carburetter, which has an external air inlet, and with the mechanical valves the engine can run at a very low rate of speed. In the absence of anyone capable of giving details of the mechanism at the time of our visit, we can only assume that the clutch is of the expanding type, for the ordinary cone has apparently been suppressed. We shall refer to this later when we have had the opportunity of examining it in this country at the premises of the British agents, the British Automobile Commercial Syndicate, Ltd.

We dealt last week with the main features of the new cars exhibited by M. L. Serpollet, 9-11, Rue Stendhal, Paris, and we shall illustrate one of these vehicles showing the arrangement of the water tank in front, and the generally improved appearance of the car as the result of the more compact form of the generator. A view is published on page 625 of the new 40 h.p. racing car, of which the following particulars may be of interest: The gauge is increased from 1m. 20 to 1m. 40, and the frame has been lowered to within two feet of the ground. The capacity of the generator has had to be increased, of course, but nevertheless its height has been reduced, and, despite the augmented power of the engine, its weight is only 18 kilogs. more than the 12 h.p. engine, the total weight being 100 kilogs. On account of this limitation of weight in the propelling mechanism, the weight of the 40 h.p. chassis is

only 950 kilogs., or 100 kilogs. more than the 12 h.p. car. This result has been attained by simplifying the mechanism and reducing the number of parts. The usual stepped cams, for example, have been replaced by a Stephenson link, which allows of any variety of travel being given to the oil and water pump plungers. This is lighter, simpler, and occupies less space. All the 1903 vehicles have the water tank in front, forming a long bonnet that gives a graceful appearance to the car, at the same time that it renders the tank more accessible. There are two series of condensers, the old smooth copper tubes running longitudinally underneath the car, and below these another series of ribbed tubes, which, in this position, give the highest efficiency and allow of the car running, it is said, 125 miles without renewing the water supply. The steering gear has been improved to give large wearing surfaces and prevent any play at the end of the steering spindle. The worm connections at the end of the pillar are enclosed in an air and dust-tight case which is filled with oil. Four chassis of 40 h.p. are exhibited on the Serpollet stand, one of them fitted with a boat-shaped racing body, and which will take part in the race for the Rothschild Cup at Nice in the spring; two others are fitted with big and commodious bodies for touring purposes. There is also a 20 h.p. omnibus, which has been built for a private school in Paris. One of its special features is the position of the generator in front, to allow of passengers getting in at the back.

In the Gobron-Brillié vehicles there is no change of any importance to be noted, the only modification being the method of throttling, advancing ignition, and regulating the admission of air with one lever. The car has four speeds, with direct drive on the top speed. Rigolly's 40 h.p. racing car is shown, and we are informed that the firm are building a 100 h.p. car for the Paris-Madrid race.

No 1903 Mercedes shown.

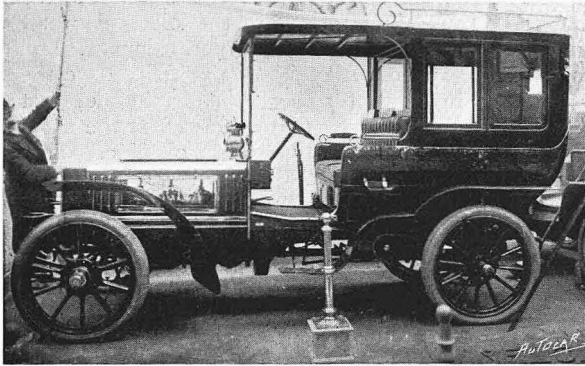
As we stated would be the case, the Mercedes 1903 cars are not exhibited, and the only vehicles on view are the current types presented by M. Charley, the representative for France.

In the vehicles of M. Vinet, 61, Rue de Villiers, the belt transmission, which has always been a feature of these cars, has been abandoned; and the maker now employs the Panhard type of gear with chain transmission to the rear wheels. The vehicles are fitted with a two-cylinder Aster motor of 12 h.p.

The Foullaron cars with expanding pulleys have also been modified by the suppression of the old means of operating the pulleys with levers, and these are now replaced with a chain, the ends of which are attached to the opposite sides of the expanding pulleys, and pass around sprockets. This system was described in our last Paris Show report on 21st December, 1901.

The Belgica car has for some time occupied a prominent position in Belgium, and on making its first appearance at the Paris Show, it attracted a good deal of attention on account of its many interesting features. This vehicle is constructed by the Société des Automobiles Belgica, 11, Rue Vander Straeten, Brussels. It is fitted with one, two, or four cylinders. Each cylinder is cast with a flat head consisting of a steel plate which is re-

movable to allow of an inspection of the piston and jacket. The valves are on each side, and are of exactly the same dimensions and are interchangeable, the induction valves being mechanically

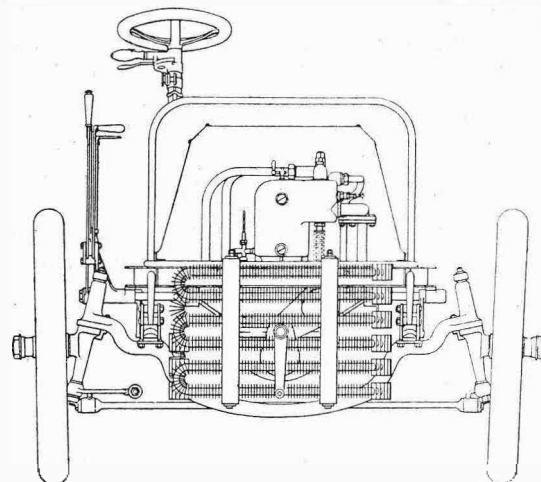


The Belgica car.

operated. The valves of nickel steel are of large diameter to allow of the free admission of gas. The water is admitted at the bottom of the jacket, and circulates upwards, so that pockets of steam in the jacket are avoided. The cylinder has a bore of 120 mm. and a piston stroke of 140 mm., and the motor runs at 750 revolutions. There is a vertical ball governor on the half-speed shaft, and this regulates the throttle valve by a short rod passing across the engine bed. The ignition is by magneto. The system of lubrication is effective, the crankshaft bearings being supplied by oil baths separated from the oil in the crank chamber, and the admission is adjusted on the principle of the syphon, so that the oil in the crank chamber is always at the same level. The engine bed is fixed to the main members of the frame by three non-rigid connections—that is to say, the connecting bolts pass through lugs on the bed, and the three points of connection prevent the engine from being influenced by strains due to jolting. The three-point system is also employed for the change-speed gear. This is composed of fixed and sliding trains of wheels giving four speeds and reverse with one lever, and all the bearings are large and well lubricated. There are two types of radiators—one with flat corrugated copper tubes and the other with flattened concentric tubes, the internal one for air circulation, and the outer tube is ribbed. The exhaust from the motor passes by short pipes into a muffler at the side, and this is connected by a long straight pipe with a second muffler at the back, so that the gases are cooled before leaving the silencer. The Belgica Co. exhibit a fine Limousine with a four-cylinder motor of 35 b.h.p.

That important concern, the Fabrique Nationale d'Armes de Guerre, of Herstal-lez-Liège, have for some years past been turning their attention to the manufacture of autocars, and after putting two or three types of vehicles on the market, they have now evolved a pattern of car that offers many novel features. In the four-cylinder motor each pair of cylinders is cast in one piece with a water jacket of oval section. The cylinders are bolted to a partinium crank chamber carried on a secondary frame. With a bore of four inches and a stroke of six inches the engine develops 14 h.p. when running

normally at 650 revolutions a minute. This slow running of the motor is one of the characteristic features of the "F.N." machine, for there is probably no other vehicle in which the engine runs normally at so low a rate. This, of course, is a distinct advantage from the point of view of durability, while as regards silence and smoothness of running it will compare favourably with any other engine. The weight is, naturally, higher than in fast motors of similar power, but 33 lbs. per horsepower is an excellent result for engines of this type. The admission of gas is throttled at the constant level carburetter, as is usual nowadays, by a tubular regulator actuated by a rod connecting with one end of a lever passing along in front of the motor, and the other end is joined to a piece running in a grooved sleeve, which is moved along the half-speed shaft by the governor. This automatically governs the engine for the normal speed of 14 h.p., but another rod operated by a lever will keep the ports of the regulator open, when the motor can be accelerated to develop up to 20 h.p. The induction pipes are kept at an even temperature in all conditions of climate by a bell-shaped heater, in which iron filings are kept hot by the exhaust. A valuable improvement in the electrical ignition is the position of the contact breaker, which is covered with glass, and is placed so as to be visible on opening the side of the bonnet. The pump for the water circulation is driven by gear from the motorshaft, and, like everything else, is enclosed and well lubricated. Pipes run from the sight feed lubricator on the dashboard to all the working parts. There are three forward speeds, the two first being changed by putting the wheels into mesh sideways, while the top speed has a direct drive. This is effected by a "cavalier" or two triangular pieces, to which a rocking movement is given by a shaft passing through the apices, and actuated by the change-speed lever under the steering-wheel. The two lower angles are connected by shafts, and between them the triangular



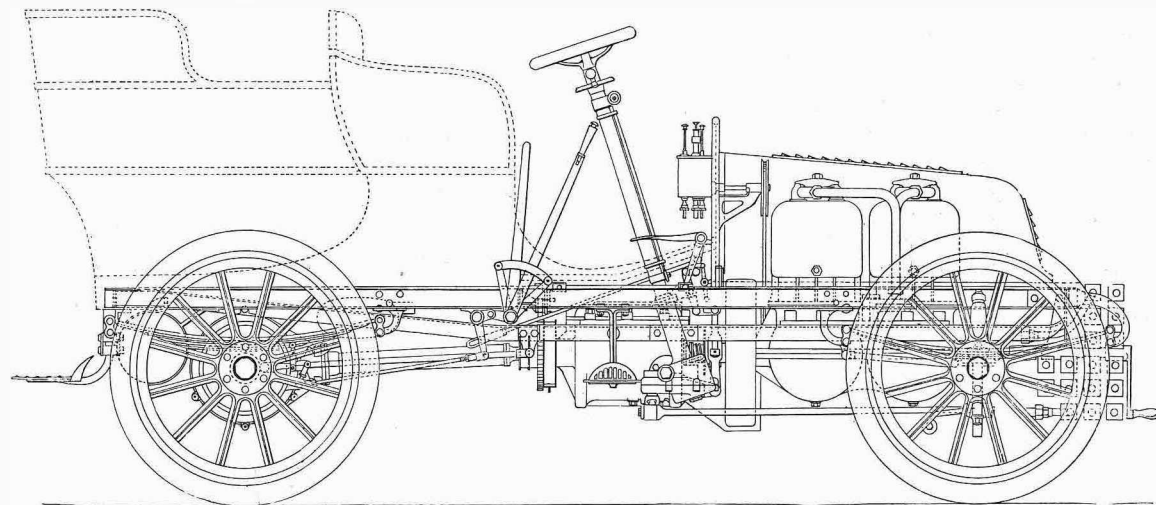
Front view of the 14 h.p. F.N. Note the inclination of the steering arms; this brings the steering line on to the point of contact with the road, easing the strains on the axle and facilitating steering.

pieces are cut away for the passage of the third shaft. The action is as follows: When the "cavalier" is moved from left to right the smaller toothed wheels gear into the wheels on the central

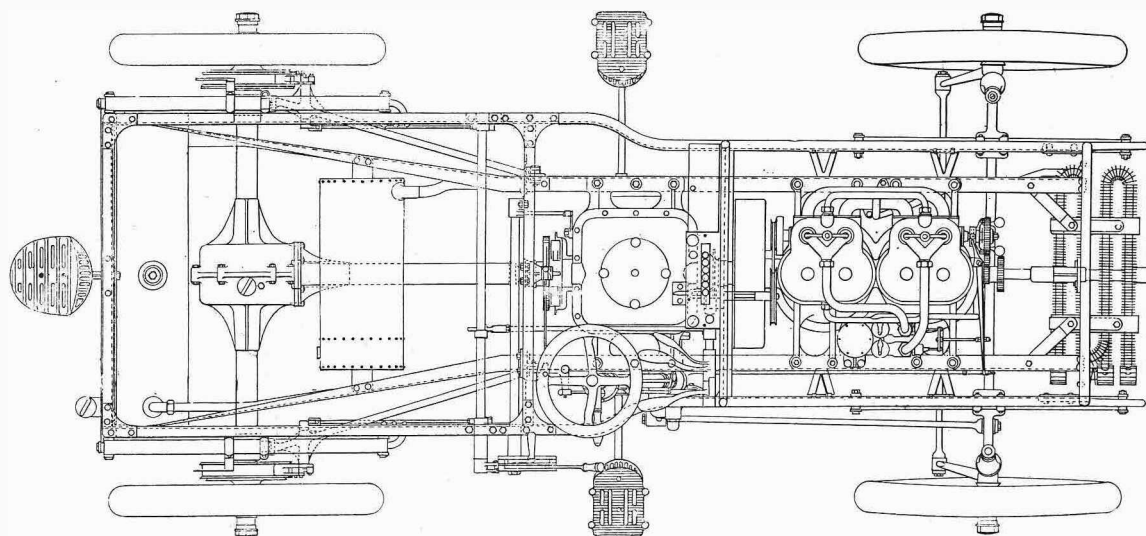
shaft for the low speed, while a movement in the contrary direction puts the larger wheels in gear. When the cavalier occupies a vertical position both the side wheels are out of mesh, and the drive is taken direct through the central shaft. The gear is extremely compact, and the changes of speed are effected without the slightest noise. Power is transmitted by a shaft to the differential, but the usual cardan joint is replaced by another of special form. The central shaft of the change-speed gear

perience we have had of the running of this car has shown us that there is no jolting even over the worst macadam roads, and no appreciable vibration from the motor, while we were also particularly struck with the perfect cleanliness of the motor and gearing.

Last week we gave some particulars of the new Titan motor manufactured by the Société des Automobiles Delahaye. The 100 mm. bore and 140 mm. stroke are the same dimensions as the



Elevation of the 14 h.p. F.N. four-cylinder car.

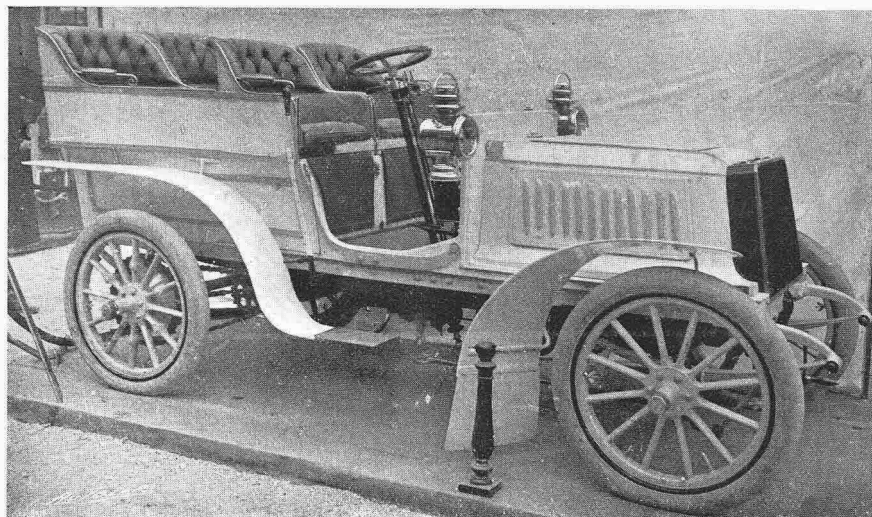


Plan of the 14 h.p. F.N. four-cylinder car. This illustration is worthy of close inspection, as it affords a good example of modern automobile construction. The bracing of the underframe to the main frame is particularly interesting.

is bored at the end and grooved to receive cross-pieces passing through the head of the transmission-shaft. To counteract torsion this shaft is carried in a long sleeve forming an extension of the casing in which runs the differential. The back springs are mounted on collars, which take the strains off the axle due to the vertical movements of the frame. A feature of the steering-gear is the pivots, which are inclined, so that a line drawn through the axis meets the centre of the rim at the bottom of the wheel. In this way the shocks are taken up through the axis of the pivot, instead of meeting it more or less sideways. What little ex-

well-known type of horizontal motor, and the speed of 950 revolutions is also the same. While, however, the firm have adopted the vertical model, they are by no means disposed to admit that it has any decided superiority over the horizontal engine, which has given sufficient proof of its high efficiency and reliability since a Delahaye car took part in the Paris-Marseilles race six years ago. As, however, fashion has gone solidly in favour of the vertical engine, the Delahaye concern have deemed it advisable to follow the general lead, and the result is the creation of a type of vehicle illustrated herewith, which on the show stand certainly has a very

pleasing appearance. We have already alluded to the simplicity and accessibility of the motor, and we may add that the firm still adhere to their well-known type of carburetter, which allows of the employment of either alcohol or petrol. The feature of the new Dalahaye car is the solid construction of the mechanism, as well as the independence of the motor, change speed gear, and differential, which are all grouped separately in a way to allow of any one of them being removed without interfering with the others. The construction of the frame and the method of power transmission were described in our preliminary report of the show in the last issue. On a second stand, the firm exhibit several industrial vehicles, including the public transport car which is shortly to be sent to Guadeloupe and two or three delivery vans. All these big vehicles are propelled by horizontal motors, with combined belt and spur wheel transmission, and they also recommend their old type of mechanism for heavy touring cars, private omnibuses, and the like, for, despite the prejudice against the horizontal



The 1903 Delahaye.

motor in the lighter pleasure carriages, they still believe in the superiority of the short belt from the point of view of smoothness of running and durability of the mechanism.

The Dietrich Refinements.

Occupying a prominent position in the body of the hall, the De Dietrich stand is presided over by M. Turcat, one of the inventors of the car, which, since its first appearance at Nice last spring, has jumped into the very foremost rank among high-class automobiles. The new features in the De Dietrich cars are in the direction of small improvements aiming at perfection rather than in any radical departure from systems which already give excellent results. The following are the improvements in the new cars: Gear-driven magneto. The clutch is made deeper, so that any wear can be readily taken up by the male cone, and the risk of slipping is thus avoided; the cone, moreover, is easily removable. By moving back the female cone, the gearshafts can also be taken out without interfering with anything else. The gearshafts, instead of being

square, have a round section with flat ridges to prevent the sliding train from working loose through any wear of the shaft. The bottom of the carburetter is fitted with a plug and filter, so that any impurities in the petrol are collected before entering the carburetter. Another convenient thing for buyers of De Dietrich cars is the numbering of every part of the chassis, and even of the carriage, to facilitate the supply of exchange parts without unnecessary delay.

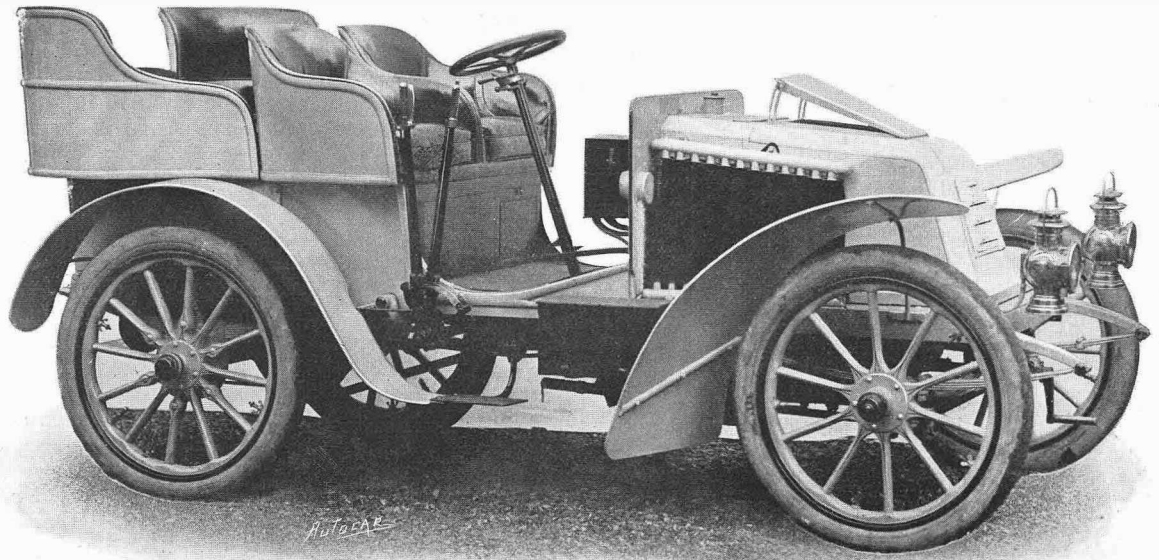
The vehicles of the Société des Automobiles Otto, 242, Rue Lecourbe, Paris, have been greatly modified, and are now driven by a vertical single-cylinder motor of 10 h.p., regulated on the exhaust. It is claimed that the engine has great elasticity, and will run from 250 to 2,000 revolutions a minute. A feature of this car is the Raffard coupling on the clutchshaft, resembling the couplings sometimes used for dynamos. It consists of a leather belt carried on the apices of triangular pieces, each alternate piece being on the opposite shaft, and the belt passes through buckles which hold it sufficiently to give way only under violent strains. This, of course, is intended to put a progressive action on the clutch and prevent excessive strains on the shaft. The change-speed gear is of the usual type, and runs in an oil bath. Pipe lubricators are entirely dispensed with on this car, as all the moving parts run in oil, and there are small lubricating boxes on all the bearings. The makers aim, indeed, at building a car which will require no attention from the driver, who need only supply oil periodically.

The Société Industrielle des Téléphones show a new type of chassis with four-cylinder Ader engine upon identically the same lines as

the two-cylinder motor of this firm. With a bore of 80 mm. and a stroke of 90 mm., the engine develops from 16 h.p. to 18 h.p. The only difference observable from the previous types of Ader chassis is the throttling at the carburetter and the adaptation of an ingenious form of air inlet. As is probably well known, the carburetter is of the wick type, and is in the form of a rectangular box packed with a number of layers of felt. The system is a very economical one, as is proved by the results of the different consumption tests in which the Ader cars have taken part. The novel feature of this carburetter, however, is the form of air inlet, consisting of a large orifice closed by a sheet cap under pressure of a spring. The cap, of course, opens more or less according to the force of the suction strokes of the piston, and thus the admission of air is automatically adjusted in the desired proportion. The friction clutch is separate and apart altogether from the engine flywheel, the male and female cones thereof being mounted on a special clutchshaft, carried in spigot and socket

bearings in engine and gearshafts. We have diagrams of this clutch, as well as the two inclined cylinder engine and change-speed gear, which we hope to produce, with description, at an early date. The Société Industrielle des Téléphones are building an extensive factory at Levallois-Perret, and in the course of a month or two the makers will be in a position to turn out Ader cars in much larger numbers than formerly.

Since the victory of the Renault light car in the Paris-Vienna race, this vehicle has come to be regarded as a standard in light vehicle construction, and visitors are naturally taking considerable interest in the new cars exhibited by Renault Frères. The chassis shown is of the Paris-Vienna type with a four-cylinder motor of 14 h.p. carried on two longitudinal steel tubes. It has a bore of 90 mm. and a stroke of 100 mm., and runs up to 1,500 revolutions a minute. The induction and exhaust valves are both mechanically operated by the same camshaft, the cams running in oil. The valve caps



The 14 h.p. four-cylinder Renault with Paris-Vienna type of chassis, but provided with touring gear and body.

are at the side, and are very readily accessible. The Longuemare carburetter is employed, and the air is warmed by passing through a pipe around the motor. The engine is automatically throttled on the carburetter. There is no modification in the change-speed gear and transmission, which have so long proved their efficiency that they have been the chief cause of the popularity of the direct drive on the top speed. All the moving parts are lubricated under pressure of the exhaust. In the latest Renault car, a brake drum with interior expanding band brake, is fitted in rear of the back universal joint of the propeller-shaft, on the driving bevel pinion-shaft, whereby the braking effect is removed from the propeller-shaft and its joints, and brought nearer the road wheels than usual. It goes without saying that the construction of these cars is of the highest order; and having developed what seems to be a definite type of carriage, MM. Renault Frères are preparing to greatly increase their production during 1903, their factory at Billancourt having been nearly doubled in extent.

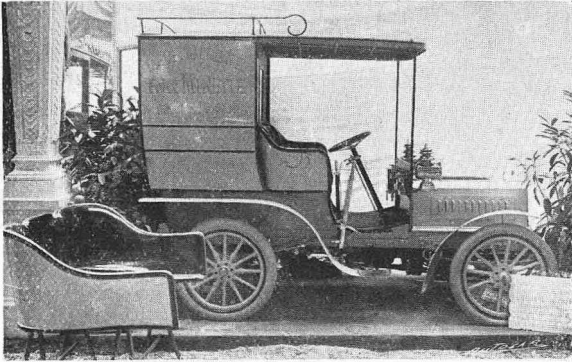
De Dion-Bouton et Cie. have an excellent display of their different types of light carriages, and they make a special feature of the new change-speed gear, which was fully illustrated and described in our last issue. This is fitted to the 10 h.p. car with two-cylinder motor, and provides for three speeds and reverse. The method of lubricating the gear and motor by means of a pump which sends the oil to the top of the gear box and crank case, where it is distributed by a perforated channel running round inside it, is, we notice, being adopted by certain other makers. The weight of the 10 h.p. engine is 78 kilogs. without the flywheel, or 100 kilogs. complete. The new 6 h.p. Popular car, which made its first appearance a couple of months ago, when it was driven around Western Europe by Cormier is exhibited here. A low-priced vehicle cannot, of course, be so elaborate as a more expensive car; but it is nevertheless likely to fulfil all the wants of the buyer in need of a cheap, useful, and reliable carriage. All the parts are reduced to the

fewest possible number, and the change-speed gear of the old type is arranged for two speeds of twenty-three and forty-five kilometres an hour. The ignition is retarded by a pedal. Another exhibit on this stand is a combined motor and dynamo, which is intended for the propulsion of vehicles by means of electric motors on the wheel hubs. The single cylinder petrol engine is coupled direct to a dynamo, forming a very compact arrangement; and a feature of this electrical generator is the magnetic throttle of the petrol motor. We are informed that this method of electrical transmission, which has a close resemblance to the Lohner-Porsche system, has been experimented with on a car, and has given excellent results.

The Société Aster, whose engines are so largely employed on light carriages, show a four-cylinder motor with the cylinders cast together; but the engine has undergone little change, the only difference being a diminution in the piston speed. Formerly driven at 1,500 revolutions and more, the Aster now only runs at about 950 revolutions. The

four-cylinder motor, exhibited with a bore of 105 mm. and a stroke of 130 mm., develops 12 h.p.

The voitures constructed by Passy-Thellier, Avenue Malakoff, Paris, have done some striking record performances during the year, and the racing car, with 20 h.p. Buchet engine, holds the world's record for the kilometre for this class of vehicle. Shaft transmission is employed, with direct drive on the top speed. Among the cars exhibited is a



The Passy-Thellier, which can be used either as a light delivery van or as a pleasure phaeton. Back seats shown detached.

transformable delivery van of a type which manufacturers have long sought to make popular with tradespeople who require a vehicle for business and pleasure. The van body can be removed in a few minutes, and replaced by two seats, forming a double phaeton. The vehicle has a 9 h.p. single-cylinder De Dion motor; but the frame has been lengthened to allow of a second motor being added if the user requires to transport specially heavy loads.

The Société des Usines Prunel, 4, Rue de Paris, Puteaux (Seine), build every part of their frame and propelling mechanism, but they fit any engine to the specification of buyers, and the vehicles exhibited have Aster, Herald, Pieper, and Prunel engines. The crank chamber and gear case are carried direct on the main frame. The change speed gear is of the usual type, with direct drive on the top speed and transmission from the countershaft to the driving wheels by chains. The countershaft runs on a double set of bearings. The Prunel motor exhibited has four cylinders. The bore is 100 mm. and the stroke 120 mm., and running at 1,200 revolutions it develops 20 h.p. It has square heads and automatic inlet valves. The firm have considerable experience in the manufacture of small internal combustion engines, as well as in the construction of gears and frames, and, possessing an extensive plant, they seem determined to actively develop their trade in autocars.

The Société des Ateliers, P. Sage, 57, Rue Emeriau, Paris, exhibit three vehicles, including a tonneau transformable to a delivery van, as well as a chassis fitted with a four-cylinder Abeille motor. This engine has a bore of 90 mm. and a stroke of 130 mm. Running at 850 revolutions, it develops 12 h.p. The principal change in this car is the tubular water tank, the small tubes being of corrugated copper. The sliding portion of the driving clutch is mounted on the engineshaft, prolonged, with a *tourne-à-vis* joint in rear, serving

to convey drive to a primary gearshaft without torsion. The overhang of the engineshaft rearwards to permit this appeared to us to be somewhat considerable, nor is the arrangement particularly new, as, if our memory serves us correctly, that particularly smart designer, Mr. Govan, of the Hozier Engineering Co., carries his friction clutch in the same way.

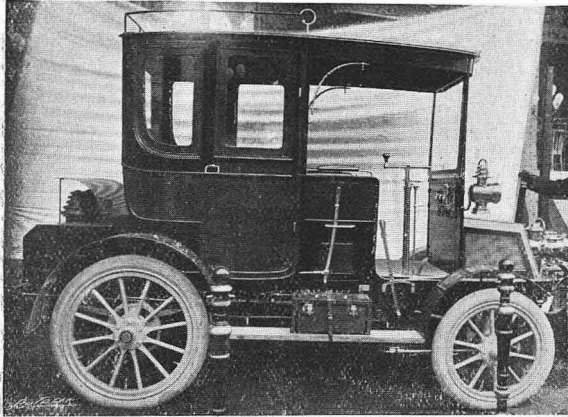
M. E. Louet, 14, Rue Fabre d'Eglantine, is a new maker, who presents a vehicle propelled by a three-cylinder vertical motor with mechanical inlet valves, and its principal novelty is the change speed gear, which is not only remarkably ingenious, but seems to be of a more practical character than is usually the case with inventions of this kind. The gear is contained in a rectangular box, in which slides a frame carrying four toothed wheels of various diameters. The bottom of the box is cut away to allow of the passage of the toothed wheel of the primary shaft, which gears into the wheels on the frame. Above them is the pinion of the secondary shaft, gearing in the same way. When out of gear, the train of wheels in its frame is drawn back to the end of the rectangular box, and for the different speeds the wheels are moved forward, when one or the other gears in between the pinions on the primary and secondary shafts, the operation being gradual and perfectly silent. When the moving train arrives to its proper position a catch falls into the frame.

M. Ernest Benoist, 233, Boulevard Pereire, Paris, exhibits some new types of vehicles known as the Dewald, and propelled by a four-cylinder vertical engine with mechanically-operated induction valves and a novel system of advancing and retarding ignition with the magneto. On the chassis exhibited there is also a new form of carburetter, designed on a principle which is now being followed by several makers who seek to automatically regulate the quality of the gas. The carburetter has a membrane or diaphragm which opens the air inlets more or less, according to the suctional strokes of the pistons, and the membrane can itself be adjusted by admitting air above it by means of a pointer closing an air pipe communicating with the carburetter, the pointer being on the steering wheel. Thus, by admitting air, there is a pressure on the top of the membrane which counteracts more or less the suctional effort of the piston, with the result that the action of the carburetter can be regulated with the greatest accuracy.

Some New Steam Cars.

Among steam cars, the only makers represented are Gardner-Serpollet, the Locomobile, Chaboche, and Turgan et Foy, the last-named showing nothing but the heaviest types of industrial vehicles; but M. Chaboche appears to be developing his system on entirely different lines, and after giving attention especially to the bigger types of vehicles he exhibits at the show a number of pleasure carriages of a much lighter type than he has manufactured in the past. We are of opinion, indeed, that the Chaboche system, with its automatic feed, is much more suitable for light cars than for big industrial vehicles, and the water and oil feed and lubrication are so absolutely automatic that the new cars certainly merit the attention of those interested in

steam traction. The whole of the propelling machinery is enclosed in one case, which is simply bolted to the underframe. The two-cylinder double-acting engine, inclined slightly out of the horizontal, forms part of the gear case, and, working with highly superheated steam, the pistons and sliding valves are lubricated separately. The engine develops 20 h.p. It has the ordinary link motion, and the hand lever at the side of the driver is notched for a cut-off of ten, thirty, and fifty per cent. In the light carriages exhibited, the chassis weigh from 700 to 800 kilogs. As we have said, the whole of the mechanism is contained in a compact case underneath the car, and the pressure



The Chaboche steam car

tanks for paraffin, water, and lubricating oil are under the driver's seat, so that the only thing observable is the generator at the rear. This is now arranged so that the two lower spirals can be easily removed in the event of deterioration from the heat, while the upper ones, being less subjected to heat, will, of course, last almost indefinitely. It is claimed that the consumption of paraffin is one litre for four kiloms.

On the stand of the Société Parisienne are to be seen what are probably the most elaborate vehicles in the show. The chassis are the new Mors, with long straight bonnet and honeycomb water tanks, and the bodies are built by Lamplugh et Cie., who have certainly combined in a remarkable degree the British ideas of comfort with the French elegance and finish. In the small private omnibus, the body is of square form rounded off at the corners, and in each corner is a fauteuil upholstered in red leather. Between the seats on each side are small cabinets. The roof is incrustated, and the windows are hung with light yellow plush curtains, which are artistically arranged with electric incandescent clusters. Inside the omnibus is an electric indicator, consisting of a number of buttons which, on being pressed, rings a bell and lights up one or other of the names on the glass top of a small rectangular box containing a number of small lamps, so that at night the driver knows at a glance whether he is required to go to the right, left, or in any other direction. These vehicles have attracted a great deal of attention, and we noticed Count Boni de Castellane and other distinguished members of the French aristocracy on this stand.

For some reason or another, the independent fore-carriage capable of being adapted to any ordinary carriage has never been a success in France. At all previous shows there have been a few examples of this system, either with petrol motors or electric batteries; but though one or two are to be seen occasionally on the streets, they have all disappeared at the exhibitions, and the only fore-carriage we have noticed in the Grand Palais is an Italian mechanism put on the market by the Cie. des Voitures Electriques, Avant-Train Cantono, 18, Avenue de St. Ouen, Paris. The battery box is carried over the front axle, and contains forty-four cells, weighing about 570 kilogs. There are two series wound motors suspended on brackets in front of the axle, and the shafts of the motors gear on to toothed wheels bolted to the front wheels. The motors are excited independently, so that they can be used for steering. They also brake electrically, and recuperate on the down grade. There are also mechanical band brakes on the wheels. The force developed by the two motors is 16 h.p. There is a vertical regulator actuated by a lever giving six forward speeds and reverse. The steering is by a vertical wheel something upon the Bersey system.

A Buchet Modification.

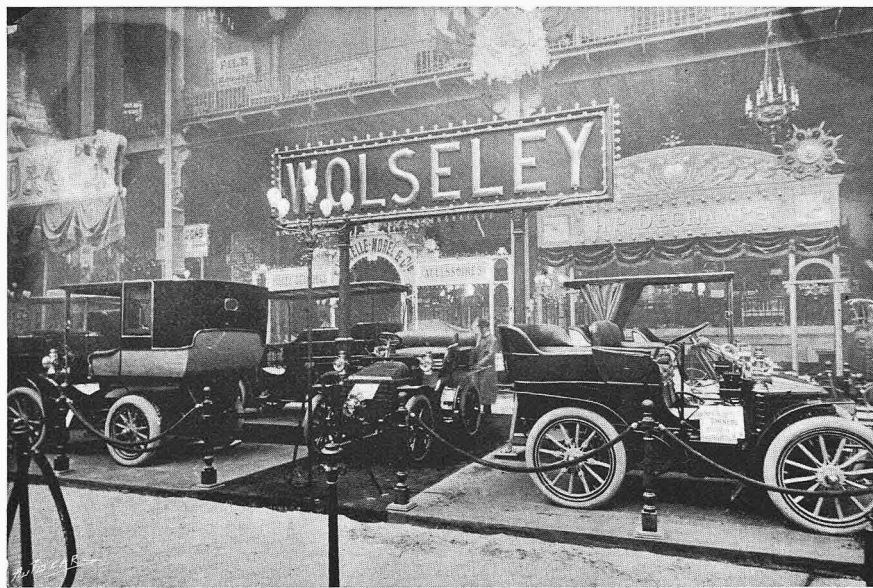
On the Buchet stand there is no radical change to be noticed in the motors, and if any further improvements are contemplated, they have been delayed by the death of the late M. Buchet; but nevertheless the makers exhibit some very fine engines, including one of 70 h.p., of a type that has been specially designed for navigable balloons. Lightened for aerial propulsion, the whole engine weighs only 220 kilogs.; but for cars the weight is 270 kilogs. The only modification on the recent types is the position of the camshaft, which is now carried along by the side of the cylinder heads, and motion given to it from the motorshaft by bevel gear.

The car, with four-cylinder motor of 24 h.p., exhibited by the Etablissements Selbach, 20, Quai de Suresnes, is interesting to British visitors, because it seems to be an attempt on the part of the English trade to carry on business in France. We are informed that these cars are to be manufactured under licence from the Brush Electrical Engineering Co. The vehicle exhibited is not the standard pattern for 1903, as this will only be exhibited at the Crystal Palace.

Brouhot et Cie., of Vierzon, are another firm who have abandoned the horizontal engine which has always been their special feature, and the adoption of the vertical engine has naturally resulted in an entire change in the arrangement of the chassis. The other points in the old cars were the carburetter and the suppression of the differential, which was replaced by a ratchet inside the hubs of the driving wheels. The carburetter has been retained, as this is found to give extremely satisfactory results when running with alcohol; but the ratchets have been done away with, and with the use of the side chains instead of the central chain, as formerly, it has, of course, been found necessary to have a differential on the countershaft. The Brouhot car has thus lost its originally distinctive features, and now follows the general practice in autocar design.

On the stand of C. E. Henriod et Cie., the leading novelty is the driving axle, which is fitted independently of the frame. The small change-speed box forms part of the differential case, and this has tubular extensions, which are bolted on the leaf springs. It has, therefore, no connection whatever with the frame. The system, of course, needs a special form of cardan shaft, with a wide angle of flexion; and the makers claim that, with a motor, transmission-shaft, and universal driving axle, any carriage-builder is able to construct autocars.

One of the most ingenious cars in the show is that manufactured by the Etablissements Hautier, which was described in these columns about three years ago; but it has recently undergone several modifications, though the general arrangement of the propelling gear is practically the same. The four-cylinder motor is made with mechanical inlet valves and flat covers on the cylinder heads to allow of inspection of the pistons and water-jacket. The crank chamber is carried on two longitudinal steel



The Wolseley stand (see page 632).

angles, and these are supported from the main steel frame by tubular arms. All the pipe connections are very short, and the spiral radiator in front of the crank chamber, and underneath the water-tank, is cooled by forced air circulation from a fan. The clutch is actuated externally. The motorshaft carries a pinion running between satellites, which gear inside a toothed drum; and to convey motion to the countershaft, the drum is fixed by a hinged clutch, which is drawn together by a wormshaft. On the drum being fixed, the satellites are, of course, obliged to revolve, carrying with them the shaft on which they run.

Improvement in Carriage Work.

In the way of carriage bodies, a general improvement is observable all round, alike in the form of the bodies and their finish. At previous shows, we have seen a tendency towards increasing the powers of motors and the size of frames, with the result that the voiturette was entirely overshadowed by the light carriage. Since that time the term "light

carriage" has become rather elastic, and though officially defined by weight for racing purposes this type of vehicle seems to be merging into the big car. The makers, in fact, scarcely stand by this definition, and being only concerned in the building of useful cars they aim at increasing the comfort and convenience of their vehicles. Firms who have hitherto turned out nothing but voiturettes and light carriages are now constructing cars with four-cylinder engines of 16 h.p., 20 h.p., and 24 h.p., and as they are increasing the size of their frames they are fitting larger bodies without any consideration for the weight limit. It is really difficult to say, therefore, what is really a light carriage or a big car, this latter term being chiefly confined to heavy racing vehicles, Limousines, private omnibuses, and the like. The voiturette is turned out mainly by the small makers, while the firms with big facilities for production are going in more and more for the trade in larger vehicles. By increasing the dimensions of the frame, the maker is able to fit

more commodious bodies; but he has been able to evolve scarcely anything new in carriage forms. The tonneau is still the most popular type of vehicle, and the rounding out of the back seats and the fitting of a folding seat to the door have certainly removed the objections that used to be raised against this type of car. The double phaeton is not so general, but the Limousine has taken a prominent place, and the leading firms are building omnibuses, *berlines*, or coaches, and other big vehicles of well-known types. For town use, a form that meets with a great deal of favour among buyers is the French cab—that is to say, the hansom cab on four wheels, with the driver's seat in

front. This form was a failure when used with horse traction, but it seems to be particularly adapted for motor vehicles. The only objection to it is that it only provides seats for two passengers. It is a convenient type for the professional man, however. The show, therefore, points to improvements in existing forms of carriage bodies rather than to the creation of new types, and as the art of the carriage-builder seems to be settling into a definite groove there is a danger that if the public get too accustomed to the existing forms they will not take kindly to novel designs, however much they may be appropriate to the automobile.

Magneto Timing.

The sliding cam sleeve, like that employed in the Serpollet pumps, we found adopted in two cases at the Salon for two different purposes. In one case it is employed by M. Edouard Benoist on the Dewald automobiles for the timing of the magneto ignition. The rods used for lifting the contact breakers within the cylinders are actuated by com-

cally inclined cams on a sliding sleeve, which sleeve moves laterally on a layshaft driven by half-time gearing in the usual way. An ordinary form of governor serves to move this shaft backwards and forwards on the solid shaft, and causes the major or minor axis of the cams formed thereon to be brought beneath the contact breaking rods. The engine of this car, when fitted with its Bergmann rotating magneto and the sliding camshaft, as above described, can be accelerated by restraining the action of the governor in the usual way. The other case is that of a car which has already made a great name for itself in the matter of extremely small consumption, and in the engine of this vehicle we find the governing performed by a hollow, sliding camshaft, the inclined cams of which operate the induction valves. It has always been admitted that control of the lift of the induction valves is superior to control by throttle, always allowing that this control can be simply and delicately effected. This has not often been very satisfactorily effected, but in the engine in question, success in this regard appears to have been largely attained. The sliding cam sleeve is controlled by the governor, and we are informed by an English agency, who will shortly introduce this car to British automobilists, that the engine runs and governs so sweetly as hardly to be audible.

One Contact Commutator for Four Cylinders.

In addition to this induction valve governing, the engine in question is remarkable for being fitted with a commutator, which, for engines of one, two, or four cylinders, has but one contact. The result of this arrangement is that a spark is produced in all the cylinders at the same time. The makers of this engine insist that the absolute accuracy of the relative timing in the cylinders makes more than ample amends for the waste of current. Again, in this car, the name of which we do not divulge until we are able to produce a fully-illustrated description, the road driving wheels rotate on a fixed axle, but are driven from a live differential-shaft by pinion and internally-toothed spur wheels, the latter being bolted to the road driving wheels. The outer peripheries of these internally-toothed rings serve as the brake drums for the hand lever-applied brake hands. In this car, too, the pedal brake takes a form which we do not remember previously to have seen. The sliding male cone of the friction clutch is formed with a rearward reverse-coned surface, and while the clutch pedal serves to withdraw the clutch cone portion sufficiently from the female cone in the flywheel to disengage the drive, the brake pedal, when depressed, not only withdraws the driven cone as aforesaid, but brings the reverse coned portion of it into con-

tact with a fixed female cone ring strongly attached to the frame, a powerful braking effect being thereby attained. The only objection we perceive to this arrangement is the fact that the braking effect must pass through change-speed gear and differential driving gear before reaching the road wheels.

What we are inclined to describe as something quite unique in body-building is shown on the stand of the Société Parisienne, where Messrs. Lamplugh have what, for want of a better term, they describe as a Pullman car body. It is a light and beautifully finished small bus body, glazed all round with heavy bevelled plate glass, rounded corners, and provided within with four swivelling fauteuils, and two small table cabinets between. Luxuriously carpeted, hung with velvet curtains, handsomely decorated, and lit by electric light, it may certainly be said to be the body de luxe of the show. By means of an electrically-actuated indicator sign the driver of the car can be instructed as to pace and direction from within. Pressure upon corresponding



The Napier stand (see page 632).

stops causes a light to appear beneath the words "Turn," "Home," "Go back," "Slowly," "Faster," "Right," "Left," or "Stop," as may be desired.

THE GREAT GALLERY.

The tour of the Great Gallery encircling the Great Hall and Transept was last year productive of many interesting finds, but we regret to say that the reverse is the case at the present exhibition. Perhaps the most instructive exhibit to be found there is that of Lemoine's axles and springs, which offer several valuable lessons to the constructor. We found Mr. Geo. Iden intently studying these exhibits, and he pointed out to us that in their latest steering axles Lemoine's had gone back to the form of axle he had originally fitted to the M.M.C. cars. In this axle the steering standard is held between the specially-fitted lugs of the yoke ends of the steering axle, and certainly appeals to the thoughtful as a stronger and more satisfactory design than that generally adopted. The hollow internally-swaged

axles shown here are particularly fine examples of the perfection to which this renowned firm have brought the art of automobile axle construction. An interesting distance recorder is shown by Delasalle, to actuate which a peg wheel is fitted to the internal face of the road wheel hub, for the purpose of actuating a gear carried in a case attached to the frame. A flexible shaft communicates with the mechanism of the recording gear to a neat case with dial plate attached to dashboard.

In F. Montandon's system we have a watch, distance recorder, and speed indicator all included in one fixture for attachment to the dashboard. The mechanism is enclosed in the watch case, and is driven by a friction wheel impinging on the driving wheel hub, and a flexible shaft leading to the recording gear. A Veeder trip cyclometer projects from one side of the watch case, and, of course, serves as the distance recorder, while an indicator hand rotating at a few seconds intervals on the watch face shows the speed at which the car is travelling.

Pneumatic and other Tyres.

Whatever of novelty there is in the tyre section of the Palais des Automobiles is directed towards the production of effective non-slipping treads. One of these—the Lucas—consists in placing a special leather cover over the rubber which protects the fabric, causing this leather cover to carry on the tread of the tyre a band of leather studded with disc-headed steel rivets. The leather band is secured by its underside to the tyre by steel rivets.

Cudie and Co. show an armoured tread, which reminds one of the Wilkinson tread we have had so long with us, save that clips of steel wire, resembling tiny belt fasteners, are thrust into the surface of the rubber tread by a particularly ingenious machine which is shown at work on the stand. The inner projecting ends of the small steel clips are turned over each other, and the cover proper of the tyre protected from these by a soft rubber liner. The tread presented to the ground is on this cover half metal and half rubber; the clips being inserted longitudinally may very probably avoid skidding. How they will wear is another matter.

The Gallus tyre, with its metal strips carried on a square rubber tread and riveted through same, is as previously exhibited.

The Invictus tyre has egg-shaped air chambers set in spongy rubber, and strikes us as being an old idea.

The Pneu. Chapelet, likewise, has an ancient ring about it. It has a rubber fabric-lined cover, extended by a series of circular blocks of rubber held at intervals on a central metallic cord, and with a small air passage through each block to the spaces between. We do not think much time need be wasted on this exhibit.

The Dunlop (Société Française de Pneumatiques) make a big show, but offer nothing out of the usual to view.

The well-known armoured treads of Messrs. Falconnet Perodeaud are exhibited with the metal-protecting clips attached in even a more secure and simple method than before. The attachment of the armour slips to the treads by skilled and intelligent artisans attracts much attention.

The makers of the Continental tyres—the Continental Caoutchouc and Guttapercha Co.—have a very large exhibit, as they have an important agency at 18, Rue Brunel, Paris, and a very large number of their tyres as used on all sorts of cars, their success in so many of the classical races having had a great effect upon the practical French automobilists.

A British exhibitor of tyres is somewhat of a rarity, to say the least of it, in a French motor show, and consequently the New Grappler Tyre Co., of Dublin, are to be congratulated on their enterprise in having a large show of their well-known tyres in the Salon.

An advertiser in a New York daily wishes to "exchange Topsy, a full-grown elephant, for an automobile." Doubtless it has become a serious question of upkeep.

* * *

A case in which a motorist was charged with driving a car at the rate of twenty miles an hour was actually dismissed last week at Stockport, notwithstanding the police evidence. Mr. T. W. Grace, of Manchester, for the defence, said the car was running within its second speed of ten miles an hour. The motor car had come to stay, but the harsh treatment of the authorities was driving an important industry out of the country. These prosecutions always originated from the country and not from town, and it was evident that automobiles gave the country policeman a cheap way of earning distinction. Mr. Grace went on to say that some magistrates entertained considerable feeling against motorists, and assumed that motor cars were only on the road on sufferance. The magistrates did not consider there was sufficient evidence to warrant a conviction, and dismissed the case without hearing witnesses for the defence.

* * *

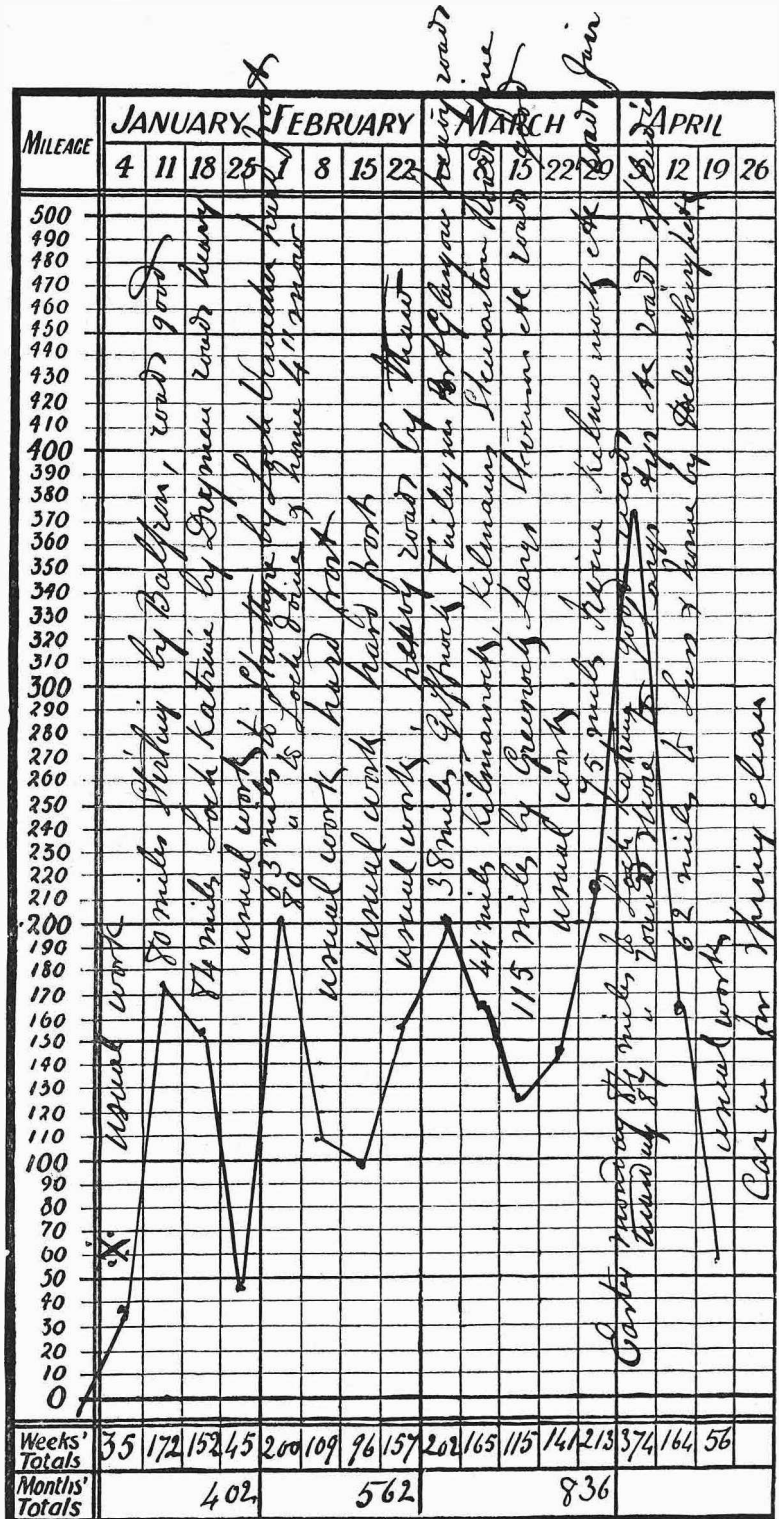
At the Newbury County Court last week, Messrs. Stradling and Plenty, motor car agents, of Newbury, sued Dr. W. S. Whitcombe, of Aldermaston, for £24 for the hire of a motor car. It appears that defendant hired the vehicle for three months, but returned it at the end of the first month, alleging that it was not in good working order. Both the judge and the jury at the outset professed entire ignorance of autocars, and His Honour suggested the appointment of an independent arbitrator, but this course was not adopted. The amount of special knowledge which was brought to bear upon the case may be gathered from the following passage in the report: "Witness was subjected to a complicated cross-examination, and His Honour quietly observed to the jury: 'I hope you understand all this, gentlemen; I confess I do not.' A juror: 'It is beyond us; I have only been in a motor car once myself.' Mr. Walsh (counsel for defendant): 'I have never been in one myself.' His Honour: 'I understand that, in justice to your client, you are bound to go into all this cross-examination, but it is all Chinese to me, and, therefore, if it is not understood by either myself or the jury, what is the good of it all?' However, in the end, the jury returned a verdict for the plaintiffs, and judgment was entered accordingly.

A FOUR MONTHS' RECORD.

Mr. Walter Creber, of Gorbals, Barrhead, N.B., wrote last spring in reply to our request for experiences: "My connection through life with railway, waterworks, and other contracts, naturally gave me a leaning towards the steam engine generally, and so soon as the Act gave us the power I naturally turned towards a steam autocar. After two years' searching, I had to give up the idea and turn to the petrol car as the most practicable, meantime. Then as to the particular one to choose. Being somewhat old-fashioned, it was natural for me to think that a little weight added stability to the different parts, and also bearing in mind the fact that I could see the whole engine and car built near my home led me to fix, eighteen months ago, on an Albion car. I am pleased to say that I have never regretted the choice. During the first ten months the car covered over 9,000 miles, part of which was the 535 miles of the Glasgow Exhibition trials, for which the car gained the A.C.G.B. and I. medal. Enclosed you will find the weekly chart of work done this year. The car has run wet or dry, snow and frost, and never given the least trouble on the road.

"I may say that I have had to return to the horse for a fortnight, during which the car is undergoing its spring cleaning, and I fail to find words to express the difference we all feel in the change back."

We have reproduced the chart to which Mr. Creber refers, as an example of the manner in which the performances of a car may be recorded. With properly ruled sheets a complete record of the distances covered each day may be preserved for future reference, and by means of notes in the blank portions of the chart valuable information may be registered as to the routes taken, the condition of the roads, etc. The information thus gleaned could be easily tabulated and dealt with afterwards so as to make it of use to other automobilists if necessary.



* The handwriting on the chart consists of notes on the longest day runs and the condition of the roads.

The "battle of the tolls" over Maidenhead Bridge advanced another step on Monday last when the town council agreed to the recommendation of the Bridge Committee that immediate steps be taken "to obtain an Act of Parliament which shall (a) repeal the Maidenhead Bridge Act of 1772, (b) abolish the bridge tolls as from November, 1903,

when the present letting expires, and (c) vest the bridge and bridge property in the mayor, aldermen, and burgesses of the borough of Maidenhead for ever." The lessee of the tolls has applied to the Corporation for recompense owing to tolls for motor cars having been reduced from sixpence to twopence.

THREE ENTHUSIASTIC MANCHESTER AUTOMOBILISTS.



The illustrations herewith are from photographs of a 10 h.p. Wolseley car belonging to Mr. James Whittaker, of Queen's Road, Cheadle, Hulme, near Manchester, who is a member of the Manchester Automobile Club. The smaller vehicle which

the larger picture, the owner of the car is standing behind, while Mrs. Whittaker is on the driving seat with Mr. Hartenfield (the Wolseley driver), who has been initiating her into the mysteries of driving. In the second illustration, Mr. and Mrs.



figures in the two lesser photographs is a Century tandem belonging to Mr. Lowther, who is also an enthusiastic automobilist. The photographs were taken in the neighbourhood of Alderley Edge. In



Whittaker are in the Wolseley car, while the Century is occupied by Mr. Lowther (in front) and Mr. Hartenfield (behind). The third picture is self-explanatory.

It has for long been obvious that there is a good opening for the hiring out of cars for business purposes as well as for pleasure trips. Several enterprising people have long realised this, and have done very well. Mr. R. M. Wright, of Lincoln, has keenly followed this phase of business, and has, in consequence, done quite a lot of hiring-out. In November alone he ran his cars 1,100 miles in hiring out, and two of his cars (Humbers) have during the last few months done 7,000 miles, the hiring mileage this year exceeding 12,000 miles.

Mr. H. Brown, the Leeds representative of Messrs. W. and A. Gilbey, recently made a three days' tour on a hired motor car, and was able to complete a greater distance than would have been possible by any other means. Many of Mr. Wright's clients have been medical men called to consultations and to urgent cases, and they appear to prefer to hire than to use their own cars for special journeys. Shooting parties also make up a goodly proportion of the trade, which looks like growing considerably. Other agents might do worse than copy.

Correspondence.

THE ROOTS-VENABLES PETROLEUM CAR.

[2711.]—In reply to enquiry of Dec. 6th *re* Messrs. Roots and Venables' oil car.

I have one in use which have nearly completed three years' service. It is speeded to about five and twelve miles per hour nominally, but it easily does fifteen, and sometimes it has been nearer eighteen, and anything below.

As to reliability, it starts at the first or second turn of the handle, and I have run it more than once for twelve hours continuously.

It will take moderate gradients on the quick speed, and it is only necessary to drop on to the "slow" for stiff ones. It is all I could wish as a hill climber. In fact, I should like the slow-speed geared a bit higher for most roads, as it is only very exceptional to meet a hill that taxes its power on that "speed." But one must be prepared for the *worst*.

As to durability, I think the car is A1. It now needs new chains and new balance gear. That is all I know of.

As to noise, I consider it an average car. It is not nearly so noisy as many that are about here, owing to its having a large silencer.

As to smell, there seems to be an idea the oil cars make more smell than petrol cars. I think it is quite the other way. If the oil-feeder does not supply lubrication too freely the exhaust is invisible, and *far* less offensive than petrol. Of course, if the petroleum oil is allowed to get on any of the external parts of the car, as soon as the car is started it will evaporate visibly as smoke, but will cease as soon as the evaporation is complete. Contrary to the common idea it does *not* smell objectionably, though smoke from an *excess* of lubrication does.

My car is housed between two Daimlers, so I see a bit of petrol cars.

Of course, the usage of ordinary lamp oil is a great convenience and safeguard. A gallon will drive one from thirty to forty miles, according to roads. Cost at small shops, 8d. gallon.

MICROBE.

[2712.]—As the owner of what I believe to be one of the pioneer cars of the above make I am able to give the information asked for on page 582. My car is five or six years old, two seated, with twin cylinders $4\frac{3}{4}$ in. bore by 5 in. stroke, and governors set for 600 revolutions per minute; geared top speed eleven and three-quarter miles per hour. This just suits me, as I am getting old, and only use it in lieu of a pony carriage, but if the gears were altered the car would certainly go twenty-five miles per hour on the level, as it has ample power. It is practically as it left the makers, and will take its occupants there *and back* to-day as well as ever it did. The engines require no attention at all, except being kept supplied with oil and water, and lubricated—never fag—and there is no fiddling with mixture taps, etc.; in fact, just the very thing for an "old cuss" who is getting lazy and likes to jog along and take it easy. The roads around are give and take. One hill is half-a-mile of one in sixteen, with a cyclists' danger board at top. The car takes this easily at about five miles per hour, and I have stopped in the middle and started again easily. It is by no means noisy, although not so well "silenced" as some more modern cars, and if kept clean makes no more smell than a petrol car. I have placed my hand in the exhaust close to the rent without it being discoloured or scented.

I recently tested the car on a twenty miles non-stop run, when it used six pints of Tea Rose paraffin, and about one and a half fluid ounces of Price's heavy gas engine oil.

RICHARD PARR.

AN ECONOMICAL CARBURETTER.

[2713.]—Can any of your large number of readers recommend a good *economical* carburetter?

I have a 9 b.h.p. "Rex" car, fitted with a small unnamed spray float feed, and even when driving on the hand throttle can never get more than eight miles out of the gallon. Perhaps someone used to this particular make of car can advise me how to overcome this difficulty.

I. P. MELL.

THE INSURANCE OF CARS.

[2714.]—Many persons pay willingly for the insurance of their cars at very high rates of premium, but it is to be feared that few of them take the trouble to read their policies. I recently invited a quotation and a submission of the form of policy proposed from the General Accident Assurance Corporation of Perth. I asked a few searching questions such as would occur to any man of business, and was in consequence informed that the company "would not be prepared to alter the policy."

It will probably, therefore, be instructive to your readers if I point out the one-sided character of the policy, which professes to insure against collision, third party risk, and larceny.

1.—Damage will be paid when it "directly results from collision with an object in a public thoroughfare in the United Kingdom," subject to the various conditions. This sounds very well, but the actual effect is that one will not receive compensation for damage resulting from collision—

- (a) In France or anywhere abroad.
- (b) In a stable or a gentleman's park or a private road of any kind.
- (c) If it is only one's lamps that are smashed or one's tyres that are cut.
- (d) For the first £2 10s. of any damage.
- (e) If one's collision is with an uprooted milestone or boundary stone in the dark which has been negligently left on the highway.
- (f) If one is driving at more than twelve miles an hour.

2.—The third party risk is also

- (a) Limited to the United Kingdom.
- (b) Limited to a public thoroughfare.

3.—The risk of burglary, housebreaking, and larceny, which the policy professes to take, does not protect you—

- (a) If abroad.
- (b) If one's motor car is in the stables of a friend.

4.—The Arbitration Clause in the conditions is drawn in an unusual way, and does not simply refer to the Arbitration Acts, and incorporate them. Moreover, it gives the corporation the option of deciding whether there is to be an arbitration or not.

5.—Condition 8 gives the corporation a most unusual power to determine the policy by posting a letter to the last known address, and provides that they shall in that case return the balance of the premium, not as a matter of course, but "on demand." It is obvious that by this provision a man who was abroad might suddenly find that his car was no longer covered, although he might not know of it for months afterwards.

In case you think it worth while, I have set out separately in full the conditions on which I comment. While policies are drawn up in this manner, it would probably be better to insure with Lloyds. Indeed, I think the most practical recommendation would be that a small sub-committee of the Automobile Club should draw up in consultation with the Insurance Office such terms as are fair, and that automobilists should then refuse to accept any others.

RUSSELL.

CONDITIONS IN POLICY.

"6.—Damage from wear and tear or bad roads or any loose metal or stones thereupon, or injury or damage from electric shock, fire, or explosion, or loss of or damage to rubber tyres or lamps, or injury or damage caused or sustained whilst racing or pacemaking, or whilst riding in a match or for a wager, or by any breach on the part of the assured of the law now in force, or that may come into force, regulating mechanically-driven vehicles on highways, is not covered by this policy."

Amendment refused by the corporation—

- (a) To insert after the word "stones" the words "for the purpose of repair."
- (b) To insert after the word "highways" the words "except the regulations relating to speed."

"8.—The corporation shall be at liberty at any time by giving notice in writing to the assured by registered letter to determine the policy as from the receipt of such notice, without prejudice, to the rights of the assured in respect of prior accident, provided that the corporation shall in that event return *an demand* to the assured the premium

paid by him, less *pro rata* part thereof for the portion of the year the policy has been in force; and such notice shall be deemed sufficiently given if posted and addressed to the assured at the within-mentioned address, and shall in such case be deemed to have been received by him at the time when the same would be delivered in the ordinary course of post."

Amendment refused by corporation—

To strike out the words "on demand."

"10.—If a dispute shall arise as to whether the corporation is liable under this policy, or as to the amount of its liability, the matter shall, if required by the corporation, be referred to the arbitration of two neutral persons, one to be chosen by each party, who may appoint an oversman or umpire in the usual way; and in case the assured shall neglect or refuse, for the space of fourteen days after request in writing from the corporation so to do, to name an arbitrator, the arbitrator of the corporation may proceed alone, and the award of such arbitrators, arbitrator, oversman, or umpire, shall be binding, and may be made a rule of court; and no action or proceeding shall be brought or prosecuted on this policy, except for the sum so awarded and costs, if any. The costs of, and connected with, the arbitration shall be in the discretion of the arbitrators, arbitrator, oversman, or umpire."

Amendment refused by the corporation—

To strike out the words, "if required by the corporation."

COLLIER TYRES.

[2715.]—Referring to the letter of "Anxious Enquirer" in the issue of the 13th inst., asking a question as to Collier tyres, the best answer I can give is my own experience. I had these tyres fitted at the commencement of last year to a Locomobile and ran the whole season, only having one puncture from a three-inch nail. A new tube was inserted, and the tyre has run ever since without giving any trouble. Early this year I had my 10 h.p. Wolseley car fitted with four Collier tyres. It has travelled nearly 5,500 miles, and I have only had one puncture from a four-inch nail. In all the tyres the treads show practically no wear, and I shall be exceedingly disappointed if I do not get 10,000 miles out of my Wolseley car without any additional expense in respect to tyres. I have never had any bursting or pinching, and it is almost impossible to pinch an inner tube with a Collier tyre owing to the nature of the seating and fastenings.

A. E. WILLIAMS.

THE NUMBERING PROPOSALS.

[2716.]—The action of the Automobile Club and legislative committees at their meeting on the 3rd reminds one of the "man and his cuddy." He tried to please everybody; he pleased nobody, and lost his donkey to the bargain. The numbering proposals of anti-motorists are made because they hate the autocar and wish to see it banished off the road; or, not to be uncharitable, they ask for a number, so that the car going beyond the legal limit may be identified. Of course, a car travelling over the legal limit could not be identified by its number, and more particularly on a dusty or muddy road, but county councils and other authorities who have no experience of motoring will not believe anything to the contrary. Of one thing the motorist may be certain, and that is, that these authorities have no intention of conceding the abolition of the speed limit. They desire a limit to speed and to have a number, too.

On our highways, be there little traffic or otherwise, I do not think that even motorists who are content to travel, say, at twenty miles an hour, have any desire that these highways should be overrun with autocars geared to sixty or seventy miles an hour. They are a positive danger to all users of our roads, and should be confined to a special track.

At the meeting it was suggested 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." A clause to this effect will not prevent cantankerous people putting the motorist to

the trouble and expense of going to court to prove there was no danger to other passengers, and with a prejudiced magistrate on the bench, the chances are ten to one the motorist would come off second best. Like all other innovations, motoring has to run the gauntlet, and till then it is surely better to put up with the ills we know than take on those which would simply make the life of the motorist unbearable, and put back for a generation an industry which can only be for the welfare and the best interests of our country.

JOHN LOVE.

P.S.—Time is certainly on our side, and if the question can only be deferred, the matter will right itself, and we shall have no numbering.

[2717.]—It was with great satisfaction that I read the decision of the Joint Committee of the Automobile Club to adhere to the policy of conceding in any statute for altering the present absurd speed limit—that cars shall not be driven on the road without having on them a symbol which shall afford means of identification. I agree with the objection to numbers, but a name, to be associated with a number in the register, will serve quite as well, and be consistent with the old usage of naming coaches and the present practice of naming pleasure-boats, yachts, etc.

We are told in the autocar press that what is proposed is quite unnecessary, and I notice that editors head paragraphs with "Let Well Alone," and correspondents sign letters with "Let Sleeping Dogs Lie." It will be obliging if they will tell us what it is that is well and to be left alone and who are the dogs that are asleep. Until they do so, we may take the liberty of holding the opinion that there are more ostriches than dogs about, and that these proverbial expressions are as appropriate to the actual situation as was the solemn utterance of a certain sleeper at the bottom of the Hill Difficulty: "Then said Presumption, 'Every tub must stand on its own bottom.'"

Meantime, I shall continue to have the belief that things are anything but well, and that this is no time for sleeping. It is a time for all moderate men to dissociate themselves from a class of automobilists, already too numerous, who sacrifice to their own gratification that kindness and consideration towards their fellow citizens, the absence of which tends to make the lives of others unpleasant, and to arouse just indignation leading to a demand for repression. Our principal reason for proposing now to put a symbol on our cars is that we desire our fellow citizens to know that we are out of sympathy with the apparent desire of some to use our roads as if they were made for racecourses, tearing along with roaring exhausts; in dry weather enveloping other users of the road in such a cloud of dust that for minutes they cannot move with safety, and so must sit till it settles down on them; while in wet weather, they bespatter carriages and foot passengers with showers of mud—in a word, displaying a cynical want of ordinary courtesy and consideration that deserves the strongest condemnation.

I say nothing just now of the great alarm caused to people—even those who are not abnormally nervous—and of the actual risk to which express-train speed on open roads necessarily gives rise.

I am prepared—as a protest against the conduct of such enemies of true autocar sport, if some other gentlemen will do the same—to put a name on my car now, without waiting for legislative compulsion.

J. H. A. MACDONALD.

HINTS AND TIPS

[2718.]—The suggestion made by J. Coop in letter 2710 of your last issue for a means of getting petrol, or paraffin, to the induction valves is a good one but not new.

In the Brooke car a small cock is, and always has been, fitted over the top of each induction valve for this purpose.

MAWDSLEY BROOKE.

[Any suggestions which are useful are published irrespective of whether they have been used on one particular make or not. We mention this so that correspondents in the desire to help their fellow automobilists may understand that usefulness, not novelty, is the essential feature of a practical hint or tip.—Ed.]

SOME IMPRESSIONS OF THE PARIS SHOW.

[2719].—Firstly, I do not think the exhibition from a general appearance point of view is up to last year's standard of excellence. I am speaking now solely on the point of appearance. Some of the signs are very much finer, but the general aspect of the show is not as good, probably because there are more firms exhibiting, and it is consequently much more crowded. The number of cars shown is considerably greater, and the models are, of course, very much finer than at any previous exhibition.

In the galleries, with the accessory people, the show is distinctly poor. There is very little of real interest to be seen, and, as compared with the number of interesting exhibits shown last year, it is nothing like as good.

The gangways are considerably narrower on the main floor, and the old complaint in regard to the gravel laid down is very much in evidence, as most of the exhibits are shown under a coating of dust, which, especially on the first two or three days, simply smothered everything and everybody.

Dealing with the technical character of the exhibits, undoubtedly the thing which strikes one most forcibly is the manner in which the French firms have endeavoured to copy Germany. When I say "endeavoured to copy," I mean that in appearance they have tried very hard to get near to the same shape outwardly of the Mercedes type of carriage, even so far as making them identically the same shape bonnets. In many cases this copying has not been done with the idea of securing increased efficiency, or a cheaper type of carriage, but merely to approach similarity in design for selling purposes. Disabilities and objections of the methods under this heading employed by the various firms have to be dealt with in detail to be appreciated and understood. At the same time the fact which impressed itself most on my mind was that, instead of endeavouring to secure the evolution of the petrol carriage into perfection by simplicity, the tendency has been on the contrary to endeavour to gain, or appear to gain, these results with complications. I cannot help thinking that this is not the right direction, as there can be no question that to secure the popularity, reliability, and success of the modern motor vehicle simplicity must be the first consideration.

That in England this has been appreciated is unquestionably one of the soundest points in favour of the English manufacturers, and, although I am to a small extent interested in the Napier, nevertheless I could not help but remark that the English-built Napier chassis was, in appearance, the acme of simplicity when compared with the chassis of other foreign makers shown on their stands, and I may say that this point also was remarked by most of the English visitors who came over.

In dealing with the question of simplicity it is, of course, understood that efficiency must not be sacrificed except within reasonable limits, and, whilst considering this point, it might be borne in mind that the great success in regard to the reliability of Panhard cars in the past has been because of their simplicity in design, and when one sees all the French makers being lured on in the direction of complicating their machines because certain results have been obtained on the Mercedes (which I would point out is exquisitely made), it is unquestionably another case of "the old order changeth," etc.

Dealing with the general appearance of the cars at the exhibition, much finer and roomier bodies seem to be the rule more than before, but this is owing, I think, to the fact that much larger cars are shown, the increased h.p. enabling the maker to fit larger and more comfortable carriage bodies.

Another point which occurred to me also was the large number of covered carriages which were shown. In England the use of covered-in petrol carriages has only just recently been appreciated, and the makers of open cars for the pastime have done practically the whole of the business. In France, however, the utility question plays a very important factor in the choosing of the types, and a number of manufacturers have now laid themselves open to build carriages to be used in cold and wet weather, capable of travelling long distances, but fitted up, and as comfortable to sit in, as the ordinary brougham.

There is much more which might be said, but there is still one more point I would like to mention, and that is that in whatever respect French manufacturers failed to realise the importance of the British trade, they

are now making up for such neglect by laying themselves open to meet the demands from England in a manner they have never done before, and never was it so necessary as at the present time for the English agents and manufacturers to pull together to hold unto themselves an industry which will in the course of time eclipse all other industries in this country.

CHAS. JARROTT.

THE 1903 RELIABILITY TRIALS.

[2720].—I should like to add a few words to your remarks on the above subject.

You say that care will have to be taken to separate the marks lost for accidents from those lost through replenishing, and I must most heartily support this.

The trials are reliability trials, and not tests of road organisation, or of driving, and for this reason I think that considerable injustice will be done to makers in some cases, and the public will be misled unless care is taken with the proposed rules.

For instance, suppose two identical cars to be entered for the run, and suppose their tanks to be equally accessible. Further suppose that the man in charge of one to have things all cut and dried before hand. On the signal being given to start he unscrews his tank stopper, and, having all his petrol for the day's run in a special tank, he passes the spout of the said tank into the filling hole, and turns his tap. Owing to special construction the supply tank will stop in the said position, and whilst the petrol tank is filling he does the same thing with the water tank. Whilst this is going on he oils up and starts his engine. Probably the total time necessary would not exceed three minutes if the oiling arrangements were well designed.

Man No. 2 comes in with his supplies in ordinary receptacles, and it is easy to see that he would be more likely to take ten minutes over the job than three, as he would have to do each job separately, instead of all three together so to speak. The above case is, of course, only intended as an illustration. It will be seen that under these conditions one car gains about ten minutes over its rival, and this for absolutely no fault of the cars. As a matter of fact, the car with least marks (for above reasons) might well be by far the better car. Further the marks lost through taking supplies on the road would depend to an enormous extent on the arrangements made beforehand for handling supplies. Thus the maker who sent three or four men for each car on ahead to get everything ready to place aboard in fire engine style would stand a much better chance than one who did not do so.

Under such conditions the winning car, other things being equal, would win by the acrobatic feats and road organisation of its men, and not on its own merits at all, and I take it this is not by any means what is wanted.

Further, I do not think that marks should be lost through the defective manipulation. This again is giving marks to the man and not to the car.

What the public want to know is, which is the best car, supposing the manipulation to be equally good in each case, and under the proposed rules this will be far from being the case. It would seem that, judging by the time allowance at the last trials, the time taken each day will not be much under an hour for adjustments and refilling. It seems to me that this is rather excessive, and one of two things should be done. Either a minimum time should be allowed free, the time to be so arranged that a car requiring no machinery adjustments could just get away under the time, or else the marks lost in replenishing should be counted at a much lower rate than those lost for repairs or road stops.

Everything possible should be done to make the results as reliable to the public as possible, and, as much as possible, results of car tests and not driving tests.

J. S. V. BICKFORD.

MR. T. M. CAIRNS, of Lochrin Works, Edinburgh, who is having a large Stirling bus—the first of its class—built for public service in the historical and picturesque districts of Scotland, writes that he would like to have the returns of any similar vehicle to seat twenty-six passengers, capable of a maximum speed of eleven miles an hour, and able to climb hills of one in four, these being what his own fine machine does. He would particularly like to hear of any electrically driven type able to equal this at a running cost of 1½d. per mile.

Flashes.

On the 21st inst. the Motor Cycling Club is going to Hertford. It leaves Marble Arch at 10.30 and Barnet at 11.30.

* * *

The people of Kilkenny—or, at any rate, that portion of them who compose the Waterford No. 2 (Co. Kilkenny) District Council—are no lovers of autocars, and to emphasise their dislike they deliberately decline to maintain the roads under their jurisdiction in a proper manner. Not only do they do this in a negative way by neglecting the roads, but pass a positive resolution, in which they declare that they “entirely disapprove of the use of steam rollers,” and the reason for their disapproval is that they may make the roads impassable for motor cars.

* * *

The new Clément cars, which will be exhibited by the British Automobile Commercial Syndicate at the Stanley Show at Earl's Court on the 15th of next month, will be particularly interesting machines, as they contain so many up-to-date improvements. In the first place, they are remarkably silent, this being largely due to the mechanically-operated inlet valves which are now fitted. The ignition is by magneto, and can be advanced or retarded according to requirements. Four speeds are provided, and on the top speed a direct drive is given, and with the great range of speed of the motor it is possible to drive dead slow on the top gear with the engine throttled down. The new cooler is of the Mercedes type, and the frame is constructed of hydraulically compressed steel with each side member in one piece. We shall shortly illustrate the new back axle, which is designed to prevent any possibility of undue strain being put upon the driving gear. It is by no means the least interesting feature of a thoroughly modern design.

* * *

The agricultural motor made by Mr. Dan Albone, of Biggleswade, which was described and illustrated in *The Autocar* a few months since, was exhibited at the cattle show held at the Agricultural Hall last week. It met with a very good reception from the more up-to-date agriculturists.

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The Engineer states, in an article dealing with the exports of British machinery: “Of British-built motor cars and cycles, forty-nine (valued at £13,301) were shipped abroad last month (November), with parts to the value of £2,234; and 331 such vehicles (valued at £125,580), with parts valued at £13,168, represent the export of British machines of this nature during the last eleven months.”

The correct name of the Taunton firm which a correspondent recommended recently as capable and obliging repairers is Messrs. C. Allen and Son, of the Tone Foundry and Engineering Works, Taunton.

* * *

Absent-minded automobilists can often do considerable harm to the movement by thoughtlessness, when their intentions are really of the best. The following incident was recently witnessed at the works of a large motor firm. A deputation from a railway company called on a motor manufacturer, with the view of satisfying themselves as to the utility of motor vehicles for station and other similar purposes. The deputation consisted of ten heavy men, and these, in company with a driver, were accommodated with seats on an old 6 h.p. car! Thus overloaded, it was not surprising that the car jibbed badly and almost refused to start, with the result that the deputation of railway men was not favourably impressed.



The Jesse Ellis steam wagon, which was recently shipped to Egypt. The special construction of the wheels to make them fit for running over the loose sandy tracks will be noted. In other respects the vehicle is of the standard type turned out by Messrs. J. Ellis & Co., Ltd.

It would seem that automobilists have persuaded Mr. Warne, of Warne's Hotel, Worthing, who closes his hotel at the end of the summer season each year, to reopen it specially on the 21st inst. for the Christmas holidays. He has engaged a private band and several entertainers, and we have no doubt that a good number of motorists will be found in Worthing next week.

* * *

The Arto-Lubrine Co., of whose oils we have spoken well before now after lengthy trial, point out that they have always kept in mind the necessity for having an oil which would run freely during the winter months, and they remind us that at the Agricultural Hall Show in April they had a specimen of one of their motor oils subjected to a temperature of 20° below freezing point, and yet it remained perfectly liquid.

We hear from Mr. Lamb, the secretary of the Stanley Automobile Exhibition, which takes place in the middle of next month at Earl's Court, that arrangements have been made for a limited number of exhibitors' cars and motor cycles to be run in the grounds. He also tells us that there is very little space left in the Queen's Palace, and that applications are being considered for positions in the Prince's Hall. We also understand that the band of the Grenadier Guards will perform twice a day in the Queen's Palace.



Mrs. Harry Barnato has just completed a three months' uninterrupted motor tour in England, Scotland, and Ireland of 6,500 miles. She obtained the car from the Star Engineering Co., and it was of the ordinary open tonneau type. The tyres were Michelin, and strangely enough the only tyre delay was on the first day of the tour, when two punctures were suffered. As to the car itself, it only failed once, through the accumulator running down, the spare battery being also spent. The longest day's run was 189 miles, and the plan was to drive to some convenient centre like Harrogate, Edinburgh, Killarney, or Oban, and to stop there till the district had been thoroughly explored by motor, when another straightaway drive of a hundred miles or more would bring the tourist to an altogether fresh environment. The roads in Western Scotland were found to be good, while those in Ireland varied from indifferent to very bad, and Mrs. Barnato considers it will be a matter of extreme difficulty to find a course for the Gordon-Bennett Cup there. There was never any trouble in obtaining petrol, though the price varied from a shilling to three shillings a gallon in out of the way spots. Mrs. Barnato is so delighted with her experiences that she intends making a further tour on the Northern shores of the Mediterranean. Our illustration is made from a snapshot taken in Phoenix Park, Dublin. Mrs. Barnato is at the helm, and by her side is her mechanic, Goodwin, who accompanied her throughout the tour.

Mr. H. R. Kirk, of Leeds, has bought Mr. Jarrott's Napier car which is being built for him for the Gordon-Bennett race. Of course, Mr. Kirk will not take possession till after the race. We are not at liberty to divulge the price, but we may say it is the highest which has yet been paid for an English-built car. It is interesting as exemplifying the benefits which accrue to the industry by the success of English-built cars in Continental races, as we have only to look back a few months, and we know that no one would have paid a fancy figure for a sporting Napier car, however high an opinion he may have had of the quality of the machine, for ordinary purposes.

The first judge to go on circuit in an autocar is the Lord Justice Clerk of Scotland. On one journey he is said to have found his car more expeditious than the train.

* * *

In our next issue we shall publish an elementary description of the working of an internal combustion engine, or, as many call the autocar engine nowadays, the "petrol motor."

* * *

Mr. J. Fullbrook writes to the effect that the challenge which he and others made with an autocar to the tollkeeper of the Maidenhead Bridge on the 8th inst. was not such a tame affair as the reports of the proceedings would seem to suggest. He says the rush was so great that the occupants of the motor car had to clear off the first time and return again later on to get a picture of the closed gate. A formal appeal is issued for subscriptions to enable the promoters of the campaign to contest the legality of the tolls in a court of law. Great public interest is taken in the matter, but it is discouraging to find that not much financial support has been yet forthcoming. Good results are shown for the two and a half years' work, seeing that the tolls for motor cars have been reduced from 8d. to 2d.; but the "agitators" express their determination not to cease their agitation until they have succeeded in getting a "free road." The appeal is signed by Messrs. Joseph Taylor, High Street, Eton; Joseph Fullbrook, High Street, Slough; and Cecil Howlett, High Street, Eton; any of whom will be pleased to receive subscriptions.

* * *

The new E.I.C. plug for 1903 has been considerably improved, and is now one of the finest sparking plugs on the market. As is well known, these plugs are practically unbreakable, having no porcelain in their construction, and requiring no packing. It is claimed that sooty deposit never forms, and that consequently fouling of the sparking points is overcome.

* * *

Last week, in recording Mr. Letts's flying visit to the United States, an error was made in his initials, which might lead to misunderstanding, so we hasten to say it was Mr. W. M. Letts, of the Locomobile Co., who was referred to.

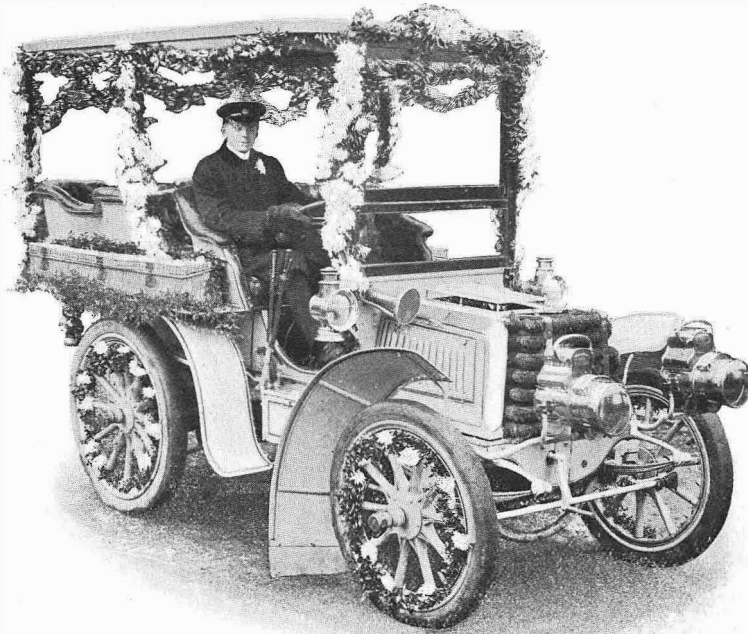
* * *

We understand that Messrs. Panhard and Levasor do not intend to supply any three-cylinder engines till 1904. Whether this be true or not, the makers of three-cylinder motors on this side of the Channel are congratulating themselves on their early adoption of a type on which the great French house has now set the seal of its approval.

It is proposed by *Insurance*, of New York, that an insurance policy should become void in the case of an automobilist meeting with a fatal accident while driving at the rate of over fifteen miles an hour.

* * *

At the termination of the Paris Automobile Exhibition, Messrs. Panhard and Levassor will transfer their stand in its entirety to this country ready for the Crystal Palace exhibition, which opens at Sydenham on the 30th prox.



One of the cars used at the wedding of Mr. Roland Winn and Miss E. Schofield at Leeds. The motor vehicles were used to convey the guests to church, and after the ceremony to the reception. After the reception, the bride and bridegroom drove to the station with as many of their friends as the cars could carry accompanying them. Mr. Winn is one of the pioneer motorists of the district, and quite a number of local automobilists lent their cars and drove them on this occasion. Crowds gathered at all points to witness this very up-to-date wedding.

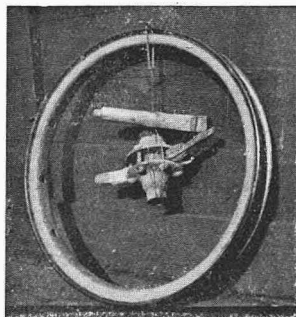
We have letters addressed to F. Carter and J. H. Spottiswoode, and on receipt of addresses shall be pleased to forward same.

* * *

Le Velo recently stated that Mr. Alfred Harmsworth was in Paris for the purpose of purchasing a new 80 h.p. automobile.

* * *

The Sirdar Rubber Co. sent us a photograph the other day of a wheel which they received in the condition shown, with the following brief but comprehensive instructions: "Please repair wheel where necessary." In two days the wheel was replaced on the car again. It was a pneumatic-tyred wheel, and damaged through a bad side-slip.



The makers of the Buffer tyre, the Sirdar Rubber Co., Ltd., have been appointed tyre manufacturers to the King. This, we believe, is the most conspicuous Royal recognition that has ever been given to a rubber tyre manufacturer.

* * *

It would appear that there is still hope for Colonel Wisden. It has even been said that he has been taken for a drive in a car. It is to be hoped the Colonel will not wear goggles, or otherwise disguise himself, as if he does we are afraid there is every possibility of trouble arising between him and the Sussex police. This, however, is by the way. At a local banquet last week Colonel Wisden, in referring to the appeal case reported recently in our columns, stated that, in his opinion, the motor car was the coming traction power of the country. Not a very happy expression perhaps, but it is obvious what the Colonel meant. He went on to say he would like to see some alteration of the speed limit, but till it was altered he meant to enforce the twelve miles an hour regulation. From this he went on to boast of the discretion of the magistrates of the Worthing Bench, but as this is a subject on which painful differences of opinion might be expressed, we pass it over with the remark that the modesty of the Worthing Bench has up to the present prevented them giving any outside evidence of the discretion which their Chairman assures us that he—we suppose, in common with them—possesses.

* * *

A very comprehensive catalogue of spare parts and accessories has been sent us by Messrs. G. T. Riches and Co., of 4, Gray's Inn Road, W.C. This firm are very enterprising, and have got hold of some smart novelties, one or two of which were illustrated in *The Autocar* recently.

* * *

The meeting of shareholders of the Hozier Engineering Co., Ltd., was held in Glasgow on the 5th inst., Mr. Wm. Alex. Smith, chairman of the company, presiding. The figures laid before the meeting were of a very satisfactory character. After debiting revenue with all proper charges, the balance at the credit of profit and loss account amounted to £4,966 11s. 9d. Of this amount £924 0s. 9d. was absorbed in payment of debenture and other interest. In view of the rapid growth in the business of the company, it was resolved to apply the greater portion of the balance in writing off and depreciation, and to paying a dividend of five per cent. It was reported that a large number of orders for the 1903 model Argyll had already been booked, and the prospects of the company were exceedingly bright. A number of those present then inspected the works, and were extremely pleased at the general efficiency, and in particular with the new automatic machinery recently installed by Mr. Govan, the managing director.

Thirty peers and forty members of Parliament are members of the Automobile Club of Great Britain and Ireland.

* * *

Mr. Alfred Stevens, Mayor of Kidwelly, whose possession of an autocar was referred to on December 6th (page 586), informs us that he bought his car—a 4½ h.p. De Dion, with tonneau body—nearly two years ago. It has given him every satisfaction and absolutely no trouble except during the first two months, before he understood it properly. The only fault was that it was hardly powerful enough for the Welsh hills. It is at present being fitted with a more powerful engine.

* * *

The new 14 h.p. Brooke car is an extremely interesting design. The three-cylinder engine, which is now a recognised feature of the Brooke practice, will be retained, but in other respects the car is quite an innovation. The inlet valves are mechanically operated, and a Mercedes type of cooler with flywheel forming the fan are used. The bonnet is airtight at the sides and bottom, so that the flywheel sucks a continuous current right through the cooler. It is gear driven, with direct drive on the top speed, from differential to road wheels, by means of chains and large sprockets. The wheelbase is 7ft. 3in., and the gauge 4ft. 8½in.; 30in. wheels and 90 mm. tyres are employed, while the total weight will be from 10 to 12 cwt., according to equipment. We hope very shortly to publish full details of this machine, and to illustrate it, as well as the new standard 10 h.p. car for next year. It should be understood that the light machine we have been describing is supplemental to the ordinary type of Brooke as now known, and it is not introduced to replace it. In fact, it is not likely that the light machine will be finished in time for the February show, though it will be on the road in the rough previously.

* * *

Mr. A. N. Deakin, of Liverpool, recently had the better of an encounter with the police. He was summoned for driving to the danger of the public, but in the presiding magistrate (Dr. Cross, J.P.) he found a magistrate who was willing to go into both sides of the question. Mr. Deakin's tale, briefly told, is as follows: He was driving down Duke Street, Liverpool, and when about to emerge from this street he observed an electric tramcar coming along at a good speed over the street he was about to cross. A policeman was stationed at this point to regulate the traffic, and as he did not signal to Mr. Deakin to pull up he came on, thinking that the tramcar would stop. The car kept on its way, however, and to avoid colliding with it Mr. Deakin had to pull up sharp. The street was greasy, and the sudden application of the brakes caused the car to slew round, which so alarmed a small boy who was standing near that he fell down with fright. The lad was quite uninjured, and had not been knocked down by the car, yet the officer brought the above charge. The policeman when in court early gave himself away, however, by stating that Mr. Deakin had approached him by a different street from that which he had really driven down, and the magistrate, after hearing Mr. Deakin at length, dismissed the case. Mr. Deakin had a valuable witness in a Mr. Langford.

A standard Lanchester car has just come through a most difficult test with flying colours. Its owner (Mr. John C. S. Rashleigh) desired that the car should pass the test of running from Minehead to Ilfracombe over the old and now nearly-disused road at Porlock Hill. In company with Mr. Archibald J. W. Millership, of the Lanchester Engineering Co., and a man, Mr. Rashleigh left Minehead at eleven o'clock exactly on Friday week. The vehicle was carrying 1 cwt. 3 qrs. 24 lbs. of sand in a sack, a large bag, overcoats, and rugs, the whole making a full complement of four passengers. On arriving at Porlock village, and enquiring the way to Ilfracombe, they were informed that they had missed the road, and that it was impossible for the car to go up the old road. However, it was decided to drive the car on, and the climb of three miles was accomplished in 28m., the rate being slightly over six miles an hour. There are two "V" corners on the hill, and the surface is more like a river-bed than a high road. The party then ran straight down into Lynmouth, and enquired the way, and were told, "Straight on up the hill." The gradient of this hill is, if anything, worse than Porlock, rising 400ft. in half a mile. After one fearful turn at the start, this hill was surmounted easily, the half-mile being negotiated in exactly five minutes. Going on the hill just out of Parracombe was climbed quite easily, although the gradient is one in five. Ilfracombe was eventually reached, much to the astonishment of some of the locals, who hardly credited that the old road had been negotiated by the car.

THE SUPPLEMENT.

The plate published in this issue will be of exceeding interest to all who have followed the motor movement at all closely within the last three or four years, as those who have done this will remember that the Star Engineering Co., of Wolverhampton, was one of the first British firms to give attention to the construction of autocars, and further that its principals had the unusual good sense at that time not to start experimenting. They were satisfied to take a tried design, and beyond modifying one or two obvious shortcomings, they left well alone. One of these early machines took part in the thousand miles trial of 1900, and after a series of misadventures, it was got through to the sincere admiration of all who knew the difficulties which Mr. Lisle and his designer had overcome. Later, the firm entirely dropped the horizontal engine, and devoted themselves to turning out four standard patterns of the approved modern type. The car we illustrate is the two-cylinder 10 h.p. machine. The bore is 5½in. and the stroke 5½in., and the normal rate of revolution per minute 850. The engine is governed on the throttle, and the governor can also be controlled from the footboard. The transmission and change-speed gearing are of the Panhard type—very large, with ample wearing surfaces. Mechanical lubrication and all approved up-to-date details of this kind are provided. The wheelbase is 7ft., the gauge 5ft. 6in., and the weight 16 cwt. Some further particulars of the Star machines will be found in *The Autocar* of August 30th, 1902, page 200.

THE DISCUSSION ON CAPTAIN LONGRIDGE'S PAPER.

(Continued from page 620.)

Mr. A. G. New gave his experiences with steel cylinders. He had found some difficulty in attaching cast-iron heads, and also that cylinders so constructed had warped when they became heated, and leaked badly at the head joint. Steel cylinders stamped with the head in one piece gave good results, but were very expensive to make. He thought it desirable for some of the larger foundries to turn their attention to motor castings, as there was some difficulty in obtaining them really good in this country.

Mr. C. Rainey referred to the experiments the author had mentioned as to the injection of water into the cylinder. His own experiments showed that an increase of power and cooler and softer running followed upon the injection of water up to a quantity equal to the amount of petrol. Beyond this point the water interfered with the ignition. Another noticeable fact was that the cooling water did not become so heated. With regard to what had been said about premature ignition, he did not believe that low flash oils were responsible for this, as he had tried to get premature ignition from this cause, and had failed. His experiments showed that such oils did flash, but they did so at the same moment as the petrol charge. The more likely explanation of this was that the platinum points were incandescent, or it might be due to badly-designed ports. In his experiments, he did not use platinum points, and had eliminated the ports. This, he thought, might account for the failure to get premature ignition. He was of opinion that a very viscid oil could be used satisfactorily, and that perfect distribution could be obtained if water were mixed with the oil in the crank chamber.

Mr. A. R. Sennett criticised the author's engine, and regretted drawings had not been given. So far as he understood it, there was no novelty in it, the first petrol car motor made in this country—by Butler, of Gateshead-on-Tyne—being on the same principle, excepting that rotary valves running at a quarter the speed of the motor were used. (See *The Autocar*, November 8th, page 471.) The speaker thought that the effect of aqueous vapour on the explosion should be worked out. He referred to some experiments of his own on the subject of aqueous vapour as an aid to combustion. These experiments were carried out, however, with a view to the prevention of smoke in boiler furnaces, and have only an indirect bearing upon the subject. As a rough experiment he had turned the spout of a kettle of boiling water towards the induction valve of a motor under test; the result was a great falling off in the efficiency of the dynamometer reading. This negative result did not alter his opinion, however, in the least, because the vapour had to pass through the carburetter first, and was likely to affect the gasification of the air. He was heartily at one with the author when he said that the thing to work for was an impulse-every-revolution motor, and also with his advocacy of horizontal cylinders. Mr. Sennett felt strongly that mechanically-propelled road carriages would in the near future be driven by horizontal cylinder motors; indeed, that they would pass through a similar phase of evolution as had the railway locomotive.

Other gentlemen, upon being called, intimated that they would submit their remarks in writing in readiness for the next meeting.

This concluded the second meeting.

At the opening of the adjourned discussion on Nov. 21st, Mr. R. Lucas described an engine he had designed, having two pistons and two crankshafts, one on either side of the cylinder. In working, the cylinders create a slight vacuum in the crank chambers, and a charge of mixture is drawn in. The outward stroke compresses the charge to about 4 lbs. to the square inch. The piston itself acts as a valve, and the compressed charges are passed into the cylinder towards the end of the outward stroke, sweeping any residue of exhaust before them, and are then compressed and fired. By an explosion every revolution, each cylinder compresses the charge for the other, thus balancing the engine. This, the speaker said, led to a reduction of the flywheel weight; effecting a saving of 1 cwt. on the combined weight of the engine. Several of his engines had already run satisfactorily. With one of these engines fitted to a car he had run forty miles an hour, and ascended

Shooter's Hill with two up, the car being devoid of any change speed gear.

Mr. M. Holroyd Smith commented upon the paper, and expended the major portion of his time in explaining that the greater number of illustrations and details which the author had placed before them were anything but new. The author had advocated the introduction of water, in small quantities, into the cylinder, but had not stated how this was to be introduced. He, Mr. Holroyd Smith, said that when water leaked into a cylinder, there was a marked improvement in the running. Some useful suggestions were, he considered, contained in the Bradley-Pidgeon carburetter. He thanked the author for the information given as to the composition of the iron to be used for cylinders, and also for the component parts of gases. These, however, he considered more a question for the metallurgist and chemist than the engineer.

Mr. J. H. Wicksteed said that the Tourand motor, to which the former speaker referred as being on the same principle as the Roots blower, was not the case, as the Roots machine worked with one piston.

Mr. Thomas Clarkson sent in a written reply, but added verbally the fact that he considered the impulse-every-revolution motor as economical as the Otto cycle motor, and quoted facts within his own experience to bear out that statement.

Mr. M. O'Gorman said that he thought that all motorists of experience would agree that engines as now built are the feature on most cars that give least trouble. Therefore a very good case must be made out for any new engine that is launched. The *raison d'être* of a new engine must be that it affords improvement in one or all of the following points:

- (a) Plant efficiency.
- (b) Running efficiency.
- (c) Simplicity.
- (d) Elasticity.

How are these qualities improved in the author's engine:

(a) Is it cheaper per horse power? I think not (said Mr. O'Gorman). Is it lighter? Possibly, since it has two explosions (and Mr. Lucas makes a strong claim here for his two-cycle engine) in lieu of one, but also possibly not.

(b) Does it burn less fuel, and cost less for repairs? Neither of these is at all proved.

(c) It is not simpler.

(d) It is somewhat more elastic.

Adding these effects together the author does not, till he brings experimental evidence, make a strong showing, though he omits to claim his most important advantage—a constant thrust. Mr. Lucas's car is without gear, and I should have admired the result were I not in possession of a car which dispenses with gear in all its normal running; this has been run for two months over 3,600 miles, and works on the Otto cycle. This is done by using a flywheel whose inertia is large compared with the weight of the car. The car is about 8 cwts., and the flywheel about 1½ cwts., acting at a very considerable radius. The gear is only used on abnormal hills. Mr. O'Gorman described a device of his own, which will give to an Otto cycle engine a measure of elasticity, namely, increased torque at slow speeds, by sacrificing at slow speeds a little more fuel per horse power. It consists merely of supplying the fuel to the motor under a small pressure, a pressure slightly in excess of that of the exhaust gases at the end of the exhaust stroke. With this system the inlet valve opens a short time before the exhaust valve has closed, and the incoming fuel blows the residual exhaust gas out of the combustion chamber, or clearance spaces, of the engine. On Otto cycle engines, working at a compression pressure of 60 to 70 lbs., the clearance volume is about one-fifth to one-sixth of the cylinder volume, and this clearance remains normally full of waste products, whereas with the pressure feed these are replaced with fresh mixture, an increased output of one-seventh or more, say a fifteen per cent. improvement, is obtained. One may obtain from the crank chamber a supply of air under a small pressure, about 3 to 4 lbs. per square inch. To do this it is only necessary to put on the crank chamber a couple of automatic valves, one to let air in, and one to let it out, and this compressed

air supply is put through the ordinary carburetter. With a pressure supply it is to be observed that a mechanically-actuated valve is necessary, so that the spring on the inlet may be strong enough only to open when it is told to do so by the cam. As for simplicity it is true that the valves are an addition to the number of parts, but they certainly are a very small encumbrance, and their exact action at a specific instant is of no consequence, unlike the automatic induction valve. Under heading (d)—"Elasticity"—this method has merits on starting and hill climbing, when, owing to the slowness of rotation, the h.p. is lowered, and the utmost torque is required. He improved the torque by allowing the crank chamber pressure to rise fairly high, say 4 lbs. per square inch. This results not only in filling the combustion chamber with fresh gas in lieu of exhaust gas, but, further, the entire cylinder charge is pressed home, not by the atmospheric pressure of 14 lbs. per square inch, but by a total pressure of 18 lbs. per square inch; a thirty-three per cent. increase of pressure and a thirty-three per cent. increase of fuel result; and, say, a thirty per cent. increase of torque ensues. He advocated external flywheels of large inertia and small weight, and with so great an increase of torque at command he could dispense with gear, save for emergencies. Reverting to the detail of valves, as dealt with by the author, he strongly endorsed his view of the advantage of a mechanically-actuated inlet valve, after trying both systems.

Mr. J. D. Roots followed, and, after discussing some of the statements made by the author, stated that in 1884 he had exhibited at the Stanley Show a motor with a separate water jacket. As the difficulty of getting solid-headed cylinders and jackets cast in one had now disappeared, he had gladly gone in for them. He went into further details of formula for valves, and pointed out that the velocity of the escaping gases had been taken into consideration. He also pointed out the fact that no discrimination was generally made between the carburetter and the vaporiser. The first was an apparatus for mixing air and the vapour from a volatile spirit together. The second for vaporising a heavy oil, as well as mixing it with air. He further pointed out that the author's experiments with varying quantities of petrol in an enclosed case were apt to be misleading, as the mixture was not under compression, as it would have been in a motor cylinder.

Errata.—In last week's issue in the first part of this discussion, page 619, we referred to "Eustace Simonds" in reporting Mr. Crowden's remarks. This, he tells us, should have been Louis Simond.

(To be continued.)

CLUB DOINGS.

The Scottish Automobile Club (Eastern Section).

The Eastern Section of the S.A.C. held its first social evening on Monday, the 8th inst., in the Royal Hotel, Edinburgh, at which Mr. John Macdonald, chairman, presided.

The Right Hon. Sir J. H. A. Macdonald, president of the club, related, in his usual vivid and racy style, some of his motoring experiences during the past summer. He also took the opportunity of urging the advisability of motorists showing gentlemanly and courteous consideration for other users of the King's highway.

Dr. Dawson Turner (vice-president) also gave some of his experiences, which date as far back as 1896. His description of the arrival of his original "quad" and his first ride on it were very amusingly told.

Sir John Murray (vice-president) said his car had been so reliable that he had practically no experiences to relate—quite a novel experience in itself for a motorist. Sir John has been engaged throughout the summer in superintending the sounding of the lochs of Scotland, and he said that by the help of his car he had been able to get through his work in an expeditious manner.

Besides the above-named gentlemen and a good turnout of members, there were also present Mr. N. D. Macdonald (chairman of the S.A.C.) and Mr. J. C. Smith (the newly-elected general secretary), who was introduced to the company.

A number of the members and friends favoured the company with songs and music, which made the evening a very pleasant one.

Bristol and District Motor Club.

The first general meeting of the Bristol and District Motor Club was held last week, Mr. Philip C. Bailey presiding. Mr. Bailey explained that the meeting had been called for the purpose of framing the club rules, which had been prepared by the secretary, Mr. Charles Franklin. After a little discussion and addition the rules were unanimously adopted. The business of electing the officers of the club was then proceeded with.

Yorkshire A.C.

The committee have arranged for a paperchase on motor vehicles to be held on Boxing Day. The "two hares" will start from Pool Bridge at eleven o'clock, and the "pack," which will consist of all the members who choose to follow, will be let loose half-an-hour later. The hares boldly offer a prize to the hound who catches one of them in accordance with the rules. It would appear at first sight that the hares will not be greatly harassed by the pack, and that the prize will be, theoretically, very difficult to win; one of the conditions laid down is that cars and cycles must keep within the legal limit of speed. The spectacle of a procession, in which the hounds, while having a hare in sight, are prohibited from giving chase at full speed, is, however, guarded against by the provision that the hare must stop when called upon to do so by any one of the hounds in pursuit. The call to stop must be made without leaving the car. We are afraid that the chase will be robbed of much of its excitement by these regulations.

Lincolnshire A.C.

The annual meeting of the Lincolnshire A.C. was held at the Saracen's Head Hotel on Saturday, Sir H. B. Bacon, Bart. (president), in the chair.

The report presented by the chairman of the committee, Mr. C. W. Pennell, showed that there had been much useful work done during the year, and that there were ninety-one paid-up members, the club's finances being much improved. Mr. Pennell pointed out that the club had been very useful indeed, and that the tolerance to motorists in the district was in a great measure due to its operations.

The report was adopted.

Sir H. B. Bacon was unanimously re-elected president of the club for the third year, and the following were added to the list of vice-presidents: The Marquis of Exeter, Lord Willoughby de Eresby, M.P., Major F. J. Laycock, D.S.O., Mr. W. Garfit, M.P., Mr. E. Chaplin, Capt. J. Ruston, J.P., Mr. J. D. Sanders, High Sheriff of the County, Mr. G. E. Sanders, Mr. C. J. E. Parker, J.P., Mr. W. B. Jevons, and Capt. J. A. Cole, J.P. The other officers are: Committee, Messrs. C. W. Pennell (chairman), Dr. J. H. Pim, Capt. H. E. Newsum, Dr. Gilpin, and Messrs. H. T. Benson, J.P., W. R. Pennell, J. R. Richardson, G. J. Wilkinson, A. A. Padley, and F. Richardson (Sibsey); with Mr. E. Cragg, M.D., honorary secretary; Mr. R. B. Wrenford, treasurer; and Mr. C. Nelson, honorary solicitor.

The question of the bill now before Parliament was discussed on a resolution submitted from Mr. C. Nelson, to the effect that the club do not support the measure relating to the speed of motors and the question of numbers. Mr. Nelson urged that the supposed benefits were not worth the disabilities which would remain. Mr. Cole seconded, remarking that automobilists would be as liable as ever to prosecution, and by being numbered would be at the mercy of any prejudiced person. Mr. Rasdall, who was in a minority of one, pleaded that motors should be numbered "like cabmen and policemen." The President said it was very unpleasant for him as a magistrate to have to adjudicate in cases when he knew that every time he went out he had to break a stupid law. (Laughter.) On being put to the meeting the proposal was carried without a single dissentient, but the words "in its present form" were included in the resolution.

Votes of thanks to the officials were passed. It was decided to leave to the committee the question of re-affiliation with the parent body. The opinion of the members appeared to be that, though it was desirable in some respects to continue the arrangement, the club could not afford to part with half its income from subscriptions as affiliation fees.

Answers to Correspondents.

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

- | | |
|-------------------|--------------------|
| L. S. Dodds. | J. T. H. |
| A. Fielding. | W. A. Spriggs. |
| H. Dewy. | N. N. L. |
| G. FitzGerald. | R. M. R. Drummond. |
| T. Postlethwaite. | Thermo. |
| R. Mainwaring. | E. H. Micklewood. |
| Lothouse. | R. Bros. |
| O. Shaw. | F. W. B. |
| H. H. Wright. | |

Our thanks are due to the following for items of news and various topics of interest, which have been or will be dealt with: J. H. Cruickshanks, Alfred Stephens, Jos. Fullbrook, W. J. Bladder, Hon. Sec. Linc. A.C., G. M., J. Morrison, and R. E. Arter.
Letters forwarded: M. P. Kavanagh.

SUBSCRIPTIONS.

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A BURSTER BY STEAM.



The above illustration, which is a photographic reproduction of a coloured print nearly a hundred years old, is something of an indication of the regard in which self-propelled vehicles were held by our grandfathers and great grandfathers. The booted and spurred cavalry officer depicted in the act of doing the splits in mid-air appears to have received the major impact of the explosion, and seems to be rather enjoying his experience than otherwise. The lady on the right clearly took to her hat as a parachute, and doubtless came safely to earth again, while the ingenious manner in which

the fat citizen has caught the sign-post while in full flight drives us to the reflection that our progenitors had more of the gymnast about them than we suspect. The artist has left no record why the inside passenger is shown caressing the body of the vehicle. Perhaps the most interesting suggestion is the evidence the drawing affords of the antiquity of the ignorant belief that motor cars are in the habit of bursting. There was more excuse for such a belief in 1802 than to-day. We have to thank Mr. H. J. Mulliner for the loan of the print from which our illustration is reproduced.