

THE AUTOCAR

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

EDITED BY H. WALTER STANER.

No. 381. Vol. X.] SATURDAY, FEBRUARY 14TH, 1903. [PRICE 3D.

THE AUTOCAR.

EDITORIAL OFFICES:

COVENTRY.

PUBLISHING OFFICES:

3, ST. BRIDE STREET, LUDGATE CIRCUS, LONDON, E.C.

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COLONIAL AND FOREIGN EDITION.

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The *Autocar* can be obtained abroad from the following:
AUSTRALIA: Phillips, Ormonde, and Co., 533, Collins Street, Melbourne.
NICE: Levani & Chevalier, 50, Quai St. Jean Baptiste.
UNITED STATES: The International News Agency New York.
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Messrs. Gordon and Gotch.

Notes.

The Motor Sociable.

From the beginning of automobilism, there has been a great want for small motor vehicles providing accommodation for two passengers side by side—machines which may well be called motor sociables. This type has always been procurable, but it must be confessed that in the majority of in-

stances the machines were poorly-made and noisy little affairs, the makers having been so thoroughly imbued with the idea that they must keep down the price that they have sacrificed everything to it. This refers to the past. As time progressed, most of the little vehicles of the type referred to passed out of use and manufacture. They became voiturettes—altogether more ambitious machines. Then, again, many voiturettes developed into light cars, and two years or so ago there was a great interval practically unfilled between the motor tricycle or quad and the voiturette—a machine selling at something above £200, and altogether outside the price limit of the people, who longed and waited for the motor sociable. The quad never became really popular, as just about the time it was approaching its highest point of development two-seated sociables at nearly the same price were brought out, and although they were not in the vast majority of instances nearly such good machines as the quads they practically killed the latter type—at any rate, for the time being.

The Fashion of the Bonnet.

At the same time, the quad price (and the best machines cost between £120 and £140 odd) was the figure known as popular; but it did not seem to matter how low the price was—the demand was for a machine which looked like a car. It must have a bonnet in front; in fact, it must be a reduced facsimile of a big car—more or less a model of it. The would-be buyers did not seem to recognise that if it was really a reduced facsimile of a large car it would cost nearly as much; but we need not enter further into the question of the manufacture of machines of this type, as they are not practical. With regard to a simpler type, it is generally conceded by those motor engineers best qualified to judge that it is not possible to build a good small and cheap machine for two which will fulfil the desires of the large class who will not, and often cannot, go far above the £125 limit, unless the thing is undertaken on a very large scale indeed and with a heavy capital invested in the enterprise. This, of course, is a large undertaking in more ways than one, as it would mean that the design adopted could not be deviated from for a long period. The machine would have to be of the very simplest character, built by the hundred, and the smallest alteration would necessitate a higher cost. In fact, it would be impossible to make any alteration, save at a prohibitive charge. The quad might have developed into a sociable, but it would never have fully met the want we have discussed. At the same time, much has been learnt by possible buyers, and they are beginning to recognise that no car is cheap unless it is good. What, therefore, is wanted is the

very simplest form of vehicle which shall be as good as possible throughout. In other words, the motor and mechanism must be equal to that of the very best and most costly machines, and, of course, the only way to meet this requirement is to simplify them as far as they possibly can be simplified, and to make in great quantities.

Present and Future.

The matter is not being neglected by some of the most enterprising firms in the motor industry, but, owing to the fact that it necessitates a very heavy outlay and a very small return for it, they are going into it with extreme care. As it is, there seems no possible and generally satisfactory simplification at the moment which will reduce the car to less than a single-cylinder engine, two speeds, cycle-type wheels, special form of light pressed frame, irreversible wheel steering, and two light scolloped seats. When these features are compared with those of two-seated voiturettes at very much higher prices than those we have cited, it will be seen that the problem is a very difficult one indeed to solve; and we think, as we have done all along, that those who feel that they cannot spend much over a hundred pounds should make up their minds to take a good motor cycle. There are still good quads to be had, and very good ones, too, they are. If these are not appreciated, there is the tandem tricycle of the Humber Olympia type, or the combination of the motor bicycle with a two-wheel front seat, which makes a very similar type of machine. It is true this does not provide the sociable sitting accommodation which is so much sought after, but it gives one of the cheapest and fastest motor combinations which can be had, and is seen in its highest type in the machines of the Century and Eagle patterns, which are a halfway house between the motor tandem tricycle and the two-seated voiturette, providing, as they do, comfortable seats for both riders, though it is true they are in a tandem position; and when it is remembered there are two speeds and high power in relation to the weight, it will be conceded they are an extremely fast and sporting type of vehicle with simply marvellous

capacity for hill-climbing. The same remarks apply broadly to the Traveller, save that it is a four-wheeler. We strongly advise those who sigh for the cheap sociable to remember that they are missing much pleasure while they wait for its advent, which may be long deferred, and to procure one of the cycle or semi-cycle types we have indicated.

Show Comparisons.

The statistics we publish to-day make it very clear that the magnitude of the Crystal Palace motor exhibition was not in any way exaggerated, as compared with other shows, though the impression of vastness which it gave naturally misled many when it came to forming an estimate of the number of machines shown. However, so many English people visited the French show that there is no need to make direct comparison between the two so far as magnitude is concerned, and we may turn our attention to the New York exhibition in the Madison Square Garden, which has been enthusiastically described in the States as the biggest and best the world has ever seen. Now, we know the Madison Square Garden, the Crystal Palace, and the Grand Palais, and we confess we wondered how it was possible for the Garden to contain the biggest and best collection of motors in the world. Towards the close of the Crystal Palace show, Mr. Letts arrived from the States, and we were then able to obtain some information from one who had the advantage of having seen both the American and British shows. He was naturally amused at the exaggeration of the Americans, as he said that while the Madison Square exhibition shows a very great advance, so far as American automobilism is concerned, it compared very poorly with the Crystal Palace show. As nearly as he could estimate, Mr. Letts imagined that all the Madison Square exhibits could have been easily staged on the floor of the south transept of the Crystal Palace. In other words, the New York show—the so-called biggest and best in the world—if placed at one end of the Crystal Palace, would not be noticeable from the other; and then we have to remember, in making



The 20 h.p. Humber exhibited at the Palace Show, and described on page 166 of "The Autocar" of February 7th.

comparisons, that the British exhibition completely filled the vast floor area of the Crystal Palace. It is a pity that our American friends cannot get out of their bad habit of exaggeration, or, perhaps we should say in this case, reckless assertion, as, of course, they had never seen the English or French shows, and imagined that because their show was bigger than last year it was the biggest the world had ever seen.

The Proposed Motor Track.

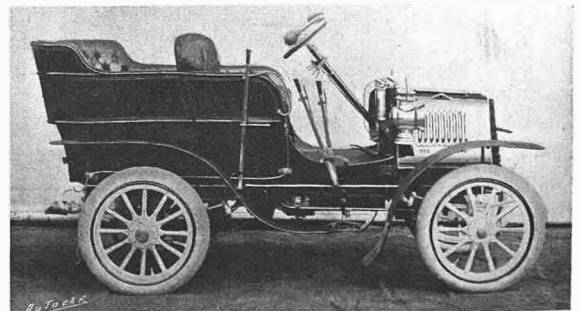
The meeting which was held at the Crystal Palace last week to consider the construction of a motor racing and testing track at Clacton-on-Sea was very poorly attended; but it was decided by those present to invite the co-operation of a few prominent people to serve upon a committee for the consideration of the scheme, but we scarcely think it will come to anything—at any rate, not until the Automobile Club proposals with regard to a track within sixteen miles of London are decided. Anyway, this project will prohibit the club from co-operating with the Clacton people, for the present at least. The secretary of the Clacton scheme is Mr. W. G. George, 61, Chancery Lane, W.C. What the Clacton people should do if they want to secure the patronage of motorists is to lay out a track themselves. It would undoubtedly prove a splendid thing for the town in every way; but, so far as we can see, this is not the idea. The Bexhill gathering indicated what might be expected when the motor had developed. The first seaside resort within convenient distance of London which has the enterprise to build a really good motor track will reap a rich reward, and it will be its own fault if it does not become the automobile sporting centre of the country. An undertaking of this kind, of course, would be very costly, though it would prove a good investment in the long run if it was managed by people who understood the requirements of the automobile world. Without such management, it would be doomed to failure, however good the track might be. Nothing less than a five or six-mile circuit would be of any use, and it must provide one good level stretch of a couple of miles in length, and a diversity of hill and dale over the other portion—conditions easy to recite, but hard to conform to.

The Gordon-Bennett Road Fund.

The executive committee of the Automobile Club, at a meeting on the 2nd inst., discussed the matter of the road surface of the Irish course for the Gordon-Bennett cup race. Mr. Gough and Mr. Johnson had ascertained from the county surveyors of Kildare and Queen's County that in places where the road surface is not so good as might be desired it would be possible to have the surface picked and steam rolled at a cost of about £10 per mile. In the event of Parliamentary sanction being obtained to the holding of the race—and there certainly appears to be every prospect of this, for the Automobile Club has left no stone unturned to bring the matter properly to the notice of members of Parliament—it has been arranged that members of the Races Committee should visit Ireland at the end of April. They will then drive over the course upon autocars with the county surveyors, and will point out to them as practical automobilists the places on the course which in their opinion should

be improved. It is necessary before this is done that the Races Committee should know what sum of money is available for improvements to the road surface, as, of course, the amount of work which can be done will depend upon this. To raise the necessary funds, the committee, believing that automobilists generally throughout the United Kingdom will be delighted to co-operate, have decided to open a subscription fund for the purpose of improving the course, as they want it to compare favourably with the roads on which Continental races are run. The proposition is to limit the subscriptions to 10s. per head, and they invite all who are willing to subscribe that sum or less to send a postcard to the secretary of the Automobile Club at 119, Piccadilly, W., to that effect. The subscriptions will not be called up till the matter has been finally decided by Parliament; but it is necessary to make all arrangements in advance, and, therefore, it will greatly strengthen the hands of the committee if they can form some estimate as to the sum which will be available for the road improvement fund. We feel sure that automobilists throughout the land will welcome the opportunity of aiding the club in this respect. Already one Irish firm has offered a sum of £10 towards the fund, and has expressed its willingness to subscribe a further £10 when the fund is opened. With regard to the race itself, it is announced that the date is fixed for July 9th, and that America and Germany have both consented to this date. It, therefore, only remains for Parliament to accede to the petition in favour of the bill.

For the Circuit des Ardennes, fixed for the month of July, the entries are rapidly increasing. The list of competitors so far is: Heavy cars.—1 (Baron Pierre de Crawhez), Panhard; 2 (Baron Pierre de Cators), Mors; 3 (Guders), Panhard; 4 (Jarrott), Napier; 5, Clément; 6, Clément; 7 (Augier), Mors; 8 (Heath), Panhard; 9 (Pinson), Panhard; 10 (Berteaux), Panhard; 11, Charron, Girardot, Voigt; 12, Charron, Girardot, Voigt; 13, Charron, Girardot, Voigt; 14 (Zborowski), Mercedes; 15 (Chauchard), Panhard; 16 (Fournier), Mors; 17 (Mark Mayhew), Napier; 18 (S. F. Edge), Napier; 19, Jenatzy; 20, Mors; 21, Mors; 22, Mors; 23, Mors; 24, Mors; 25, Mors; 26 (A. Tourmand), Brouhout; 27, Pipe; 28, Pipe; 29, Pipe; 30, Pipe; 31 (Evince Coppée); 32 (Baron Joseph de Crawhez). Light cars.—33, Clément; 34 (Osmont), Darracq; 35, Ader; 36, Ader; 37, Ader. Motorcycles.—38, 39, and 40, Minerva.



The 8 h.p. M.M.C. with tonneau body. A smart car exhibited at the Crystal Palace. See "The Autocar" of the 7th inst., page 169.

USEFUL HINTS AND TIPS.

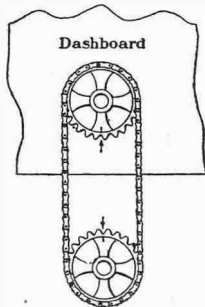
A useful addition to the motorist's outfit is a length of piano wire about the same gauge as the existing inlet spring. It not infrequently happens that a proper valve spring is not included in the spares carried, and when one of these becomes weakened or breaks it is often a matter of difficulty to get even so small a thing into proper working order again. By carrying a piece of wire of this type, a spring of practically any required strength can be made and used without the necessity of tempering, as would be the case with most of the other kinds of wire used for spring making. This may appear to some to be superfluous, but it is within our experience when a length of wire would have meant a great saving of time and temper had it been available.

x x x x

For the guidance of the novice, perhaps a little explanation of the advantages claimed for two types of motor which are at present in use—the short stroke high speed motor and the longer stroke and lower speed motor—will be of interest. The chief claims for the slow speed engine are that by using the longer stroke a more perfect combustion is obtained, and, therefore, the greatest use is made of the expansive quality of the gases. It is also claimed that there is considerably less wear throughout the engine and the transmission gearing. There are other detail claims made, about which it is hardly necessary to go into here. For the high speed motor it is claimed that greater elasticity is obtained and greater power for the total weight employed, with less wear on the engine bearings by reason of the quicker stroke giving a less hammering action upon them than in the case of the low speed engine.

x x x x

Now that the practice of mounting a chain-driven commutator upon the dashboard has come somewhat into vogue, it should be remembered that a great deal of difficulty will be experienced in getting the chain correctly replaced if it is taken off for any purpose. Of course, where a spur gear is employed to drive the commutator, it is perfectly easy to mark one tooth and the bottom of the two opposite teeth into which it engages, thus ensuring correct timing; but with a chain drive it is impossible to simply mark two teeth alone. This may be done to a certain extent with satisfaction, however, by marking the rim of the wheel on the centre line; it then becomes a matter of the eye in replacing the chain, and also one of memory to ensure



the marks being in correct position, *i.e.*, both marks should be at the bottom or top of the wheel, as originally placed when they were indicated. Writing upon the subject, Mr. J. Emmerson suggests pointers being attached to convenient parts, the marks on the chain wheel being brought opposite to these. In any case, it will, of course, be necessary to ascertain, roughly, the relative position of the crankshaft to

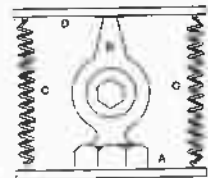
the camshaft. Unless this is done, it is quite possible to get the setting incorrect, as while one wheel may be in position correctly, the other may be a revolution before or behind it.

x x x x

Sometimes one is troubled with back-firing in the induction pipe, flame being seen to issue from any orifice between the valve box and the carburetter. This points to imperfect closing of one or more induction valves, due either to unequal wear of the surface of the valve itself or the valve stem in the guide. The valve, with its seating, should be withdrawn and examined. By pressing with the fingers in an attempt to rock the valve on its seating, wear of this kind can be quickly detected. If the valve itself is worn, the remedy is to grind it in with very fine emery powder and oil. Fix the valve upside down carefully in a vice, the jaws of which are protected by leaden sheets, having first dismantled the cap, cotter, and valve spring. Smear the seating of the valve with a little oil and emery, and twist the same a quarter-turn each way, lifting the valve slightly out of its seat in little jumps by pressing the forefinger of the left hand against the end of the valve stem. The pressure to allow this should be adjusted between the finger of the left hand pressing upwards on the valve stem and the pressure of the right hand on the butt of the screw-driver used to twist the valve. This serves to grind the valve and seating down equally all round, and when the ground surfaces show a clean and silvery appearance, and the valve feels perfectly solid in its seat, the job will be sufficiently well done.

x x x x

We are indebted to Mr. Ernest Hopkins for the accompanying sketch of a useful little fitting employed in conjunction with compression relief taps. It is a well-known fact that a compression tap to be of any use should have a fairly large hole in it. On the other hand, if such a tap were used on the suction stroke, pure air would be drawn into the cylinder in such quantities as to alternate the mixture and cause it to be non-explosive. To overcome this difficulty, Mr. Hopkins devised the fitting depicted here. A washer or plate A is made to fit over the screwed end of the relief cock B, on to which two spiral springs CC are fastened by convenient hooks. Across the mouth of the relief is another plate D also connected to the springs. It will be seen that when the tap is opened, compression is relieved by the lifting of the plate away from the opening of the cock; but on the suction stroke the plate closes the orifice, preventing pure air being drawn in, a perfect combustible mixture being obtained, therefore, in conjunction with the relief tap, which really does release the compression to an appreciable extent in high compression motors. This fitting, of course, would be of more practical use to motor cyclists than to the automobilist, although to the latter it is not without its value, particularly in the case of the single-cylinder engine.



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

The De Dion engines have so long been of the single-cylinder variety that great interest is taken in the new 10 h.p. two-cylinder car which has been introduced to meet the wants of those who require a still more powerful engine than the 8 h.p. and 9 h.p. single-cylinder types. This car was exhibited in the Palace show, and, in addition to the two-cylinder engine, it was fitted with a sliding sleeve, or modified form of Panhard change gear, known in France as the *train baladeur*. The new type does not displace but is supplemental to the older forms of both engine and gear. By the courtesy of Messrs. De Dion-Bouton, of 8, Brooke Street, Grosvenor Square,

the cylinders above the pistons, by means of the outer and inner cylinder caps $E^1 E^1 E^1$ and the studs and nuts $E^2 E^2 E^3 E^3$. It will also be perceived that ample water-jacketing is provided, there being a good body of water round the piston travel and a considerable mass over the combustion chambers. The bore of the cylinders is 3 17-32 and the stroke 4 11-32, as near as possible. The particular departure with this motor as a De Dion product, however, is the complete and effective method of forced lubrication, which we will now proceed to describe. Dash lubrication, or "barbotage," is discarded. To the underside of the aluminium crank chamber $L L L L$ is attached an oil well M , into which all the lubricant thrown on to the walls of the crank chamber drains. From this well, the lubricant is drawn by a toothed wheel positive rotary pump $Z Z$ (fig. 2) through a suction pipe, the entry of which to the oil well is at M^1 . This pump within the pump case marked Z (fig. 2) is driven off the half-time shaft W by means of a worm wheel X on the upper end of the pumpshaft Y (fig. 2). By this pump the oil is raised to a small oil tank set close to the cylinders on the side opposite the valve chambers, and from such tank descends by means of two copper tubes to the oil leads $K^1 K^1$ formed in the crank chamber. By these leads the lubricant

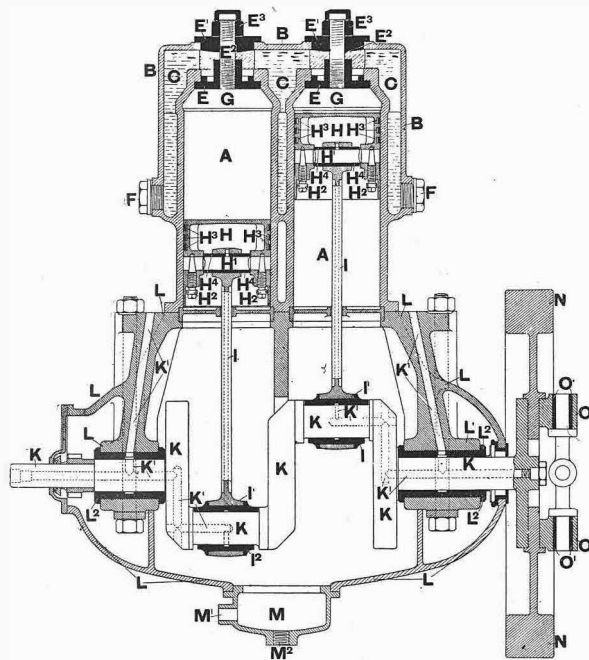
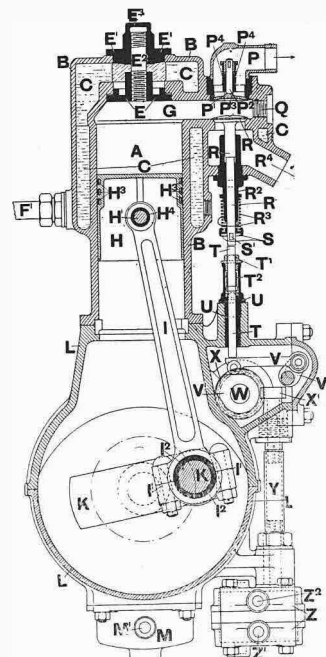


Fig. 1. Longitudinal section of the engine.

- | | |
|---|--|
| A A, cylinders | I ¹ I ¹ , big ends |
| B B B, water jacket | I ² I ² , big end bushes |
| C C C, water space | K K K, forged steel crankshaft |
| E E, lower cylinder caps | K ¹ K ¹ , oil leads |
| E ¹ E ¹ , outer cylinder caps | L L L L, aluminium crank chamber |
| E ² E ² , studs to cylinder caps | L ¹ L ¹ , bearings formed in crank chamber |
| E ³ E ³ , nuts to cylinder caps | L ² L ² L ² L ² , phosphor bronze bushed crankshaft bearings |
| F F, water jacket plugs | M, oil well of crank chamber |
| F ¹ , water inlet | M ¹ , junction for suction pipe to oil pump |
| G G, cylinder compression spaces | M ² , washout plug |
| H H, pistons | N N, flywheel |
| H ¹ H ¹ , gudgeon pins | O O, engineshaft, half of the universal joint |
| H ² H ² , set screws for holding gudgeon pins | O ¹ O ¹ , bushes to universal joints |
| H ³ H ³ H ³ , piston rings | |
| H ⁴ H ⁴ , phosphor bronze bush | |
| I I, connecting rods | |

who readily furnished us with drawings for the purpose, we are able to give our readers very comprehensible illustrations of the new engine and gear, the new four-speed expanding clutch (which was shown in actual section at the late Paris show), the new flywheel friction clutch used in connection with the sliding sleeve change-speed gear, and the road-driving wheel axle arrangement. Careful comparison of figs. 1 and 2 with the reference will enable even the uninitiated to grasp the different parts of the engine, so that it is only necessary for us to draw particular attention to convenient and simple means provided for access to the interior of



- | |
|---|
| P, induction valve dome |
| P ¹ , induction valve |
| P ² , induction valve spindle |
| P ³ P ³ , induction valve spindle guide |
| P ⁴ , P ⁴ , induction valve spring |
| Q, sparking plug orifice |
| R, exhaust valve |
| R ¹ R ¹ , exhaust valve spindle |
| R ² , exhaust valve spindle guide |
| R ³ , exhaust valve spring |
| S, exhaust valve spring cap |
| S ¹ , cotter securing same |
| T, exhaust valve striking rod |
| T ¹ and T ² cap and spring to same |
| U U, bushed guide to exhaust striking rod |
| V, exhaust valve striking lever varying left of exhaust valve |
| V ¹ , exhaust cam |
| V ² , link movement for varying left of exhaust valve |
| W, half-time shaft |
| X, worm wheel on half-time shaft driving perpendicular pump-shaft |
| X ¹ , worm wheel on pump-shaft |
| Y, perpendicular pumpshaft |
| Z Z, rotary oil pump |
| Z ¹ , oil suction pipe |
| Z ² , oil delivery |

Fig. 2. End section of the engine. The same letters apply to figs. 1 and 2

attains the crankshaft bearings, affording them sufficient lubrication, and descends into the passages drilled in the crankshaft K , shown by dotted lines, and also marked there $K^1 K^1$. The openings of these passages in the ends of the crankshafts and the crank arms are plugged, so that the oil travels through the centre of the crank pin to the bearings of the big ends $I^1 I^1$. The oil dropping from the edges of these bearings and those of the crankshaft returns to the oil well M , and is pumped round again. The oil thrown through the connecting rod

slot in the cover plate from the big ends is depended upon for lubrication of the cylinder walls. Two channels (not shown) formed upon the arched partition in the centre of the crank chamber catch sufficient oil from the big ends to serve the gear, etc., in the division of the crank chamber enclosing the half-time shaft. The oil tank when fully charged contains sufficient lubricant for 240 miles.

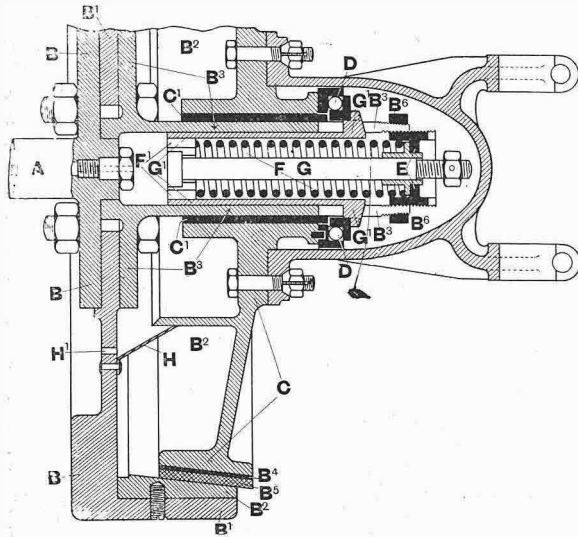


Fig. 3.—Part section of clutch and flywheel.

- A, engineshaft
- B B B, flange on engineshaft to take flywheel
- B¹ B¹, flywheel
- B² B², coned clutch ring
- B³ B³, flanged sleeve bearing bolted to flywheel
- B⁴, phosphor bronze ring carrying clutch leather
- B⁵, clutch leather
- B⁶ B⁶, locking ring nut to secure thrust cap E E in slotted end of B³ B³
- C, male clutch cone
- C¹, phosphor bronze bush
- D D, ball thrust bearing
- E E, clutch spring thrust cap
- F F, clutch spring
- F¹ F¹, clutch spring draw ring
- G, clutch spring
- G¹, clutch spring draw tube
- H, oil drip catch serving clutch
- H¹, oil exit

Fig. 3 shows clearly the flywheel clutch, as used in the De Dion chassis, fitted with the sliding sleeve change-speed gear, to be next dealt with. The flywheel B¹ B¹ is bolted to the flange B B B formed on the rearward end of the engineshaft A. Within the rearward overhanging flange of the flywheel B¹ B¹ is an internally-coned ring B² B² secured by set screws, as shown in the fig. This coned ring forms the female portion of the friction clutch. The bolts which serve to secure the flywheel B¹ B¹ to the flange B B also attach to the rear face of the web of the former a deep-flanged sleeve or collar B³ B³, which serves as a bearing for the male or sliding portion of the clutch C. Upon this sleeve the cone C slides for clutching and de-clutching, and rotates freely when withdrawn from contact with the coned ring B² part of flywheel B¹ B¹.

The section of the sleeve B³, owing to the necessity of leaving the rearward portion thereof plain, in order to indicate one of the deep cross slots cut therein, to take the lugs formed on the end of the clutch spring draw tube G¹ G¹, may be found somewhat puzzling to those unaccustomed to the perusal of drawings. But in order to grasp the

ingenious design of this clutch, the reader must comprehend that the sleeve or collar B³ B³ forming part of the flywheel continues rearward to where the clutch spring thrust cap E and the locking-nut B⁶ are shown screwed into and around the same respectively. If this is clearly understood, the action of this clutch can be seen at once. The ball bearing, clutch spring, etc., are all enclosed by a metal dome, which is shown bolted to the boss of the sliding cone clutch. When the male or sliding cone C is caused to move rearward for the purpose of cutting off the engine drive from the car, the boss of C with its phosphor-bronze bush C slides to the right on the sleeve B³ B³. The rearward pressure is communicated from the exterior ball race of the ball thrust bearing D D through the balls to the inner ball race, which is carried, as shown, by the clutch spring draw tube G¹, and is by that tube communicated to the ring block F¹ F¹, which carries the fixed end of the clutch spring pin G. But, as has been already shown, the clutch spring thrust cap E E is screwed fast and locked into the end of the sleeve B³ B³, which is practically part of the flywheel B¹ B¹.

So it will be seen that any rearward sliding movement of the boss of the clutch C must be accompanied by a similar movement of the clutch spring draw tube G¹, and that consequently the clutch spring F is thereby compressed against the clutch spring thrust cap E. So that when the clutch pedal is released, the thrust of the spring E E against the ring F¹ serves to carry the coned leathered periphery B⁵ of the clutch C back into driving contact with the coned ring B², part of the engine flywheel. Thoughtful provision has also been made to protect the frictional surfaces of B² and B¹, the engaging and driving surfaces of the clutch, from oil exuding from the sleeve bearing C by a surrounding ring C¹ C¹ on the forward face of the clutch web, and the oil drip case H attached to the flywheel. Whatever oil finds its way from the bearing C into this case is thrown out forwards through the holes H¹.

The Sliding Sleeve's Change Speed Gear.

In fig. 4 we have a vertical section of the aluminium gear box A A, showing not only the primary feathered gearshaft B B and the secondary gearshaft C C C, but also the driving bevel pinion H H on end of latter, and the rotary toothed wheel oil pump for the constant and effective lubrication of the gearshaft bearings. Free to slide on the primary gearshaft B B are the two sliding sleeves D¹ D¹ E¹ E¹, the former carrying the first and second speed pinions 1 and 2, and the latter having secured to a flange formed thereon for the purpose the third and fourth speed pinions 3 and 4. In the vertical plane, and below the primary-shaft, is the secondary-shaft, carrying on its left-hand end without the gear case the brake drum D D, and within the first, second, third, and fourth speed-driven pinions marked 1¹, 2¹, 3¹, and 4¹. These wheels are attached to flanges formed on half sleeves bolted together round the secondary gearshaft, as shown in dotted lines on section, and made solid therewith by means of the keys indicated. At the right-hand end of this shaft, also without the change-speed gear box, we find the driving bevel pinion H H, which drives the toothed bevel ring round

the differential gear box. The same system of lubrication we have seen applied to the crank chamber is also found here. E E is a rotary toothed wheel pump driven by wheel and worm gearing off the rearward exterior end of the primary gearshaft B B. The driven worm wheel is set upon the upper part of the hollow pumpshaft G¹ G¹, and is marked G². The oil is drawn by the pump from the bottom of the gear case through a suction pipe E¹, and is delivered by F¹ up the hollow pumpshaft G¹ G¹ into the oil vessel F above. Thence it flows along the oil space G G on the top of the gear case, and finds its way by means of the various leads H² H² to and from the bearings of both gearshafts. The gear-striking rod for placing in mesh the four pairs of wheels is not shown, but the grooved collars on sliding sleeves D¹ D¹ E¹ E¹ are seen on the inner ends of each sleeve. The pinion for obtaining the reverse speed is not shown, but by the movement of the gear lever to the reverse position a long toothed pinion is brought

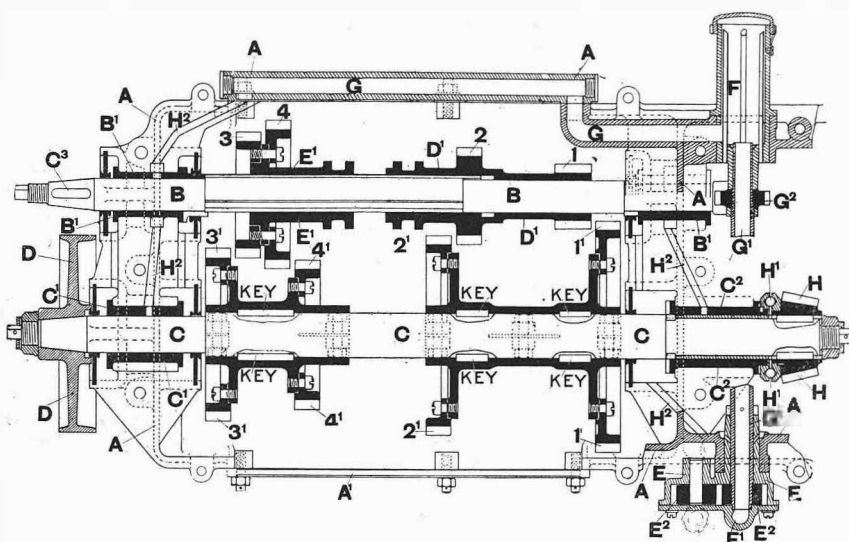


Fig. 4.—Sectional elevation of the sliding change speed gear.

- | | |
|---|--|
| <p>A (repeated), aluminium gear case
 A¹, inspection cover
 B B, primary feathered gearshaft
 B¹ B¹, phosphor bronze bearing to shaft B B
 C C C, secondary gear shaft
 third and fourth speed driven pinions 1', 2', 3'
 C¹ C¹, phosphor bronze bearing to shaft C C C and
 C² C², phosphor bronze bearing to shaft C C C
 C³, attachment for universally jointed clutchshaft
 D D, band brake drum
 D¹ D¹, sliding sleeve carrying first and second
 speed driving pinions 1 and 2
 E, rotary pump
 E¹ E¹, sliding sleeve carrying third and fourth
 speed driving pinions 3 and 4.</p> | <p>E², pump pinions
 F, oil chamber
 F¹, oil delivery pipe
 G G, oil channel feeding oil leads H² H²
 G¹ G¹, hollow pumpshaft forming oil delivery pipe
 G², worm wheel driving G¹ and E²
 H H, driving bevel pinion on rear end of secondary
 gearshaft C, driving bevel toothed ring bolted to
 differential gear box
 H¹ H¹, ball thrust bearing to bevel driving gear.
 H² H², oil leads from oil channel G to various shaft
 bearings
 R, oil wash out</p> |
|---|--|

into mesh with the wheels r and r¹ as they stand in the section, and so reverse movement is obtained.

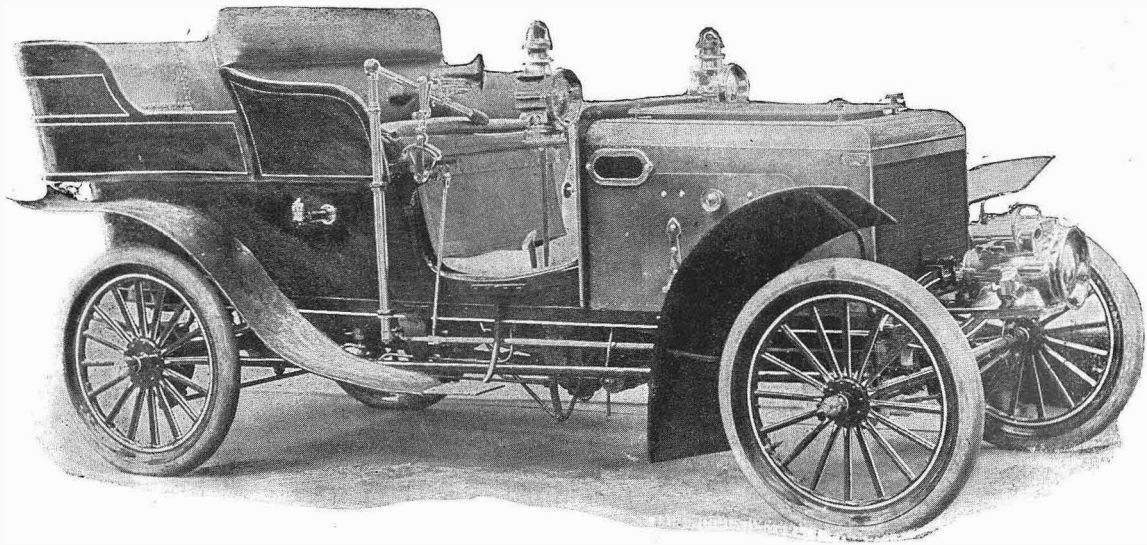
(To be continued.)

MECHANICAL INLET VALVES. By Capt. C. C. Longridge, M.Inst.Mech.E.

The extended use of mechanical inlet valves in the motors of 1903 has received frequent notice in the press. But there has been a somewhat obvious tendency to abstain from criticism, to withhold judgment, and await the results of experience. We see no reason for this policy of reserve. Mechanically-operated valves were bound to come, and it is equally certain that they have come to stay. There can be no doubt of the superiority of the mechanical over the automatic valve, and this is the reason for its advent and for its stay. But in the matter of present designs and existing applications, as portrayed in the recent shows, there is scope for both criticism and doubt as to permanence. To introduce the mechanical valve is a step forward, but to accompany it with such modifications of cylinder design as are distinctly opposed to good practice is a pace to the rear. It is to mix evil with good and to counterbalance the advantage of prompt and certain valve action by a disadvantage affecting the power of the motor. It is in this respect that the motors of 1903 appear open to criticism. With rare exceptions—notably, the Maudslay and the Mercedes 1903 type—all this year's engines fitted with mechanical valves have adopted this improvement at the expense of increased irregularity in the shape of the combustion chamber and of enlarged area of cooling surface. For these results attend the introduction, seen in most cases, of valve boxes and ports on both sides of the cylinder head. This modification of design is, no doubt, due to a desire to

keep down the height of the motor, and by introducing symmetry to build a pretty engine. The result cannot but be prejudicial to combustion and the operation of the motor. A leading rule in gas-engine design is to reduce to a minimum the area of cooling surface in contact with the hot gases. For this reason the combustion chamber should have a minimum surface for its volume, and as regular a form as possible. This is no purely theoretical rule, nor is it limited to gas engines. It applies to all internal combustion engines, and its influence or efficiency is abundantly proved by experience. The observation of this principle is perhaps of special importance in the case of petrol motors. Petrol mixtures are slow-burning, and the cooling effect of increased wall area must tend to produce slower flame propagation and lower temperature, and, therefore, loss of power. A few makers, such as the designers of the Maudslay engine and of the new Mercedes, have evidently appreciated the influence of the explosion chamber on combustion, and have recognised that for this and perhaps other reasons, valves are best placed directly in the head of the cylinder. Whatever may be the experience of others, we believe that these makers will have no cause to find mechanical valves anything but distinct improvements on automatic action. In connection with valves, another improvement is noticeable in some motors—that is, a combination in which both the valve and its seat are detachable from the cylinder, thereby giving greater facilities for grinding-in operations.

THE LAMPLOUGH-ALBANY STEAM CAR.



This car embodies original features, and is the outcome of several years' experiments, the motor being an adaptation of the Lamplough system.

A pair of engines are coupled together, with the cranks set at right angles. Each engine is arranged to operate its own lap and lead, and its opposite engine's cut off; consequently the parts are very few, eccentrics, links, and all attendant gear being entirely dispensed with. The advantage of using this style of gear is its great economy in the consumption of steam, owing to the full boiler pressure being admitted to the engines. The speed of the car is regulated by the cut-off, the operations of stopping, starting, reversing, and controlling speed being by means of a single lever.

By regulating the speed of the car by cutting off the steam at different periods of the stroke, an economy results, as every grade of expansion takes place in a single cylinder. For example, when the car is running on the level at a moderate speed, it has been found that the cut-off can be set at one-eighth stroke, expansion taking place for the remainder.

The valves are preferably of the mushroom, or gas engine, type. The engine is also fitted with trunk pistons, entirely dispensing with the necessity for using stuffing boxes and glands, while the whole, being enclosed and running in a bath of oil, is subjected to so little wear and tear that engines, after running several thousand miles, appear to be none the worse for their experience.

The steam generator is the result of considerable experiment, and may be termed the generation of steam within steam, first advocated by Lamplough in 1884, but looked upon with little favour by engineers of that time.

The present type of generator is a considerable advance upon the Lamplough method of 1884 and 1897, inasmuch as the primary and secondary generators are not sealed from each other, wet steam being generated in the primary, which is excessively superheated in the secondary, and afterwards brought to a workable temperature by the extraction of some of the heat units through frictioning the sur-

face of the primary generator, the result being considerable economy with an enormous increase in evaporative efficiency; while the generator, being of the coil type, is claimed to possess all the advantages that could be obtained by the combination of all the best points contained in tubular, flash, and water tube boilers, with none of their disadvantages, being safe from explosion and practically indestructible.

The burner is automatic, and constructed to break up and burn both light and heavy hydrocarbons, such as paraffin, petrol, alcohol, and methylated spirit, and it not only adapts itself to the altered conditions necessary to burn these fuels, but will do so silently, and give excellent results in all cases.

The pumps are arranged automatically to pump fuel and water, the method being to vary the quantity of liquid delivered in preference to varying the stroke, this being done by a single oscillating lever worked off the pump ram and fulcrummed at its centre to a diaphragm-controlled piston. This fulcrum alters its position according to the pressure on the fuel tank or boiler, and causes the free end of the oscillating lever to hold up a return valve for a more or less portion of the stroke; consequently, when the maximum pressure is reached, the pumps are doing no work, and at all times doing only what is *actually necessary*. Hand pumps for oil and water are also fitted.

The driving is direct by means of a flexible-shaft connecting the engine to gearing, entirely dispensing with chains and sprocket wheels. As the whole runs in oil, it only needs occasional attention.

Foot and powerful hand brakes are fitted. The engine can also be used as a steam brake without fear of injury to the mechanism, on account of the method of construction making it adaptable for that purpose; consequently, it is not necessary to use either the foot or hand brakes except for emergency.

Side or wheel steering may be fitted. The wheel steering has a diamond thread, ball bearing, quick action screw, adjustable by means of a single nut which takes up the wear on all points at once, backlash being entirely prevented.

The condensing of the exhaust is by means of the well-known Lamplough-Albany system, which, it is claimed, perfectly condenses the steam, and returns the whole of the water, enabling the car to be run for two hundred miles on one filling, the oil being separated by gravity, which in practice has been found to be the only method capable of achievement. The whole of the work is English throughout, being constructed by the Albany Mfg. Co., Ltd., Willesden Junction, N.W.

THE MARKS FOR THE 1903 RELIABILITY TRIALS.

The sub-committee, in connection with the September trials, have passed the following recommendations with regard to marks:

(1.) Marks to be allotted as follows:

3,000 for reliability.	250 for dustlessness.
1,500 „ cleaning, etc.	250 „ re-starting on hill.
1,500 „ hill climbing.	250 „ vapour or smoke.
500 „ condition.	250 „ appearance.
250 „ brakes.	250 „ accuracy of adjusted h.p.
250 „ steering.	250 „ fuel consumption.
250 „ silence.	250 „ cheapness.
250 „ vibration.	
500 „ speed.	

(2.) The maximum daily marks obtainable for reliability to be at the rate of three marks per mile, from which one mark per minute is to be deducted for stoppages, adjustments, or replenishments *en route*.

(3.) From the maximum of 1,500 marks for "cleaning, etc.," is to be deducted one mark per minute for cleaning, adjusting, and replenishing in the garage at the Crystal Palace.

(4.) The marks given for "accuracy of horse-power" shall be taken from the *best* performance of the cars on any one of the trial hills.

The marks for hill-climbing, horse-power performance, accuracy of advertised horse-power, fuel consumption, speed, and cheapness will be based upon the following formulae:

Hill-climbing.—

$$\text{Marks} = \frac{3300}{\text{No. of hills}} \times \frac{(6 + \text{No. of pass.})}{(1500 + \text{£})} \times \text{average grade per cent.} \times \text{speed miles per hour.}$$

H.P. Performance.—

$$\text{Marks} = \frac{(\text{laden weight, lbs.} \times \text{vertical rise, ft.}) + (\text{length of hill, ft.} \times 35 \text{ lb. per ton laden weight})}{33,000 \times \text{time, minutes.}}$$

Accuracy of Advertised H.P.—

$$\text{Marks} = 250 \times \left(\frac{140}{100} \times \frac{\text{H.P. performance}^3}{\text{H.P. declared}} \right),$$

with a maximum of 250.

Fuel Consumption.—

$$\text{Marks} = \left(25 \times \text{distance in miles} \times \frac{\text{laden weight cwt.}}{(2) + \text{laden weight, cwt.}} \right) \times \frac{1}{\text{fuel in gallons} \times \frac{\text{pence per gallon}}{12}} - 125$$

Speed.—

$$\text{Marks} = \frac{\text{speed, m.p.h.} \times (6 + \text{No. of passengers})}{1500 + \text{price, £}} \times 2500$$

Cheapness.—

$$\text{Marks} = 7 \text{ for every } \text{£}1 \text{ per cent. below maximum price in class.}$$

MILITARY OFFICERS' CARS.

Officers owning cars have for some time been using them to facilitate their service duties, and it has now been decided by the War Office, as a tentative measure, to grant certain rates to officers using privately-owned cars when on duty. Provisions are made that no allowance will be granted except when the hire of a cab or other conveyance would be admissible by the existing regulations, or if the employment of a car permitted duties to be promptly carried out which would otherwise have not been the case; and in all times of urgency where the use of a car proved to be quicker than any other available means of transport. The allowances are as follow: For a four-seated car, 4d. per car mile; three, 3d.; two, 2d.; one, 1d.; and 1d. per mile extra for each passenger carried in excess of four, for whom travelling expenses are recoverable under the present regulations. We suppose motor bicycles are included in the penny grant. The regulations are to be tried for twelve months, and at the expiry of that period the General Officers Commanding are to send in a report on their working. We expect in many instances no applications will be made for the allowance, though it is satisfactory to note that the regulations appear to be as simple as possible, and that the judgment of the officer employing his car is relied upon as to the suitability of the particular means of transport. There is no doubt that in many cases an immense saving of time will result, and, considering the allowances made, it is perfectly certain that the country rather than the officers will benefit.

A new garage and motor works have been opened at Gloucester by Mr. A. C. Stretton, in Northgate Street.

* * *

Three English motor cars are running between Dungu and Lado, the first automobile service in the Congo Free State.

* * *

Last week one of the drivers of the Manchester Motor and Transport Co. was charged at Bolton with permitting a motor lorry of which he was in charge to emit steam and smoke. Mr. W. E. Rowcliffe, who appeared on behalf of the company, pointed out that the machine was a light locomotive, and that the summons should not have been taken out under the Locomotives Act. Light locomotives had the right to emit steam from a temporary cause, and no smoke was shown. The superintendent magnanimously intimated that he was prepared to withdraw the summons on payment of costs; but we should like to know why the defendants should pay for police errors.

CLUB DOINGS.

Oxford and District Automobile Club.

A meeting of local automobilists took place at the Clarendon Hotel, Oxford, on Thursday of last week, when a club was formed, some thirty names having been given in. Mr. Claud Rippon was elected president; Mr. Allen, vice-president; Mr. Briscoe, treasurer; and Mr. Crake, secretary. The Clarendon Hotel is the headquarters, where there is a special room set apart for the club, and the opening run is arranged to take place on some suitable Saturday.

THE CRYSTAL PALACE SHOW. From a French Point of View.

In making a comparison between two shows, the one last visited has usually the advantage of leaving fresh impressions which tell in its favour, for while the mind obtains a grasp of the many novelties and improvements to be seen there, it is apt to forget the instructive details of the previous exhibition, which is only remembered for its general lessons. This is the difficulty one contends with in comparing the Crystal Palace Show with the last Salon de l'Automobile held in Paris. Our recollection of the one has been partly effaced, while the other stands before us in clear-cut detail. The show at the Palace was so much more interesting and successful than could have been anticipated that many people seem to have concluded that it eclipsed the French Salon; as, indeed, in certain respects it did, but I think that the comparison which has been made in favour of the Palace Show on the score of size is rather misleading. I will not dispute the statement that the ground space was twice the area of the Grand Palais, because in all probability this is correct, but it must be remembered that this restriction of space compelled the French organisers to limit the size of the stands to such an extent that exhibitors could get nothing like the area they applied for. They were all inconveniently crowded, which was not the case with the Crystal Palace, where makers had plenty of room for the display of their vehicles. The best comparison is to take the number of exhibitors at the two shows. There were 185 firms exhibiting at the Crystal Palace; many of them with two, three, or more stands, but in Paris there were no fewer than 766 exhibitors. It is true that the French show was of a much more comprehensive character, and included alcohol engines, ballooning, and other matters; but even after deducting these exhibits the number of makers showing in the section devoted to autocars, motor cycles, and accessories was nearly treble that at the Crystal Palace.

After all, quantity is not such an important matter in an autocar show as quality; and it is here, I think, that the Crystal Palace display has managed to score. The French Salon was more particularly remarkable as an illustration of the wonderful development reached by the industry in the way of productive facilities, and it was to be noted also that makers had about got to the limit of practical invention, and were contenting themselves with improving on standard patterns of vehicles. At the Palace the keynote was excellence of construction and the progressiveness of makers, as shown by the novelty and variety in mechanical design.

First Impressions.

The first thing that struck the foreign visitor was the considerable number of British firms engaged in the industry. He has so long been under the impression that the British trade was scarcely yet out of its swaddling clothes, and would not be able to supply the home demand with cars for many years, that the enterprise of the English maker has come to him as a revelation. Instead of England relying upon France for automobiles, and taking the surplus production which cannot find a market in that country, he sees that the Britishers are seriously

preparing to cater for the home needs, and that a new era is opening up, when foreign makers will find it very difficult to keep their foothold on the English market. This impression is not forced upon him by a cursory view of the show, but grows with a closer inspection of the exhibits. On a first examination, he was certainly not prepared to admit that the English were at all likely to threaten the supremacy of the French even in the English market, and it was only afterwards that he saw they were working on somewhat different lines.

Racing not the English Ideal.

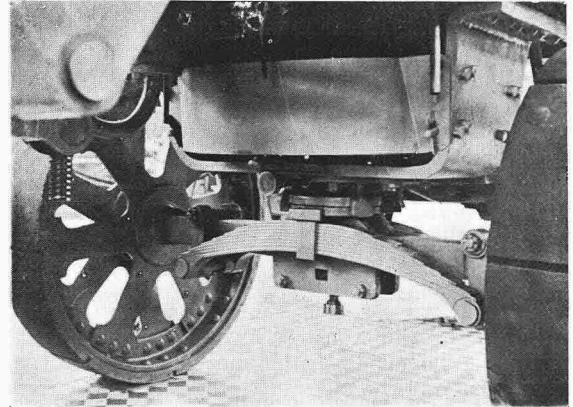
In France ideas of automobile design and construction have crystallised into definite grooves, as the result largely of the failures of all attempts in the past to strike out on new lines, and being unable to break away from tradition, the trade has gone steadily in the wake of a few leading firms whose mechanisms are copied with more or less success. It is thought that there is no salvation for the great majority of firms except in this imitation, for where the big firms have set a fashion in vehicles they think it useless to try and induce the public to take anything representing a considerable departure from ordinary practice. The visitor, therefore, was at first inclined to look with scepticism upon the many new things to be seen at the Crystal Palace. In this respect the show seemed to resemble the Salons of three years ago, when new mechanisms presented by unknown firms were condemned as freaks, and foredoomed to failure. But a closer inspection proved that, if these novelties seemed to revive the past history of the French industry, they were at all events of a much more practical character. In the one case we have seen theorists at work trying to apply simple ideas by complicated devices, and in the other these ideas have been put into shape by sound engineering methods. It is for this reason that we observe such a great difference between English and French automobile practice. The French maker has been following up a certain ideal, which is the outcome of the racing car, and as he aims at one thing, so the means of attaining it are limited, with the result that the French find it extremely difficult to break away from the standard type of vehicle which has become so general on the Continent. The English are fortunately not limited by such restrictions. Buyers will not purchase a particular type of car because it is the fashion to do so; but they will take the best and most reliable, whether it is propelled by a four-cylinder vertical engine, a horizontal motor, or has a belt transmission. The presence of horizontal engines and belts at the show was rather refreshing, since it points to the possibility of this driving gear getting something like a fair trial. Those firms who have always made a speciality of them on the Continent only gave up the system with regret, under stress of the fashionable demand for vertical motors and sliding gears. Perhaps the greater freedom allowed English makers in autocar design will enable them to show that the belt transmission and the horizontal motor possess an advantage for certain types of really serviceable and economical carriages.

Advanced British Practice.

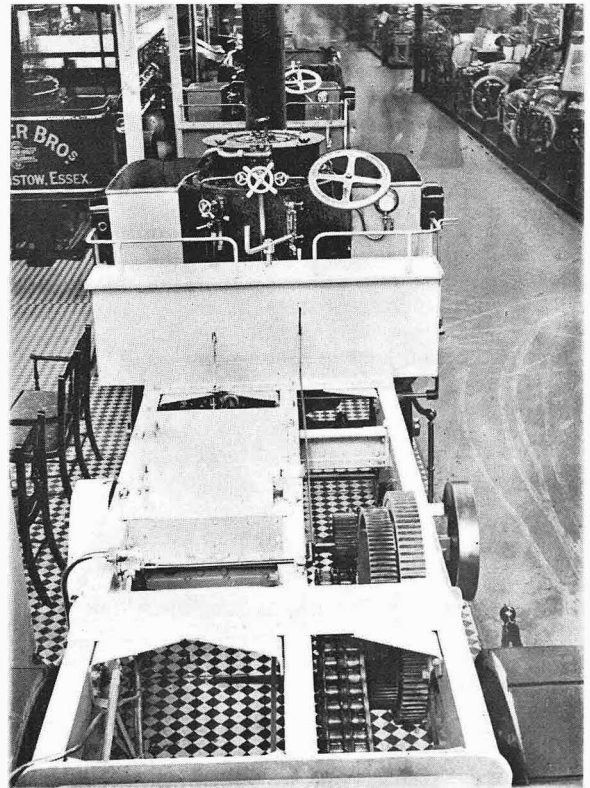
Not only did we see a good many old ideas at the Crystal Palace—some of them greatly improved upon and others, I fear, with little chance of developing into a commercial success—but there were numerous points which certainly show that the English makers have a good grasp of the automobile problem, and to a large extent they seem even to have taken the lead on foreign manufacturers. An instance of this is observable in the method of suspending the mechanism from the frame, whether by springs, as in the case of the Soames car, or by lugs, as in the Waller and certain other vehicles. This method of suspension has only recently been attracting attention on the Continent, where a good many firms are beginning to think it advisable to interpose flexible or non-rigid connections between the machinery and the frame; and as the frames are now built as light as possible, this is no doubt an important feature. This individuality certainly gives a great advantage to the English industry, because no one can pretend that the standard type of car, though highly efficient and satisfactory, has yet reached perfection; and, moreover, as the requirements of buyers differ so considerably, it can hardly be expected that they will all be satisfied with the same systems of vehicle.

And yet the foreign manufacturer has now reached a point when he finds it extremely difficult to make any further headway. His cars are appreciated by a certain class of users, but there are others—and they are in the majority—who need something that fulfils entirely different conditions; and it is in this direction that the English makers seem in a fair way of doing more than their foreign competitors. They are not bound down by prejudice or by a fear that, because ideas may be old, they are therefore out of date. It only needs the necessary skill to adapt them properly, and skill in design and construction was one of the most noticeable features of the Crystal Palace show. Makers who can present cars teeming with novel and practical points are capable of doing great things in the future. Some of the cars exhibited were more interesting than any yet seen at the Paris shows, for though the different Salons have had new cars presenting as many points of novelty, they have never conveyed such a good impression as some of those seen at the Palace. They are sound mechanical devices, and not merely ideas which fail to become a success because they are imperfectly developed. In construction, too, there was nothing to surpass some of the English cars. Their workmanship was essentially thorough, and yet there was no sense of undue weight; in fact, they gave a comfortable impression of an ample margin for safety, which is sometimes lacking in the lighter construction of the French cars. This superiority was specially marked in the tubular frames, which were far better constructed than any I have seen on our own vehicles. The only thing open to criticism is perhaps the practice of finishing off the motor bonnet to represent lagging with brass studs. The autocar is after all a carriage, and the mechanism should not be obtrusive. The bonnet on many of the British cars has too mechanical a finish, and the lavish display of brass is something of an eyesore. This, however, is a small matter, for the main thing is the definite position which the

British maker has taken up in the automobile industry; and having shown a remarkable ingenuity and skill in presenting new cars of high merit, which are really national productions, he seems to be in a fair way of monopolising his own market and taking his stand with foreign manufacturers in other countries.



The front transverse spring arrangement of a 7 ton Straker heavy vehicle.



The chassis of the Straker lorry, exhibited in the Palace show, described in "The Autocar" of the 7th inst., page 181.

A rumour has been circulated to the effect that Sir Edward Jenkinson has resigned both the chairmanship and directorship of the Daimler Motor Co. We are asked by Sir Edward Jenkinson to emphatically deny this report.

STATISTICAL SYNOPSIS OF THE SHOW.

THE NUMBER OF AUTOCARS AT THE CRYSTAL PALACE.

Counted, Compiled, and Classified by H. Hewitt Griffin, M.J.L., and Statistician.

One of the most amusing features of autocar, cycle, and kindred exhibitions is the wild and wonderful guesses at the number of machines, etc., made by many of the daily and weekly papers. For instance, after last year's Agricultural Hall show, one weekly, which used to be noted for its extreme accuracy, came out with a big type headline, "One Thousand Cars"; other estimates varied from the modest 200 to the swollen 700. As a matter of calm cold fact, there were 329, as shown below. To the man in the street, it may not seem of much consequence as to the extent or exact number of motors or cycles at any particular show; but, be it remembered, these exhibitions are chapters in the history of the development of the movement—ear marks in the march of the industry's progress—and, therefore, unless current records of these events are built on a sure foundation, how can future exhibitions be compared with those of the present? or how will the investigator of the future be able, when looking backward, to reconcile the statements in the press of 1903?

I may claim to have invented show statistics. For many years—over a dozen—I have made a careful count and classification at all cycle shows and several motor shows. I attended the first gathering of motors ever held in this country, when Sir David Salomons held a display at Tunbridge Wells—15th October, 1895—and when the entire motor resources consisted of a couple of motor carriages, a steam tractor, and a motor bicycle, not counting a Daimler fire engine. I have the catalogues of this and of the Imperial Institute and Crystal Palace shows—the first actual shows, held simultaneously May-June, 1896—all now rare documents, and of considerable value to collectors.

Since then, exhibitions have grown and developed; but, with very few exceptions, there is not any record of the exact number of cars, much less of their classification, extant. I was determined, therefore, that this reproach should not be hurled at the splendid show which closed on Saturday last, and accordingly made a most careful statistical survey on Friday last week. This—the preparation of the score sheets, the actual count, which alone occupied eight hours, and the aftermath of comparison, calculation, and classification—is a much more serious affair than the few resultant figures would imply.

Wild Estimates by Experienced Persons.

During the progress of the count, I derived considerable amusement from the estimates that various people gave me as to the number of cars they thought were in the Palace. In many cases also I asked for an "opinion" as to the number of cars at Earl's Court. The result was, in the majority of cases, laughable in the extreme. Although I did not actually know the exact number

until the show was over and my score sheets were checked and rechecked, I had, from long experience, a shrewd idea that the number would be over 500 but under 600. The men whose powers of observation I tested were not casual visitors, but all men of experience—many of them veterans in show work, from the president of the show downwards, and most of them exhibitors. Some of the answers were astounding; such, for instance, as the exhibitor who thought "between 3,000 and 4,000 cars." The average guess was about 700 or 750. The president and chairman, after mature deliberation, gave as his opinion that at the lowest there were "over 800 cars," but rather thought there were "900." Many put the figures at 1,000. Very few were below; but one modest man put the number at "180." The estimates of those who had been at Earl's Court were nearly as bad—even from those who had been in daily attendance thereat. Only one was right—Mr. J. H. Adams (100), who also came very close (560) to the Crystal Palace figures. Now, if it were not for *The Autocar's* accurate analysis, this margin of mistakes would be the standard by which future shows would be judged; and so interesting are the conflicts of observation powers that I give a few samples:

Estimates for cars at Earl's Court: 60, 90, 100, 150, 180, 200, 220, 250 (many times), 320, and 400 by three people.

Estimates for the Crystal Palace Show: 180, 200, 290, 300, 400, 425, 450, 500, 500 to 600, 560, 695, 700, 750, 800 to 900, 1,000, 1,200, 1,500, 2,000, 2,300, and 3,000 to 4,000.

Of course, several of these figures were given many times over. Most also seemed to vastly overestimate the value of the cars present. Opinions on this were not asked, however, but one maker volunteered the information that "the cars in the building are worth £3,000,000." On being asked if he valued each car at over £5,000, he was staggered. At the official lunch, the chairman estimated the value of the cars at £500,000; but even of all the cars in the grounds, with accessories and components thrown in, this sum does not seem possible. £250,000 would be a liberal estimate.

Unfortunately, statistics of the last (December, 1902) Paris Show have not yet come to hand, or it would have been extremely interesting to give a further comparison. However, I have the figures of the 1901 show, which were little, if any, smaller.

In fairness to the Crystal Palace Show, it must be stated that only the machines actually on view in the building were counted. It was quite impossible to obtain a correct return of those in the grounds. The catalogue gave 113 cars so arranged for, but 176 or 196 were given permits (this included a large number of cycles), so these figures cannot be included. If they were, it would put London far in advance of Paris, and as it is there were only twenty-two cars less than the 1901 Paris Show figures, for which we are indebted to *Le Vélo*:

Statistics of Four Shows.

A, Earl's Court, 16th to 24th of January, 1903.
 B, Agricultural Hall, 19th to 26th of April, 1902.
 C, at Paris in December, 1901.
 D, Crystal Palace, 30th January to 7th February, 1903.

	A	B	C	D
1. Light and Heavy Motor Cars ...	61	171	416	273
2. Voitures ...	27	60	48	118
3. Covered Carriages ...	4	24	*	40
4. Vans and Lorries ...	3	21	15	24
5. Omnibuses ...	6	14	24	11
6. Chassis ...	6	39	53	69
Grand totals ...	101	329	556	534
Total (Catalogue) Exhibitors ...	72	248	—	189
Exhibitors of Cars ...	32	111	—	115
Exhibitors of Cycles (only) ...	7	—	—	14
Motor Cycles ...	126	42	115	151
Method of propulsion:				
1. Petrol Motors ...	78	231	261	438
2. Petrol or Alcohol ...	—	—	210	—
3. Alcohol only ...	—	—	22	—
4. Electric Cars ...	4	32	46	33
5. Steamobiles ...	19	65	15	63
6. Electricity and Petrol ...	—	—	2	—
7. Liquid Air Motor ...	—	1	—	—
Totals ...	101	329	556	534
DRIVING GEAR:				
Chain ...	61	—	—	294
Propeller-shaft ...	27	—	—	230
Belt ...	16	—	—	10

* Included in 1 and 2. † There were 214 motor cycles at the Stanley (Nov.) Show, and 22 motor cars.

Of the 115 firms 90 showed only petrol cars, 14 steam cars, 4 electric cars only, 4 both petrol and electric cars, and 3 both petrol and steam motors.

Needless to say, pneumatic tyres were, save on the heavy lorries and vans, practically universal. 1 firm showed 2 lawn-mower motors, and 1 firm showed a regular steam road engine, but it came within the three-ton limit. These are not included in the foregoing tables; so with the 7 firms showing motor cycles only it made up 124 firms, showing 648 self-propelled vehicles.

Of the 111 cycles 5 were tricycles, 2 tandems, 1 quad, and 7 bicycles with corearriages.

There were also 1 ordinary safety bicycle and 1 horse car (but no horse—a "horseless car," but not a motor).

The Classification.

Where to draw the line between a motor car and a voiturette is often a puzzle indeed; but, speaking broadly, the rule followed was to classify them as follows:

All vehicles with only seats for 2 persons (save racing cars) as voitures, and all cars with 3 or more seats as light cars.

There ought to be further divisions for motorettes—light, single vehicles (bath-chair like) or tandem cars, such as the Eagle, Century, etc. These are not "cars," yet, for want of a recognised division, had to be ranked as "voitures."

To prove the marvellous progress of the pneumatic tyre, only 2 vehicles—both American electric cars—had solid rubber tyres.

Belt driving has almost disappeared; less than two per cent. were so fitted.

Rod driving (or propeller-shaft) is only so reckoned where the chain is not used at all.

Chain driving is counted where the chain is called into requisition in any way for driving. A year hence the propeller-shaft drive appears almost certain to be far ahead of the chain system.

The Percentage of Popularity.

Power.	Percentage.		Drive.	Percentage.	
	Crystal Palace.	Earl's Court. †		Crystal Palace.	Earl's Court. †
Petrol ...	82.023	78	Chain ...	55.056	64
Steam ...	11.798	19	Propeller-shaft	43.071	27
Electric ...	6.180	4	Belt ...	1.873	16
	100.000	100		100.000	100

† These figures are sufficiently near.

Mere figures do not convey the proportion clearly set forth by the percentage.

Only a very "wild hazard" can be made as to the value, already referred to: At £300 each = £150,200; at £400 each (a high estimate) = £213,600—plus sundries, stands, etc.

ECHOES OF THE SHOW.

Mr. Vernon Pugh, in studying the cars at the Crystal Palace Show, paid particular attention to finding out the proportion of cars fitted with live axles. Out of a total of 441 cars he found 193 with live axles and wood wheels, fifty-five with live axles and wire wheels, 192 with fixed axles and wood wheels, and only one with fixed axle and wire wheels.

* * *

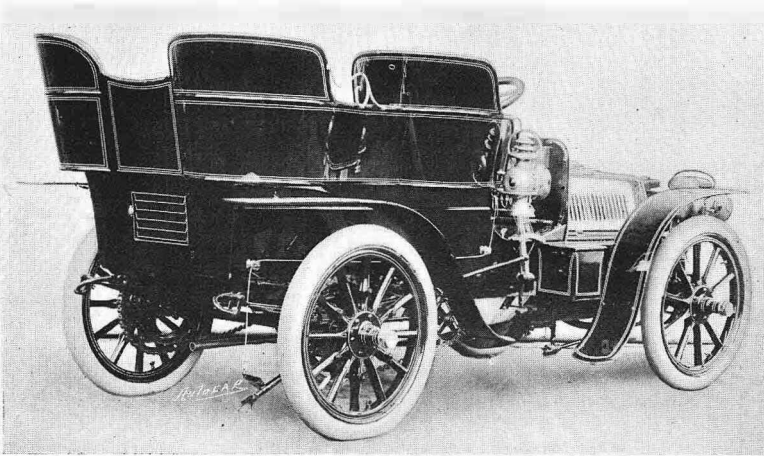
Many of the excellent illustrations which we have produced of exhibits at the Crystal Palace have been made from photographs taken by Messrs. J. Russell and Sons, the official photographers. Their manager, Mr. T. H. Everett, who was greatly harassed by pressure of work during the week, spared no pains to meet the desires of illustrators and exhibitors in providing excellent photographs of cars and stands.

* * *

During the printing of our show number, the copy relating to the exhibit of the Automotor Accessories Co. was, unfortunately, lost. Needless to say, this firm had a very representative exhibit of motor parts and accessories. The principal specialities which attracted attention were a neat little carburetter particularly suited to a bicycle motor; Pfluger coils, which are made in a variety of sizes; and the Stéate sparking plug, which, it is claimed, is not affected by oil. Among other good things shown were the Timkin rolling bearings, which, it will be remembered, were lately illustrated and described in our columns; Nadall auto tyres; Bell odometers; and various sizes of the A.A.C. sprags, which we also illustrated and described recently, were also exhibited.

* * *

In dealing with the Crystal Palace show last week we omitted from our report the exhibit of Messrs. Waddington and Co., of Middlesbrough. This is accounted for by the fact that it is one of the several firms exhibiting, but not appearing in the catalogue and having no stand number. This firm exhibited a light car with 9 h.p. single-cylinder De Dion motor with three-speed gear and reverse, driving direct upon the top gear, in which case the countershaft is out of action, so that none of the gearing is running idle while the top gear is in operation. The remaining features of the car were on lines usually associated with this type. Another car of 6 h.p. was shown, with details precisely the same as those of the larger car. The only constructional feature of particular note was that the under-frame members of the tubes, instead of being rigidly attached to the frame by being brazed into lugs, were fixed by means of lock-nuts engaging on a thread cut upon the outside of the tube, which, of course, is sufficiently strong to admit of this being done. It, therefore, is possible to detach the gear with the minimum of trouble.



The 20 h.p. M.M.C. car exhibited at the Palace show (see "The Autocar," page 175).

From a letter which appears in the current issue, it will be seen that a good suggestion is made by a show visitor for improving the arrangements with regard to the trial cars, which were a great and very much appreciated feature of the show. An improvement in this connection which should be recorded was the parking of the trial cars in the North Tower Garden instead of on the terrace. In some cases the cars ran down in the grounds, and in others they went outside on the roads around the Palace, where a number of steep gradients enabled the visitors to form an excellent idea as to their capacity. The great advantage of starting from the North Tower Garden was that there was no necessity to go down on to the terrace, and then after the drive to toil up to the level of the Palace floor again, as the Tower Garden is upon the same level as the main floor of the Palace building.

* * *

One day at Sydenham we saw the Humber motor bicycle, ridden by Mr. Yates, climb Woodland Road without pedalling. We do not know the gradient of this hill, but it is exceedingly stiff—far steeper than the average one meets on an ordinary drive. Later, the Humber Olympia tandem ran up the hill to the North Tower Gardens with two riders. Only three strokes of the pedals were made, and these would not have apparently been necessary but for the fact that the engine missed three times at the steepest part.

* * *

One day during the show a four-cylinder 12 h.p. Siddeley car was being run outside the Palace for the edification of a possible purchaser, and Mr. Siddeley, by way of showing his passenger the capabilities of this excellent car, drove it along Farquhar Road and round at the back to tackle the exceedingly steep bit by which the Farquhar Road is regained at about its centre. This decline will be recognised when we say that it is protected by the local council's own danger-board. Well, with three up, Mr. Siddeley put the car at the ascent, and it ran up on its first without hesitation until about the

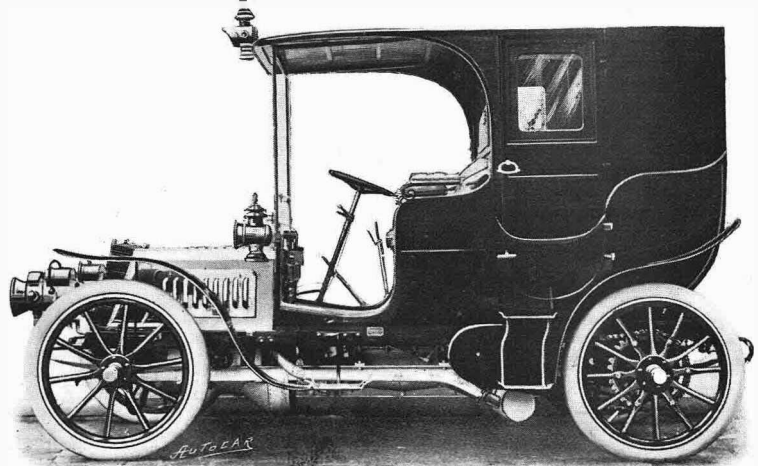
middle, when the engine stopped dead. To jam down both brakes and drop the sprag was the work of an instant, and they held well, but the passenger was so scared that he would not remain in the car. Upon investigation, it was found that there was not a drop of petrol remaining in the tank. A fresh supply was at once brought, the tank replenished, and the engine re-started. Mr. Siddeley took off his brakes and carefully let in his clutch, to find, to his pleasure and the astonishment of those looking on, that the engine took right hold, and the car sailed away to the top of this steep pitch as if it was quite an everyday occurrence.

* * *

In dealing with the exhibit of Messrs. Hedley S. Hunt and Co. we erroneously described their tyre pumps. They were referred to as combined pumps for tyre inflation and for getting up pressure in petrol tanks. We should have described them as "compound," and not "combined" pumps.

* * *

There were one or two accidents among the trial cars which were, so far as we can ascertain, entirely due to the reckless driving of many of the drivers. We do not go into the merits of any particular case, as we did not witness the accidents; but we saw enough at other times to convince us that much of the driving was too fast and extremely reckless. When it is remembered that from the Tower Garden one road branches down the steep, narrow, winding hill in the grounds, and the other turns out on to the parade, it will be seen that the possibilities of accidents are great. Flag signalling was used to indicate to the drivers whether the course was clear; but this in itself is not enough unless the men will use some restraint. A few drove with commendable carefulness, but the majority were reckless, and we felt sorry for the innocent people whose lives and limbs were in their charge.



The 16 h.p. Brush car, with diligence body, shown at the Palace (see "The Autocar," page 158, February 7th).

Repairers, both amateur and professional, will be glad to know that Messrs. Melhuish, Sons, and Co. are making sets of taps and dies to French measurements, ranging from four to eighteen millimetres. We examined these tools at the show, and found them very nicely made and well relieved for use in any kind of metal. The firm issue a very complete catalogue of machine and hand tools,

which should be of interest to the mechanically-minded.

* * *

Mr. F. W. Baily, the secretary of the show, writes that early in the exhibition someone who called at his office left an umbrella behind him. If this meets the owner's eye, Mr. Baily will send the umbrella to him on receipt of a description of it.

CONTINENTAL NOTES AND NEWS.

Interdiction of the Nice Races.

There can no longer be any doubt that the days of indiscriminate racing in France are past, and not only so, but it is likely to be very difficult in the future to obtain permissions at all, to the extent that it has become a question whether it will be possible to run off some of the more important events this year. The series of interdictions began with the Pioule race, which had to be declared off, because the Government refused to sanction it; and now it is the turn of Nice, which has always incorporated a speed contest in its programme of events. Last year the big race was prohibited by the Italian Government when all the cars were down there ready to start; and now, not to be behindhand, the French Minister of the Interior has formally declared that the A.C. of Nice will not be allowed to run off its projected race from Nice to Salon and back. The interdiction is all the more singular, as the club had decided to make it an alcohol event, so that apparently a propaganda in favour of the new fuel cannot always depend upon the support of the Government. In his letter to the Prefect, the Minister of the Interior states that he cannot give permission unless the races have a "general interest," and he also applies another reservation in terms so ambiguous that they may mean anything. To give them the most liberal rendering, it would appear that the Government is only disposed to sanction races which have come to be regarded as annual events, and only when they offer an interest for the development of automobilism generally. Of course, this does not commit the Government to anything, as its ideas of what is necessary for the interest of the industry may not be the same as those of the makers themselves; and it is to be feared that very few races will be authorised in France during the present year. The outlook for the Pau meeting is extremely dubious. On the other hand, it is hardly likely that the Government will withhold its sanction and patronage from the Paris-Madrid event; and it is probable that the manufacturers' syndicate will be permitted to run off their alcohol circuit in the French Ardennes; but, apart from this, it is very doubtful whether any racing will be sanctioned. As for Nice, while shorn of its big event, the programme is nevertheless likely to offer plenty of interest.

Electrical Timing.

A commission of the A.C.F. are engaged this week in carrying out trials on the Dourdan road with electrical timing devices which have been submitted to them. Eight different systems are to be experimented with, some of them of an extremely ingenious character, and capable, it is said, of timing to the hundredth of a second. The inventors, however, do not all appear to have thoroughly

understood the conditions under which such an installation is required to work, with the result that most of them are not altogether practical; but the commission are greatly impressed with the device of M. Pottier, an electrical engineer at the Mors works, in which the times are recorded on a band of paper on the principle of the Morse telegraphic system; and also with the apparatus of Chevalier von Stralsec, which records the times by means of a pen. This was successfully used in Vienna last year to time the kilometre record attempts which followed the Paris-Vienna race. The only drawback appears to be that the cost of the apparatus is high. It seems clear that the commission will have no difficulty in selecting a device which can be used in future mile and kilometre record attempts. Such a system has become absolutely necessary with the speeds attained by autocars, when the seconds will have to be split up into tenths.

The Pau Meeting.

At the last moment we learn that, following upon the interdiction of Nice, the Government has announced that no permission will be given to run off the circular race which was to have been held at Pau on the 22nd inst. The Automobile Club Béarnais had hoped to obtain permission by making it an alcohol event, but the Government evidently thinks that the promoters of races are imposing a little too much upon the "national product." In the letter declining to sanction the Pau event, the Minister of the Interior states that no new races on the public highways will be authorised; and automobilists are now asking whether this means that racing is to be altogether suppressed, or that the interdiction simply applies to races other than the big annual events. The outlook for the sport is anything but encouraging.

The new Mercedes of the 1903 pattern are exciting great interest, and we have to thank Mr. E. W. Hart, of Lorne Gardens, Regent's Park, for the following details of the 18 h.p. car. Weight of car, 1,040 kilograms. (20 cwts. 48 lbs.), without petrol or water; wheelbase, 2,300 mm. (7ft. 6½ in.); bore of cylinder, 110 mm.; stroke, 140 mm.; normal rate of revolution, 1,000 per minute; mechanically-operated inlet valves, which have a variable stroke; amount of water carried in the radiator, 11 litres (2¼ gallon). The car has four speeds and reverse operated by single lever moving backwards and forwards, the lateral motion of this year's lever having been done away with. None of these cars are at present in this country, but Mr. Hart tells us he hopes to show one at the coming Agricultural Hall exhibition, and possibly a 60 h.p. as well.

Correspondence.

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

OBJECTIONABLE METHODS.

[2815].—We were more than pleased to see a letter in your issue of Jan. 31st entitled "Objectionable Methods," and signed by the Duryea Company. We have ourselves suffered similarly, and feel very strongly on the subject. We also are only too pleased to give an agent who has honestly endeavoured to effect a sale for us his legitimate commission, but only too often, after we have sold a customer a car, we have had the provincial agent from his particular town rushing down to London to claim his commission, when we have frequently found that the said agent has probably been recommending another car all the time.

Then again there is the chauffeur, who was very much in evidence at the Crystal Palace Show, dogging his master's footsteps, and seeking an illegitimate commission from the attendants of a stand where his employer had previously been inspecting a carriage with the probable intention of purchase. We were much annoyed with this class of individual in the recent show, and persistently declined to accede to his requests for tips, even at the risk of possibly losing an order through his giving an adverse opinion of our productions to his master, who very often knows very little about the mechanism of a motor carriage. The whole system is becoming so widespread that it will be necessary for the trade to take up the matter, and to put down its foot unitedly once and for all, otherwise the evil will assume such widespread proportions as to become a positive danger to the future of the industry.

It seems to us that this is a matter that the Society of Motor Manufacturers could take up with advantage.

THE WESTON MOTOR SYNDICATE.

BRITISH CAR DESIGN.

[2816].—Will you kindly allow me to endorse Mr. Crowden's timely remarks in your issue of February 7th, in letter 2812? I have had the same experience in that direction, and regret to say that it appears to be a special rule with some prominent motor car firms apparently to ignore any new design or simple improvement that is introduced to their notice. Then a short time after the same firms who had the improvements specially introduced to them bring out a very colourable imitation, and boom it with capital loud and long, until the man who originally discovered the improvements is lost in the motor world. In conclusion, at the last Automobile Show in the Agricultural Hall there were several improvements on cars being boomed as quite new. The identical improvements were introduced by me three years previous, and fitted to at least a dozen cars at that time, and to-day there is scarcely any cars of that class used without the improvements I introduced, but unfortunately for me they are boomed by other firms in England and abroad.

H. BROUGH.

[2817].—As an old and regular reader of your valuable paper, I was more than surprised to notice in your issue of January 31st a letter written by Mr. H. Austin, entitled "British Car Design."

I have always rated so very highly the impartial manner in which you treat all subjects (which, by the way, is such an unusual factor in modern journalism), that I trust you will permit my recording my astonishment at the publication of the letter in question. Had this letter, instead of appearing in the correspondence columns of *The Autocar*, found a place in the preface of the Wolseley catalogue, it could not have proved a better advertisement for the Wolseley machine. It is, of course, exceedingly difficult for a manufacturer, in entering upon a correspondence of this description, to avoid anything that may be interpreted by your numerous readers as an intended advertisement for the particular cars in which he may be interested. Mr. Austin, however, seems to have cherished none of these scruples.

Coming now, however, to the question of British car design, and more particularly to Mr. Austin's assertion that many mechanical improvements introduced by British constructors have been copied by Continental builders, I

should be more than gratified to hear from any of your readers of any single radical mechanical improvement which has been generally adopted by the Continental trade. I am recalling the vital structural improvements which have been introduced in the last few years, and which consequently have been adopted by all the leading Continental firms, and which may be termed epoch-making improvements in automobile construction. I am sorry to say that I cannot find a single advance which could properly be classified under this heading emanating from British workshops.

In order not to appear in any false light, I should like to record the fact, of which you are probably well aware, that I am interested in the importation of foreign vehicles; but, notwithstanding this fact, as a true British sportsman, I should be only too ready and happy to acknowledge any advance introduced by my own countrymen in automobile engineering.

I am afraid that the British motor engineer is at present living in an imaginary paradise, as, owing partly to the present healthy state of the motor business and mainly to insular prejudice to foreign production, he is able to sell almost anything which he produces; and, consequently, he cannot be considered as competing on equal terms with the foreigner in the universal struggle for supremacy, for there is no doubt that where the foreigner secures a sale in this country, such sale is obtained purely and simply on the question of sheer mechanical merit, and notwithstanding the very important factor of British prejudice to foreign productions.

On the other hand, I think that any qualified and unprejudiced automobile engineer, of whatever nationality, who visited the late Crystal Palace Automobile Show—which was probably the most representative automobile exhibition ever held, comprising, as it did, specimens of autocar construction from almost every country producing self-propelled vehicles—could not help admitting the extraordinary backwardness of British automobile engineers, as exemplified by their productions on the different stands. It is only needful to recall the extraordinary number of chassis built with tubular frames (now entirely abandoned in France, with the exception of one make), an almost equally large number with channel steel frames (entirely abandoned long since on the Continent), the almost entire absence of the now almost universally-adopted mechanically operated inlet valve, the many non-rectangular chassis (providing for a narrower track in the front than the rear, which recalls the French practice of three years since), and finally the extraordinary tendency displayed by even some of the best English makers of raising the height of their cars instead of, as is now universal in France, lowering it, in order to provide an extra factor of safety, and, generally speaking, to comply with well-known mechanical laws. I have only here mentioned a very few of the more flagrant indications of backwardness which the British cars display to anyone well versed in modern motor construction.

The reason that British cars have, generally speaking, turned out so well on the score of reliability is that the materials and workmanship put into them are, generally speaking, superior to those embodied in the average Continental machine. The French builders, however, who cater for the very large section of buyers desirous of securing a thoroughly reliable machine at a reasonable price, have long ago found out that there is such a thing as putting in too good work, and thus raising the cost of production to a figure which will exclude them from the markets for which they especially cater, and there are many machines now manufactured in France which will probably outlast many better-finished English productions, owing to soundness of design, although the materials, and particularly the finish, are not in any way up to the English standard.

This letter has already assumed far too great a length, and I will conclude by offering one piece of well-intended advice to the British manufacturer—namely, that before he can hope to really hold his own in the universal struggle against his French competitor, he must thoroughly remodel his design, and learn in the bitter school of experience, which his Continental rivals have already passed through, instead of imagining that he can, with his obsolete machines at the present moment, teach the foreigner the game which he is only just beginning to learn, for before we teach others we must learn ourselves.

A. E. COHEN.

THE STORAGE OF PETROL.

[2818.]—I venture to address you upon a point which may be of some interest. I am informed that the clerk of the Smallburgh Rural District Council is of opinion that any person having a store of petrol, however small (only a pint is sufficient), although not for sale, is bound under a penalty to take out a licence to store the same from the District Council.

As, however, those who possess petrol-driven cars as a matter of course, nearly always have a supply of petrol on their premises, I, in common with other owners, would be glad to have an expression of opinion from you as to whether it is really necessary to take out a licence or not. This point may have had a notice in your columns before, but if so I have not noticed it.

C. W. WILLIAMS, M.R.C.S., etc.

[There is no need for a private owner to take out a licence for petrol provided he conforms to the regulations laid down by the Secretary of State. Briefly these regulations set forth that petrol which is kept for use on a light locomotive and not for sale shall be free from licence restrictions. It must, however, be stored in proper vessels, such as those in which petrol is sold, not more than sixty gallons must be kept at one time, and no vessel must contain more than two gallons, except, of course, the petrol tank of the car. If it is kept in a store-house within twenty feet of another building, whether occupied or not, the owner must advise the local authorities under the Petroleum Act.—Ed.]

AUTOMATIC CARBURETTERS.

[2819.]—We note description in your issue of Jan. 31st the "new" Germain automatic air adjustment to the carburetter, and we also notice a somewhat similar device upon a Panhard engine running at the Crystal Palace. Permit us to say that the automatic adjustment of the air according to the force of the inspiration of the engine was patented by Mr. Charles E. Duryea so far back as 1900, so that—quite apart from the question of patent rights—we again find principles used by us for several years now adopted by the so-called "leading" firms of the Continent.

THE DURYEA COMPANY.

THE CRYSTAL PALACE EXHIBITION.

[2820.]—Future exhibitions at the Crystal Palace would be improved if the cars running in the grounds were put under some definite organisation.

It was most difficult this year to find the car required, and when found it seldom had anyone in charge of it. Once, after wasting half an hour searching for a car, I went back to the stall inside (quite a long walk) only to learn that the car in question had retired "owing to a punctured tyre." As this car was still absent three hours later, the "puncture" must have been a bad one.

A central bureau, to which such "punctures" might be reported, and from which the approximate position of each car and its driver might be learnt, would save a lot of time and annoyance.

H. BURY.

CARS FOR MEN OF MODERATE MEANS.—A WARNING.

[2821.]—Now that a correspondence is going on in your valuable paper with reference to the cost of maintaining small cars, it seems to me that a word of warning to the man of moderate means may not be out of place. Nothing is more sad than for a person who is not well off to save and scrape perhaps for a couple of years in order to be able to buy a car, and then find in the end that he has not purchased a suitable article. The market is now being flooded with cheap imitations of the De Dion populaire, which are as different from the original as light from darkness. What the poor man wants are good workmanship and accessibility. It is easy enough for our foreign friends to give a voiturette a grand name worthy of a British battleship, and supply a pleasing exterior as far as paint, varnish, and seats are concerned. But the luckless buyer soon discovers to his cost that he has purchased a pig in the poke. An instance is given. A friend recently wished to present his son with a voiturette at the Paris Show. He fixed his affections on a genuine De Dion, but the younger man thought he could go one better, and invested his money in a car, with three speeds and reverse, a

tonneau body, and a 6 h.p. De Dion engine. He was uncommonly pleased with his bargain, and drove it to England. Precisely four weeks later, he asked the writer to go for a drive with him. The car was already rattled to pieces, and neither foot nor hand brake would act. The result was that, in rounding a corner, the driver unexpectedly came upon a horse and cart, and, in his efforts to avoid them, he took the curbstone. A stoutly-built vehicle would probably have suffered no damage. As it was, the axle gave way, and we only escaped a serious accident by a miracle. We were forced to return by train, and a new axle had to be fitted. Shortly afterwards, the owner drove the car back to town. He collided with a horse and cart, and knocked over a man, owing to being minus brakes. Arrived at his destination, the whole of the gear smashed up, and the luckless *bargain* had to be towed to a repairing shop. When examined by experts, it was pronounced to be absolutely unsafe and a danger to human life. Wheels, axles, and springs were light to a degree, and the advice tendered was to sell it for what it would fetch. So much for safety. As to accessibility, the prevailing fashion places the radiators on the front of the bonnet, and the water tank well over the engine. In a large car there is space, but on the small ones to get at the trembler and platinum screw resolves itself into a conjuring trick. To unscrew the inlet valve presents a similar problem, for if a spanner is used large enough to fit the nut of the pipe, then it is impossible to turn it on account of the water tank. A small spanner cannot be employed, owing to the jaws being deficient in width and strength. When the poor man buys a car, he must buy wisely and well. It is of all importance. One had only to visit the Crystal Palace Show to perceive what immense strides our native manufacturers have made. If the person of moderate means wants a vehicle to wear well, look well, and last well, let him invest his money in a British article, home made throughout, save for the 6 h.p. De Dion or Aster engine. There are many such on the market to be obtained for about £200. The native product is a good sterling little car, thoroughly and soundly constructed, and not mere pretty, trumpery rubbish. After using it for two or three years, if a change is desired, the owner can always sell again at a reasonable loss, and, unlike the son of the writer's friend, he will not be told after the lapse of a month or five weeks that his vehicle is only fit to be placed on the scrap heap.

M. E. KENNARD.

PARBOLD HILL.

[2822.]—May I suggest another route from Ormskirk? If entering from Liverpool, pass straight over Market Cross into Burscough Street, turn first road on right (Derby Street), and keep straight on past Brewery and Water Towers, keep left at foot of hill, shortly passing close by ruins of Burscough Abbey, also Blythe Hall, after passing which turn second road on right hand, then straight ahead to Parbold Hill *via* Newburgh; distance six miles to foot of hill. Another route from St. Helens would be by Ormskirk Road up to cross roads; distance seven and a half miles. Go straight across, and turn right at second road on right hand, then turn right at next cross roads ("Plough Inn," Lathom), after which keep to the left up to Newburgh village, then straight ahead for foot of Parbold Hill.

PEDAL.

MOTOR CYCLE TRIALS.

On Wednesday last, at the Automobile Club, the following committee was appointed to make the necessary arrangements for the 1903 motor cycle trials, viz.: Messrs. Arnott, Batson, Belcher, Citroen, Cooper, Goodwin, Hart, Jackson, and Martin. Following this meeting, Mr. Dring proposed, and Mr. Batson seconded, that a motor cycle trades' association be formed; and this being unanimously decided, a committee—consisting of Messrs. Edge, Arnott, Belcher, Dring, Citroen, Jackson, Garrard, and Hooydonk—was appointed to draw up a provisional programme to place before the trade, with Mr. E. H. Arnott, 19, Woodstock Street, Oxford Street, W., honorary secretary *pro tem*.

Flashes.

An autocar service has been commenced from South Croydon to the Sutton corner of Epsom Downs, by way of Carshalton.

* * *

"Find me the capital and I'll put a motor on the road inside six weeks which shall do what I've told you." "Incredible!" This extract from a new novel is most distressingly up to date.

* * *

For the convenience of northern competitors, the Scottish Automobile Club are arranging to carry out hundred miles trials like those held by the Automobile Club upon the Oxford Road. They will be held under the approval and rules of the Automobile Club, and the route, to say the least of it, will be no less trying than the one selected for the southern run, as it will include the ascent of Whistlefield Hill, which stalled so many cars in the Glasgow trials held in the autumn of 1901.

* * *

An instance of the serious and irritating errors which are made in reading the numbers on French cars, the owners of which the police desire to summon for breaking the law, is given by *La France Automobile*. A car owner named Sevier was summoned on the 2nd inst. for an infraction of the law with his automobile, No. 418E, on the 31st ult., at five minutes to three, in the Avenue de la Grande Armée. Now, this particular car, No. 418E, has lain in a stable at Yport, with tyres detached, ever since December 15th of last year. This is the kind of thing to which the numbering supporters would subject us in this country.

* * *

It is as an indispensable adjunct of the country house, says *Country Life*, that the autocar has made its most striking advance in popular favour. Speedy, untiring, ready for instant use night and day, it has completely changed the conditions of life in the country.

* * *

A retired naval officer, who was charged at Marlborough Street with furiously driving an autocar, said that a man who drove like a gentleman and who had a naval training did not inconvenience or endanger people. "There is no analogy between a motor and an ironclad," responded the magistrate. The handy gentleman, however, with an emphatic "There is," apparently convinced the court that there was, as the case was then dismissed.

The Austrian Ministry of Railways has issued a request to the directors of State railways to formulate a programme for the introduction of motor waggons on the Imperial lines, each waggon to travel at least one hundred kilometres a day.

* * *

A well-known Master of Hounds purchased a 12 h.p. tonneau at the Palace show. This is interesting from the fact that, six months ago, the M.F.H. was dead against the autocar and all its works. Now, it is said, he cannot drive too far or too often.

* * *

We were somewhat amused the other day to see a circular which had been issued by a paper which calls itself the *Friend of India*, in which it is stated that the difficulty hitherto existing of obtaining petrol in India has been overcome lately. This, unfortunately, is not the case. As we pointed out a week or two since, the Assam Oil Co. could deliver almost any quantity to Calcutta; but the carriage from Calcutta elsewhere is not systematised, and it is left to the buyer to settle this for himself in the best way he can.

* * *

After all, the French Parliament is more niggardly than our own in voting money for improved forms of locomotion in connection with the Army. Automobilmism for military purposes does not appear to appeal to the average French deputy. The Minister of War asked for a vote of £4,000 only for the use of automobiles in the service, which was a small amount in all conscience; but after much to do, the Deputies gave him £800. What can a Minister of War do in the matter of military automobiles with £800?

* * *

The first Swedish automobile exhibition will be held in Stockholm in the month of May. Amongst its committee of organisation are Lieut.-colonel Balk, who is president, Count Clarence von Rosen, Chevalier C. Silversparre, Chevalier Sven Hermelin, and Count Carl Binde.

* * *

At Berne they are only waiting for the spring to make experiments with replacing the old-fashioned horsed diligences with automobiles over the mountain passes. The advantage to tourists from the point of view of time will be great, while, should the trials prove satisfactory, it will open the mountain roads to private automobilists—an enjoyment which is at present denied them for fear of alarming the horses.



The first bend in the Devil's Elbow.



A full view of the Elbow.

The captain of the Motor Cycling Club—Mr. Ernest H. Arnott—points out in reference to the objections which have been raised to the club trials of motor cycles not being open to amateurs, that the Motor Cycling Club will organise a number of tourist or amateur competitions during the coming season, in which “even the modest 1½ h.p. machines will have a chance to win a prize.”

* * *

From a case which has come to our knowledge, it appears that Inland Revenue methods are not always what they might be. A member of the firm of Messrs. Thornton and Sons, motor engineers, of 86, Clapham Road, S.W., was summoned for using a motor car without a license. Special reference was made to the effect that he used the machine for pleasure upon the 19th September, although it was proved that the only car which was outside the premises on that day was one which called for a trifling repair, which was effected in less than half an hour, and went on its way. The magistrates, of course, dismissed the case, but it is certainly not creditable to the administration that such trumpery charges should be brought, as it was only by being able to trace the car which called that the motor engineers were able to prove their case.



Approaching the top.

C. F. Barden writes that he is prepared to accept the challenge of Maurice Fournier to race anyone in the world for £250 a side on motor cycles not exceeding fifty kilogs. in weight.

* * *

The Gillet-Forest are putting in hand a petrol engine of 80 h.p., and it is believed that the racing car to which it is to be fitted will attain a speed of over ninety miles per hour.

* * *

The Worcester steam motor fire-engine which Mr. Crowden, of Leamington, made is giving every satisfaction. It was the first motor fire-engine to be made after the passage of the Light Locomotives Act.

* * *

It is said that the German Automobile Union is appealing to the Government for a monetary grant to aid in establishing an automobile museum to show the development of the industry, and it is thought the request will be granted, in view of the large amount of German capital now placed in the motor trade.

* * *

One result of the big railway strike at Amsterdam goes to prove that, in many instances, the motor car excels the train as a means of transport. Country readers of the newspapers published in Amsterdam have been surprised to receive their papers several hours earlier than usual, owing to the motor service inaugurated at the beginning of the strike by the chief newspaper proprietors. Owing to the great success of the experiment, it is proposed to extend the scheme.

* * *

The newly-established Norfolk Automobile Club is going ahead strongly, and already possesses a membership of over sixty. Among these are Lord Battersea and Baron de Barreto. The club will affiliate to the A.C.G.B. and I. Mr. G. N. Mann, 2, Redwell Street, Norwich, is acting as honorary secretary. All Norfolk motorists who are interested in the club, but who have not as yet sent in their names, are requested to communicate with Mr. Mann.



Mr. Ean Cecil on his 9½ h.p. Clement at the top of the pass.

The illustrations on this and the opposite page show the ascent of the Cairnwell Pass. This is in the Grampian Mountains, and on the borders of the shires of Perth and Aberdeen. The pass is 2,200 feet above the sea level, and is the highest main road in Britain. It contains a fearful bend known as the Devil's Elbow, the photographs of which were kindly sent us by Mr. Ean F. Cecil, who has driven both his 7 h.p. Panhard and his 9½ h.p. Clement up and down this awesome steep on several occasions. When driving himself over the pass Mr. Cecil preferred to take the helm of the Clement, and leave the other car to the conduct of his engineer, A. Boon, as up this hill the Clement, we are told, would always get away from the Panhard.

During the spring the War Office propose to have a service of motor car trials on Salisbury Plain, and arrangements have been made for testing the Rucker tyre in connection therewith.

* * *

As evidence of the interest which Sir Alfred Jones takes alike in the city of Liverpool and motor transport, we may mention that at the opening of the Liverpool Exhibition he offered a hundred guinea cup for the best Liverpool-made vehicle for goods transport and a twenty guinea cup for the best Liverpool-made pleasure motor.

* * *

A correspondent writing to the *Birmingham Daily Post* on the petrol question deplors the conservatism of the British authorities and the ridiculous laws which have retarded motor progress. Incidentally he refers to the difficulties to be surmounted ere the Gordon-Bennett cup race can be authorised for Ireland, and rightly asks why we should close one of our thoroughfares—the Thames—for a purely sporting event, and refuse a similar privilege to one of international standing, which carries with it the nucleus of a mighty trade?

* * *

There were 142 exhibitors in the New York show, and from particulars published by the *Motor Age* it would appear that eighty-one showed complete cars, the rest of the exhibitors having engines, parts, or accessories. Of these, sixty-eight exhibited petrol cars, thirteen steam, and eight electric. Seven firms made more than one type. Among these, sixty-five of the petrol cars were more or less different, though, of course, in many cases the main parts were the same. We mean to say, they were not distinct systems. There were eleven distinct styles of steam cars, and eight of electrics. The biggest machine was a five-ton truck, and the smallest a 350 lb. buckboard. The last show only had thirty-six exhibitors, and the previous year twenty-eight, so it will be seen that a very great advance has been made.

* * *

A very extraordinary magisterial feat is reported in the *Chippenham Guardian*. A groom in charge of two horses lost control of one when Mr. Talbot Clifton's car passed him and fell from its back, but he at once regained his feet and control of the animal; and as he was all right, Mr. Clifton went on. For this he has been fined no less than £10 and costs for driving to the public danger (*i.e.*, at a speed which was unsafe, considering the traffic on the road), £10 and costs for exceeding the legal limit under the Light Locomotives Act, and £5 and costs for negligently causing damage to a horse or beast, etc. The summons for not stopping when signalled to do so was dismissed, as it was not proved that any such signal was given. There is no doubt that the legal side of this matter requires looking into, as it would appear that the idea of the prosecution was to make things as uncomfortable as possible for the motorist. We think he made a mistake in not stopping, though all who are acquainted with Mr. Clifton know that he would have stopped had he not been convinced that the man was unhurt; but undoubtedly the greatest mistake of all was that of frightening a horse belonging to a magistrate.

The delivery of goods from goods stations to private houses by motor vans has been found so successful in Brussels that further vehicles for this service are to be added.

* * *

On the 25th ult. a motorist was fined at the York Police Court for furiously driving a motor car. In commenting on the case at the time the Lord Mayor said: "We cannot accept the constable's evidence based upon snap observation." As the case against the constable for alleged perjury is *sub judice*, we defer commenting thereon until our next issue.

* * *

The Automobile Mutual Protection Association has issued a circular strongly advising members of the association and the trade to refrain from signing the agreement issued by the committee of management of the Crystal Palace automobile show, as those who sign it, owing to its stringent terms, may find themselves liable in heavy damages. We presume this would be in the event of their breaking the agreement, but this point is not made clear in the warning. We have no bias in the matter either way, but it appears somewhat petty to issue a warning of this sort, as people who sign an agreement should be prepared to stick to it, whether the conditions are onerous or not.

* * *

The Goodyear Tyre and Rubber Co. evidently have great faith in the pneumatic motor tyre they are putting on the market for the present year. They guarantee these tyres for a distance of 3,000 miles under all ordinary conditions of usage, and for one year from delivery, subject to certain stipulations. They undertake that if from any constructional defect there should be nipping of the air tube, leakage of air tube or valve, cover coming off wheel, breakage or bursting of cover or creeping after the tyre has been sent to them for inspection and the defect is proved, to either repair the tyre free of charge, or in cases where the efficient repair cannot be made, they will supply a new tyre or cover, as necessary. Where a new tyre or cover is supplied, it will be charged at ordinary price, and the defective one which may be retained by them credited at the same price, if it has not completed 1,000 miles. If the record is over 1,000 miles and under 1,500 miles, it will be credited at seventy-five per cent. of the original price only. If over 1,500 and under 2,000, at sixty-six and two-thirds per cent. If over 2,000 and under 2,500 miles, at fifty per cent. If over 2,500 and under 3,000, at thirty-three and one-third per cent. of the original price. This guarantee does not apply to punctures, cuts caused by stones, etc., or damage from similar external cause, and is also conditional upon the following: (a.) The tyres must not be ridden deflated. (b.) The inner tube must be put in correctly in accordance with their instructions. (c.) The load per tyre must not be greater than the proportions given in their 1903 catalogue. A careful mileage must be kept, and the company retain the right to call upon the user for a statutory declaration that the distance stated has not been exceeded. There can be no doubt that the Goodyear tyres will be purchased under this guarantee for use on automobiles with a considerable amount of confidence, and the company deserve congratulation upon giving so broad a guarantee.

They are much troubled by strikes of railway servants in Holland just now, and the Government, which has hitherto placed all sorts and conditions of obstacles in the way of automobile traffic, has now turned to it as some amelioration of the *impasse*. Automobilists are not only being encouraged to keep up communications between town and town, and paid as much as £24 per day for the use of their vehicles, but are being encouraged to drive *as fast as possible!*

* * *

Wooden wheels will shortly be fixed to Lanchester cars for those who prefer them. The wire wheels have been found perfectly satisfactory, but there appears to be a general idea among motorists that wooden wheels look better. This may be so in the case of certain cars, but we think with an original design like the Lanchester there is really nothing to be said against the cycle type of wheel, and there is no doubt whatever that for lighter and smaller vehicles it is a more satisfactory type, though even here the prejudice is found against it at present. In France there is no such prejudice, and the tangent wheel is much more widely used, and no one would dream of fitting anything else to the smaller types of vehicles.

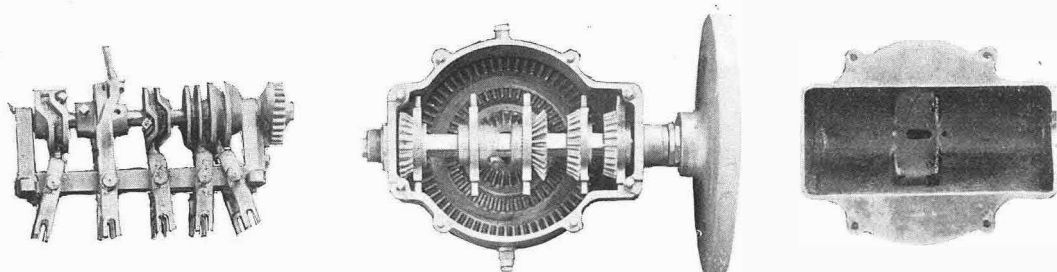
* * *

The Automobile Club is proposing to erect caution-boards after the style of the French boards, which were illustrated in *The Autocar* of November 29th, 1902—in fact, they will adopt the signs of La Chambre Syndicale de l'Automobile, but they will be diamond in shape instead of square. It is proposed to treat the Portsmouth road first, and it is thought that many residents in different places near dangerous points will purchase plates and erect them themselves. In such cases, it is proposed that the name of the donor shall be marked on each plate. Mr. Alfred Harmsworth has already promised £100 towards the cost of erecting caution-boards on that portion of the London-Portsmouth road which lies in Surrey. These boards will undoubtedly be useful, particularly for indicating cross-roads or very steep descents. We do not regard the others as particularly needful or of any real service to drivers proceeding at moderate speeds and with their cars well in hand. Caution-boards are good things, but they must not be overdone, or they will be disregarded.

THE MARCH SHOW.

We have received a list of exhibitors of Messrs. Cordingley's exhibition, which takes place at the Agricultural Hall from March 21st to 28th. The exhibitors number over 220, and more than ninety of them showed at the Crystal Palace last week. Of course, some well-known names are missing, as some fourteen prominent exhibitors in the Palace show had agreed to patronise no other exhibition; but we suppose their products will in most cases be exhibited by one of their agents, and there will probably only be one or two of the best-known makes missing. In going through the list, we note that some firms which will be exhibiting at the Agricultural Hall actually showed at the National, Earl's Court, and Crystal Palace. We have seen the plan of the Hall show, and there is practically no further space available; and as the gallery and floor are entirely occupied, the Berners Hall and the North gallery annexe are being prepared for exhibition purposes. These are apartments opening from the main exhibition premises, and not one in a thousand visitors to the Hall has previously entered them. The great feature of the show, as compared with last year, will be the fact that the galleries will contain a good display of cars, in addition to those on the floor. There appears to be no doubt whatever that the exhibition will be a great success, and will have the largest number of exhibitors of any motor show which has yet been held in Great Britain. The date of the 1901 exhibition has already been fixed—March 19th to March 26th.

On Monday last, at a meeting of the Kildare County Council, held at Naas, which has jurisdiction over the greater portion of the proposed road for the Gordon-Bennett cup race, on the suggestion of Mr. Matthew Minch, M.P. for South Kildare, Mr. Stephen Brown, J.P., chairman, proposed, Lord Frederick Fitzgerald seconded, and it was unanimously resolved: "That the Council heartily approve of the proposal for the Gordon-Bennett race, and undertake to co-operate with the Automobile Club of Great Britain and Ireland in taking precautions for the public safety, and appeal to the Lord-Lieutenant of Ireland to urge the Government to make the necessary bill a Government measure." The county council of Queen's County have also passed a resolution of approval.



A three-speed and reverse gear by bevel wheels. The three bevels on the right are the forward speeds; the single bevel on the left giving the reverse. The right illustration shows the lid of the gear box, while the left one shows the cams and strikers for changing the gears. The subject of the illustrations has been in use on a Liberty car for two years. We are indebted to Messrs. Meredith, Ltd., Birmingham, for the photograph from which our engravings were made.

THE LIVERPOOL SHOW. An Interesting and Successful Exhibition.

The exhibits at the Liverpool Show were a very fine lot, particularly that of the Road Carrying Co., Ltd. (Liverpool and Blackburn), who had the whole of the Crown Court to themselves. Upwards of thirty vehicles were shown by this firm, including Daimlers, Georges-Richards, Lanchesters, M.M.C.'s, De Dions, Panhards, Oldsmobiles, Locomobiles, Eagles, Leanders, City and Suburbans, etc. The Liverpool fire chemical engine (illustrations of which appeared in *The Autocar* of last week), a one-ton delivery van (built to the order of the China and India Tea Co., Ltd.), and a four-ton steam lorry (as



Taking in the City and Suburban electric car.

used by the company on the St. Helens and Blackburn services) were also shown by the Road Carrying Co.; and although these vehicles—by reason of their size and weight had to be staged in the passages, they nevertheless came in for much attention.

Bennett and Carlisle, Ltd. (Liverpool and Manchester), showed an 11 h.p. Argyll car, a 10 h.p. Georges Richard car, and a Toledo steam car; also a two-seated car, having a 6 h.p. De Dion engine, specially constructed for them. The latter, which had direct drive on top speed, without gear wheels on countershaft running, was a very business-like-looking car. Two of the most talked-about small cars in the show were the Nos. 2 and 3 Traveller voiturettes exhibited by Alldays and Onions, Ltd., Birmingham. The finish of these little vehicles was excellent, while the workmanship was of the very highest class.

An Ariel car (10 h.p.), having governed twin-cylinder engine, and four speeds forward and reverse, occupied

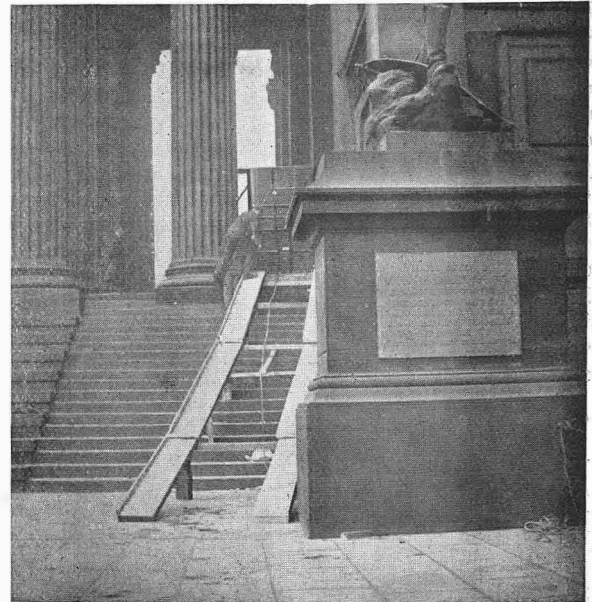


A back tire.

pride of place on the stand of W. J. Neason, of Granby Street, Liverpool. The exhibit of the Rex Motor Manufacturing Co., Ltd., Coventry, included two very handsomely-finished cars, one of which had a covered body. W. Johnson (Liverpool), sales' agent for the British and

Foreign Motor Car Co., Ltd., showed three Rochet cars and a model of the latest type of Rochet silent changing gear. Four Locomobiles were exhibited by W. H. Buxton and Co., Liverpool; and a John-o'-Gaunt car, with 8 h.p. M.M.C. engine, by W. Atkinson and Sons, Lancaster.

William Lea, Liverpool, showed a 9 h.p. Darracq, which had been specially built to the order of a local lady, and also a 12 h.p. Darracq. The former had a removable brougham body, and the latter a tonneau body. A 12 h.p. Belsize car was exhibited by Marshall and Co., Man-



The ramp up which the cars were run into the Hall.

chester; and a Prescott steam car, an Oldsmobile, a 9 h.p. Princeps, and a 12 h.p. Gladiator by the Northern District Motor Car and Waggon Syndicate, Liverpool (W. T. Pritchard, manager). The last-named firm also had on view the famous tyres with which the car which won the Gordon-Bennett cup was fitted.

That interesting little vehicle—the Rigal voiturette—was shown by the Liverpool and Manchester Motor Mfg. Co. This is a new firm, who have taken large works at Lytton Street, and 45, Everton Road, Liverpool, and who intend taking up the manufacture of motors on a large scale. They also showed a 16 h.p. De Dietrich car and a model of the "Popular" motor launch engine.

Other exhibitors included Macgowan Bros., Liverpool, "Premierlene" motor oil and grease; Alfred Dunhill, London, leather clothing for motorists; the North British Rubber Co., Ltd., Clincher tyres, etc. Since this report was penned on the opening day, a number of other cars besides those mentioned have been brought into the Hall.

THE GORDON-BENNETT RACE.

A Certainty for Ireland.

We understand that no doubt exists as to the holding of the 1903 Gordon-Bennett race in Ireland. A bill to legalise the holding of the event over a course to be chosen by the Automobile Club of Great Britain and Ireland will be introduced into Parliament as a Government measure early in the approaching session. Nothing could be better than this. By so doing, the present Government will do much to wipe out the reproach that hangs to Legislatures for the repression of the self-propelled traffic industry in years gone by.

THE 1903 NEW YORK AUTOMOBILE EXHIBITION.

By Hugh Dolnar.

THE American nation was a bit slow in comprehending the great truth that the automobile is the largest and most important work of man, but as soon as it was clearly proved that there was real money in power driven road vehicles, the American machine constructors went to work in earnest, and the results of their labours, now on show at Madison Square Garden, New York, are far beyond all anticipations.



A view of the New York Automobile Show, from the Gallery. Reproduced by permission of "The Motor World," New York.

The collection of steam, electric, and cylinder-fired motor-driven cars housed under the feet of the Golden Diana, who bends her bow at the summit of the Garden Tower this night of January 19th, 1903, is, without doubt or reservation, the finest and the best, all round and in detail, ever shown anywhere in the Western Hemisphere. The American automobile has arrived, and now for the first time reveals itself as the industrial giant infant, or infant giant, whichever, of this twentieth century. We can be very proud of this show without in the least exceeding the warrant of our accomplished results. We have at last taken up in earnest the work of Griffith and Gurney and Dance and James in the steam vehicles; and though we cling closely to the forms and elements of the steam cars of 1831, we have added boilers that will make steam, we have petrol to burn instead of coals, we have compound engines, we have surface carburetters which will turn most of the exhaust steam back to the boiler again, and we have pneumatic tyres for our steam car wheels. What must the ghosts of Cugnot and his followers in early steam car building think and feel as they confer together in this midnight over the embodiments of their dreams and the redemptions of their disastrous failures, as shown in the elegant steam vehicles gathered in the caverns of the magicians of the machine shop at the Garden?

Cold Comfort.

It may be cold comfort to assure an inventor who has starved himself, and sunk the money of his

friends who tried to help him carry out his schemes that were born too soon for his own success, that a hundred years or so after he is dead his ghost can have the late satisfaction of a remembered name, and see his early failures turned to later triumphs; but that is about all he who sees the future most clearly can expect. It is in truth better to follow what has been proved and accepted than to attempt the great things to come, and dreamers must suffer for the benefit of those who live after them; and perhaps that is what the shades of the early builders of power-driven cars are saying to each other tonight, as they glide in shadowy groups through the labyrinths of the Garden under Diana's cold feet and see every yard of available space—galleries, main floor, restaurant, and basement alike—crowded with such creations as they vainly sought to produce: cars fit for kings, and priced at kings' ransoms, too; cars that will run anywhere, cars plain and cars luxurious, steam cars, electric cars, cylinder-fired motor cars, but all horseless carriages, all eloquently condemning that noble brute whose iron-shod feet trampled on the visions and the hopes of the first automobile builders while they lived and toiled and failed, and were laughed at and pitied, and died—unsuccessful!

There are not so very many of the steam vehicles which are here first mentioned, because they were the beginning of the great work; and more than one of the hitherto exclusively steam car making concerns show doubts of the future by exhibiting cylin-

der-fired motor-driven vehicles with their steam carriages but there are very great improvements shown in the way of the condenser (which the White steam car exhibits in a wholly unobjectionable form), flash boilers, and in other steam generators in which super-heating is fully carried out, and in improved transmission elements, better car framing, and better boilers and better gasoline burning devices for firing the boilers.

Electromobiles.

Electric carriages are shown in relatively diminished numbers, but in great variety—from Baker's beautiful little electric "buggies" and his larger carriages up to ponderous trucks loaded with heavy merchandise to show their powers. In our previous American shows, electrics have been given first place in point of numbers and elegance, steam cars come next, and gasoline last. In the present exhibition the cylinder-fired motor vehicles are overwhelmingly in the majority, and are shown in all types, with a strongly accentuated trend towards multi-cylinder motors. Few cars show less than two cylinders, and four cylinders are not thought too many, great as is the number of parts entailed by this multiplication of motive agents.

In electric driving no very startling novelty is shown. The loudly-heralded Edison storage battery, which was represented at last year's show by a single cell reposing on velvet in a glass case in solitary and unvoiced grandeur, now appears with an attendant, who tells a tale of double the current storage and delivery capacity, with half the weight of battery, and adds some embellishing details, which are repeated hereafter, but do not include offers to sell.

The bodies of our latest vehicles do not display any strikingly new arrangements. A "convertible" front seat fitted to fold the footboard up, and with a back, is placed over the front "hood," which covers the fuel tank of some steam cars, thus extending the seating capacity from two to four; and there are a great many four-passenger bodies on view, and the tonneau is in high favour.

Covered Cars.

The regulation forms of covered carriage bodies in all degrees of cost and luxurious upholstery are

shown in many instances, though the enclosing and protecting of passengers receive as yet but little attention, save in the case of vehicles intended for public service, of which some are on view. The time will come, without doubt, when protection from sun, wind, and rain will be much more in demand than now, and cars will then show more hoods and canopies and curtains than they do at present, while the readiness of the wealthy—who would not use an uncovered horse-drawn carriage to expose themselves to the fervour and fury of the elements in an automobile—is rather surprising. Just why passengers carried by automobiles should not be covered and enclosed the same as in vehicles using animal traction is not clearly apparent, but such is certainly the present condition.

Only one three-wheeled carriage is shown, and it may be safely assumed that the four-wheeled carriage is to be the exclusive type of the future. The motor bicycle is very meagrely displayed, and the "Thomas" is shown with a four-wheeled vehicle by the same makers.

Motor Cycles not yet Arrived.

The Marsh Motor Bicycle Co. shows two-wheelers only, and attracts a share of attention, though there is not much interest shown in motor bicycles in the United States. It seems that there must be a great future for the motor bicycle, but its day has not yet come in America, and there is distinct evidence of preference for large, heavy, and powerful vehicles to carry four or more passengers in imposing state, although very large numbers of small vehicles for two passengers only have been sold here in the past year. Current report places the profits of the Oldsmobile factory in 1902 at a million dollars and over; the Haynes-Apperson are just completing very large and fine factories; the Grout steam cars sold to the tune of 1,100 vehicles last year; and Stanley Brothers are selling two \$650 steam cars every day from their factory door without agents or advertising. Put in spite of this great demand for small and low-cost vehicles, crowds surround the larger vehicles, and the ownership of a small automobile appears invariably to whet the appetite of its user for a larger and finer equipage. There seems to be no limit to demands for power,



Photo.

The Baker Electric Cars.

"The Motor World."