

THE AUTOCAR

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

EDITED BY H. WALTER STANER.

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THE AUTOCAR.

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Notes.

The Cars of 1904.

As a useful preliminary to the Crystal Palace Show, which opens next Friday, we publish to-day a list of the cars of 1904. It must be clearly understood that, although this Buyers' Guide, as it may be called, is compiled from returns sent in by manufacturers and agents themselves, it is not in any sense binding upon them. That is to say, it is not a collection of announcements of the firms concerned, but a compilation from information supplied by them at our request. The responsibility for its issue, therefore, rests upon us, and the object we have had in view is to enable prospective purchasers to see at a glance the types of cars within a given price margin that may best suit their individual requirements. We do not say that this list is absolutely complete. Some of the details, for various reasons, are not at present obtain-

able, and in a few instances the manufacturers or agents have not been able to furnish us with the needful particulars. On the other hand, the vast majority of cars at present obtainable are included. They are classified according to price, so that the reader contemplating the outlay of a given amount may refer to the class within his price limit without having to go through the entire list to find the vehicles which are within his means.

The Scope of the Summary.

In a tabulated summary such as "The Autocars of 1904" it is impossible to go into great detail, and we have, therefore, contented ourselves with giving the points about which questions are often asked. The reference to transmission by chain or gear is given in the accepted sense. That is to say, with very few exceptions indeed the chain-driven machines have sliding-toothed gear, and except for the fact that the final drive from the balance-geared countershaft to the road wheels is by chains instead of by propeller-shaft and bevel gear to a balance-geared live back axle, the mechanism of transmission is, broadly speaking, the same. There are, of course, certain exceptions to this. As an instance we may mention steam cars, which usually have no change speed of any kind, the transmission being by chain or gear, only one ratio of speed being provided owing to the elasticity of the motor. Again, with regard to bodies the prices given are for the ordinary standard body, with the number of seats stated in a separate column, and in most instances special bodies, with long chassis allowing of side entrance, and other deviations from the ordinary bodies supplied, can be had at higher prices. With the higher-priced machines it is often customary to quote prices for chassis only, as almost every purchaser has his own ideas as to style of body, or he may wish to have the work carried out by his own coach-builder. In all cases the nominal horse-power is given, so that in the majority of instances the cars are actually considerably more powerful than stated, this particularly being the case with those of over 15 h.p. The majority of so-called 15 h.p. cars being equal to 18 or 20 h.p. upon occasion, while nearly all those of nominally 20 h.p. will develop well towards 30 h.p. Another thing which should be remembered is that, with the exception of a few of the very cheap cars, reversing gears are always fitted, though no mention may be made of them, and the number of speeds referred to the forward speeds only. We have included the name of the firm responsible for each type of car, because the particulars given are necessarily incomplete, and if the reader wishes to ascertain further details he will be able to write to the makers, or ascertain them by direct enquiry at the show. Of course, many intending purchasers will be unable to visit the Crystal Palace Show, but there will be

an immense number of those who contemplate deciding on the make of car they will use this year who will be there, and "The Autocars of 1904" in the present issue, with the guide to the show which we shall publish next week, will enable any visitor to the exhibition to ascertain for himself with the greatest ease any other detail particulars in connection with the cars in the class in which he is particularly interested. Perhaps one of the most striking examples of the completeness of the show is found in the fact that, with very few exceptions indeed, the cars of which particulars are given will be found at the Crystal Palace, which on this occasion will contain the most representative collection of British and foreign cars ever shown.

Anti-freezing Mixtures.

Every motorist who keeps his car in an unwarmed place is looking forward with hope to the time when some sort of anti-freezing compound can be added to the water in the tank to prevent it from freezing at any temperature likely to be experienced in this country, and at the same time the addition to the water should have no effect whatever upon the interior of the cylinder jackets, coolers, or connections. Many experiments have been made from time to time with this end in view, and we have conducted some researches ourselves and vicariously. At the moment it appears possible, from information to hand, that a well-known contributor to our columns has satisfactorily solved the question. However, it is too early to make any definite statement as to this, for experiments are still in progress which may yet end in disappointment. In the

meantime it would be of great assistance to our contributor if all motorists who have made any experiments with anti-freezing mixtures would be good enough to send us an account of them. What we particularly want to know is the nature of the substance added to the water, the proportion it bore to the water, and then its general behaviour and effect upon the engine, and, of course, if possible, some intimation as to whether it was successful as a non-freezing mixture, how long it could be used without renewal, and last, but not least, whether it had any deleterious effect upon the jackets, coolers, or connections. This information would not only be of considerable help, but it would also be useful if anyone who has had any inexplicable difficulties or experiences with the circulatory system in their engines would describe the nature of these. The finding of the satisfactory non-freezing solution is a many-sided undertaking, as the conditions which have to be fulfilled are so numerous and in some respects contradictory, so that the greater the volume of information from the user which we can collect, the more the researches we have referred to will be expedited. Our readers always respond warmly to any request of this sort, so we may take this opportunity of thanking them for doing what experience has shown us they will be good enough to do. They will, of course, understand quite clearly that the work is for the good of automobilists at large, more particularly for those who have not had the good fortune to enjoy the use of a properly warmed coach-house, and by helping us in this matter they will enable us in our turn to help other motorists.

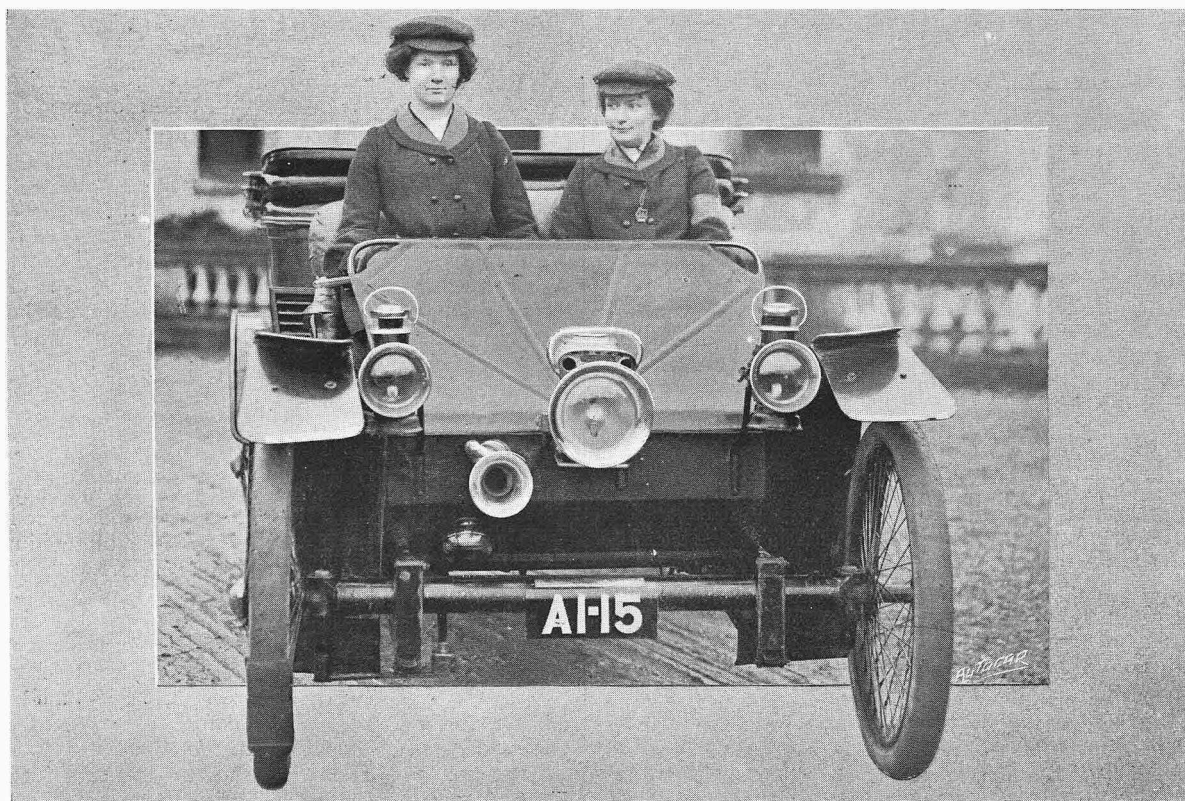


Photo by
LADY DRIVERS IN IRELAND. The Misses Rowly, of Sylvan Park, Killybegs, on the 10 h.p. Lanchester. These are the first two ladies who have procured drivers' licenses in Ireland. The occupant of the left seat acted as a steward in the Gordon-Bennett race course and is seen wearing her badge of office.

Lafayette.

USEFUL HINTS AND TIPS.

A Spare Battery Tip.

The details of the usual high tension current electric ignition, though simple and effective enough in themselves, are still very much of an unknown quantity to many automobilists. Only the other day we ran across a motorist stranded on the roadside, and standing with a somewhat bewildered and "what shall I do next" expression by the side of his small car. Naturally, we slowed up, and asked if we could in any way assist him, whereon he replied that he thought not, as his accumulators had run down, and he could only get the faintest suggestion of a spark across the jump gap of his plug when the latter was withdrawn from the cylinder. He had no voltmeter, but by the evidence of our own little instrument, we proved that the accumulators were at the bottom of the trouble. Strangely enough, the unfortunate had two spare two-volt cells with him, and had substituted these before we arrived, but both original and spare sets had run out, each cell showing less than 1.5 volts. It had never occurred to the stranded one to couple up the lot, but when we did so for him and showed him that the four cells so connected gave him over four volts and would get him home, his gratitude was warm indeed. We have seldom seen a man look so much relieved as did he when everything was put right and the engine fired merrily. Novices reading the above little incident may bear it in mind should such a happening ever befall them, although we would strongly advise them to avoid it altogether by keeping their accumulators both working and spares fully charged.

Illuminating the Numbers.

So far as the larger cars are concerned, the various lamp makers have made very good provision for lighting the back numbers, but when it comes to voiturettes and smaller vehicles the same remark does not apply. The lamps usually available are, many of them, very much too large, and, for the matter of that, too costly. Nothing is wanted but a small red light showing backward—it scarcely matters how small—and the number plate illuminated. This can be done quite well by a thoroughly good bicycle headlight, provided that the red light at the side of the lamp is on the left side. This lamp is fixed at right angles to the car, and it will illuminate the number plate, and at the same time show a red gleam backward. No alteration of the lamp is required; it is only necessary to have a neat bracket made which can be fixed to the back of the car so that the light of the lamp is properly focussed upon the number. A thoroughly good bicycle lamp by one of the best makers can be obtained which is about 5 in. high, and with a full inch wick gives an excellent light. In its ordinary bicycle lamp oil can be used, or, if wished, it can be nearly filled with cotton wool, which can be saturated with paraffin or petrol, all the oil or spirit not taken up by the wadding being turned out of the lamp and a felt wick used. It is only necessary to see that the lamp is so fixed, that as it is held sideways and not forward the wind does not get into the

cowl. This can generally be arranged, as the back of the car will shelter it from the current, but if it projects from this shelter, the cowl should have some sort of guard made to it, so that it does not get a direct draught into it. Quite apart from any consideration of cost, a neat little lamp of this description looks very much smarter than one of the larger patterns which, on the other hand, look quite in keeping with a large car. It will sometimes be necessary to limit the working of the spring bracket on the lamp itself, so that the light may always shine direct upon the number even when going over rough roads.

Fixing Solid Tyres.

As there are now a goodly percentage of automobilists using solid tyres, perhaps my experience with the fixing of these will be of interest to many fellow readers of *The Autocar*. I have a 10 h.p. char-a-banc, carrying nine people, and weighing approximately two tons when loaded. This was fitted by the makers with $2\frac{1}{2}$ in. solid tyres, which, after a few weeks use, began to "lift." Upon examination I found that owing to the heat generated by road friction the fixing cement had melted, as a result of which the tyre started creeping slightly on the rims. This movement caused the cement to accumulate at certain portions of the rims, and to gradually force the tyres from them, at the same time wearing the inner part of the tyre. I attribute this failure entirely to the makers using unsuitable cement. The second pair of tyres, which I fitted myself, are still in excellent order, and have done double the work that the first pair did. These I fixed with a liquid cement called "Pramfix."

TOM NORTON, Llandrindod Wells.

An Ignition Experience.

My $6\frac{1}{2}$ h.p. single-cylinder engine had always been a trouble to start, but once going would run well. Complete rewiring, a new sparking plug, shifting the non-trembler coil nearer to the engine, and a general clean up of all the electrical fittings did not improve matters. Finally, a second earth wire was attached to the coil, ending at the blade of the contact breaker, and the engine now starts without hesitation. The question now is, why was the first earth wire ineffective? It was a good wire from the coil to a bolt holding the engine to the frame of the car. The platinum tipped screw is insulated, but the trembler blade is attached to a metal segment moving about the half-time shaft as usual. The only explanation I can give is that the thick oil from the crankcase proved an insulator, a film of this lying around the half-time shaft between it and the metal segment. Whilst the engine was at rest, this oil more or less set hard. Upon trying to start the engine, it was necessary, by a long period of starting handle exercise, to wear through this film of oil until the one metal surface of the half-time shaft rubbed against the other metal surface of the segment. This has now been saved by giving an alternative path direct from the blade to the coil.

EDGAR SCAMELL.

THE 1904 OLDSMOBILE.

A TWO-SEATED CAR, SIMPLE IN CONSTRUCTION, EASILY MANAGED, AND CAPABLE OF BEING KEPT IN ORDER BY THE USER. SINGLE CYLINDER HORIZONTAL ENGINE, WATER COOLED, HIGH TENSION IGNITION. TWO SPEEDS AND REVERSE, DIRECT DRIVE ON THE TOP GEAR. MAXIMUM SPEED ABOUT TWENTY-FIVE MILES PER HOUR. QUIET RUNNING A SPECIAL FEATURE.

So excellent a name has the little Oldsmobile car gained for itself, both in public trials and in private hands, that even those who know it well will be glad to renew their acquaintance therewith, as it is being put upon the English market for 1904.

The Chassis.

As can be seen from fig. 1, smart-looking, well-made artillery wheels carrying detachable tyres are now fitted, and these undoubtedly add to the outward appearance of the little vehicle from an English point of view. The frame is simplified to the uttermost, for it will be seen that the two six-leaved truss-shaped springs K K form the longitudinal members. They are strongly secured as to their forward ends to suitably shaped brackets brazed on to the straight tubular steel front axle J, each by four lock-nuts and keyed bolts. Similar shoes or clips on the rear tubular axle take the back ends of these springs, but are secured therein by four bolts and an adjusting plate, which grips the tail end of the spring between the shaped bed of the shoe and itself. The end of this shoe is provided with an adjusting stud P, by which the adjusting plate and four holding-down bolts may be cast loose. The rear axle can be set sufficiently back to take up any slack which after considerable

usage may appear in the driving chain O (fig. 3).

The spring frame is stiffened laterally by the central angle steel engine-frame K¹ (fig. 1), the

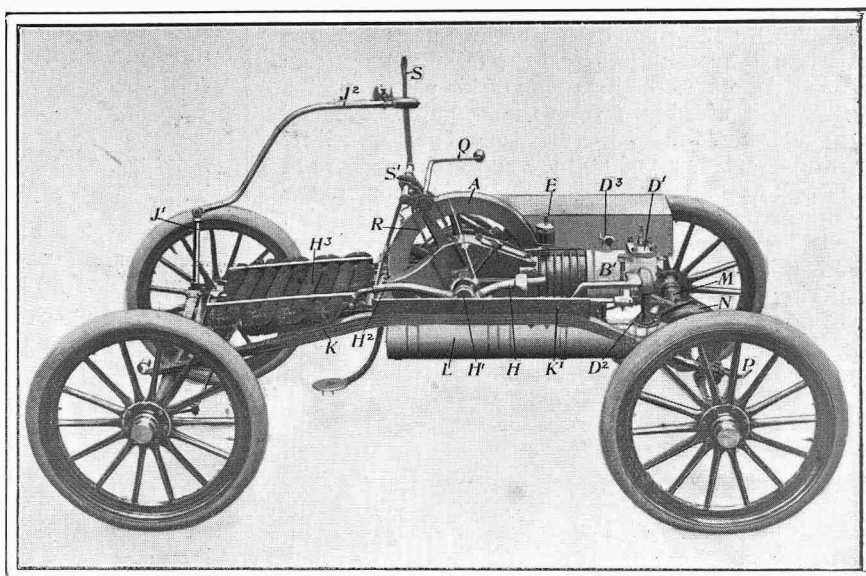


Fig. 1.—Elevation of the 1904 Oldsmobile with body removed.

- | | |
|--|---|
| A, flywheel | J ² , steering lever |
| B, crank chamber and cylinder | J ³ , steering levers and gear |
| B ¹ , water jacket to cylinder | K, K ¹ , spring frame |
| D, cylinder head and valve chamber | K ¹ , engine frame |
| D ¹ , valve chamber inspection cover | L, silencer |
| D ² , exhaust pipe | M, live axle sleeve |
| D ³ , water uptake from cylinder jacket | N, differential gear box |
| E, cylinder lubricator | O, driving chain |
| F, suction pipe from cylinder jacket | P, adjusting screw in spring shoe |
| H, circulating pump case | Q, starting handle |
| H ¹ , delivery pipe to radiators | R, starting gear chain |
| H ² , nest of radiating flanged pipes | S, change speed lever |
| J, steering axle | S ¹ , change speed spindle |
| J ¹ , steering standard | T, change speed gear box |

rearward transverse member of which is swept downwards to carry the cylinder. On this frame, too, the light body is set, and being so centrally carried on the spring frame, the utmost freedom afforded by the long lithe springs is felt from the shocks and jars of road inequalities, while engine vibration is averted by the interposition of rubber blocks.

The Engine.

The position of the 5 h.p. horizontal engine on the frame is seen in both figs. 1 and 3, the major portion of the weight of the motor and flywheel being taken by the driving wheels. The engine itself is carried by the forward end of the crank chamber C, which is bolted to the front transverse member of the engine frame K¹ and the rearward downward-swept member, which has already been referred to.

The crank chamber C, radiator, and water-jacketed portions of the cylinder B B¹ are now cast

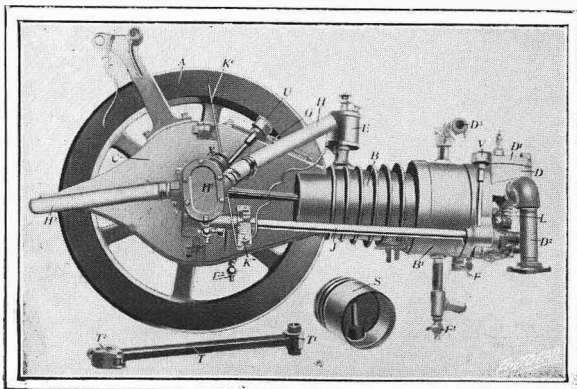


Fig. 2. Left hand side of the engine. For reference key see fig. 4.

in two portions only, the perpendicular joint between the two castings and the manner in which they are bolted together being shown in fig. 2.

Again, the silencer L, which is of quite unusual

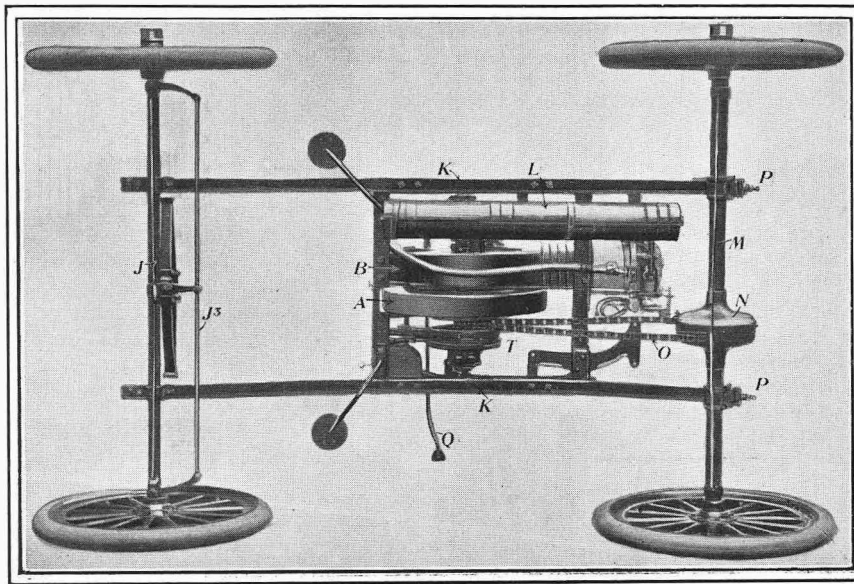


Fig. 3.—Plan view of the 1904 Oldsmobile. For reference letters see fig. 1.

dimensions for an engine of this power, is so constructed as to most effectually silence the motor's exhaust, being now, as seen in figs. 1 and 2, placed below the spring frame, the products of combustion being delivered from the rear end, clear away from the occupants of the vehicle. The radiating flanges H³ on the forward portion of the cylinder are new in the 1904 model, and, of course, aid largely in the efficient cooling of the motor. Rather more weight has been put into this year's flywheel rim, which is a good feature, the diameter and rim weight of the flywheel being one of the dominant factors in the remarkably slow and smooth running of this motor.

The Transmission Gear.

The drive is direct from the chain pinion on the crankshaft, through the chain O (fig. 3) to the chain wheel surrounding the differential gear enclosed within the differential gear-box N (fig. 3). On the high speed a very sweet, easy, and noiseless drive is obtained. Although not discernible in either of the chassis illustrations, the rear tubular axle, in which the live axle rotates in four long roller bearings, is strongly tied by a tension rod which passes from clips at each end beneath the differential gear-box, and upon which tension can be put by means of a suitable coupling nut.

The flat range of flanged radiating tubes H³ are set above the spring frame forward of the engine, and are placed most advantageously for catching a good draught.

Coming immediately to the cleverly-designed motor, views of either side of which are given by figs. 2 and 4, it will be seen by fig. 2 particularly that the toothed wheel circulating pump is set upon the left-hand extremity of the crankshaft. The suction pipe from the upper side of the cylinder water-jacket is broken in the illustration, but the

delivery and suction mains are thereon seen, marked D³ and H.

All the bearings of the crankshaft, half-time shaft I, and the pump-wheel spindle are served by forced feed lubricators, and marked U, X, and V in figs. 2 and 4.

The cylinder, piston, and crank chamber are served with oil from the lubricator E, which can be set to drip any required number of drops per minute, the feed being controlled by a small lever ready to the driver's hand. B¹ is the water-jacketed portion of the cylinder, and D is the valve chamber, in which are set the automatic induction valve and the exhaust valve, actuated by the half-time shaft I, which is rotated by a worm wheel on the crankshaft A¹. M and M¹ are the upper and lower portions of the carburetter, the ingenious and efficient internal arrangements of which cannot be clearly described without a properly drawn section, the

presentation of which we reserve for a future issue.

In the crown of this carburetter is set a small valve by which the petrol feed is adjusted, and at O is a needle valve controlling the admission of petrol to the carburetter, and which is under the command of the driver by means of a lever placed

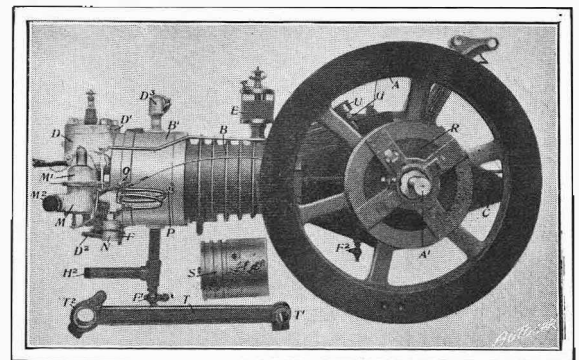


Fig. 4.—Right-hand side of engine

- | | |
|--|--|
| A, flywheel | H ¹ , pump case |
| A ¹ , crankshaft | H ² , delivery pipe to radiators |
| B, rear portion of crank chamber and flanged portion of cylinder | I, half time shaft |
| B ¹ , water jacket to cylinder | K, commutator |
| C, forward portion of crank chamber | K ¹ , rod from ignition advance lever |
| D, cylinder head and valve chamber | L, exhaust valve lifter and spring |
| D ¹ , valve chamber inspection cover | M, lower portion of carburetter |
| D ² , exhaust pipe | M ¹ , upper portion of carburetter |
| D ³ , water uptake from cylinder jacket | M ² , air supply pipe |
| E, cylinder lubricator | N, catch pot |
| F, compression relief rock to cylinder | O, needle valve to petrol supply |
| F ¹ , cock for drawing off water in water jacket | P, petrol supply pipe |
| F ² , cock for running surplus oil out of crank chamber | R R, change speed gear box |
| G, inspection cover to crankshaft | S, piston |
| H, suction pipe from cylinder jacket | T, connecting rod |
| | T ¹ , small end of connecting rod |
| | T ² , big end of connecting rod |
| | U, forced feed lubricator to crankshaft |
| | V, lubricator to half-time shaft bearing |
| | X, forced feed lubricator to pump wheel spindle |

conveniently to his left hand. A horizontal sliding throttle-valve is placed in the upper part of the mixture chamber, and with a valve in the air-inlet is connected to a pedal on the dashboard by means of a rod, which has a return spring to the throttle-valve. The speed of the car on the direct drive is wholly controlled by this pedal to a minute degree, and is responsible for the accuracy and certainty with which this charming little vehicle can be driven in traffic. The low or steep hill-climbing gear is obtained through a Crypto gear enclosed in the box R, on the face of which is seen, in fig. 3, the four-armed friction clutch locking this gear solid with the crankshaft when driving on the top speed. This change-speed clutch is controlled by the lever S (fig. 1), and when changing from the low to the high speed no grinding or shock of any kind is felt. The Crypto gear wheels are now made all in steel, and not as to the pinions in fibre as heretofore.

From fig. 1 it is plainly seen that tiller steering

is fitted, but as the steering standard J¹ (fig. 1) is set upon the bow spring shown, no road shock of any kind reaches the hand. With the tiller in the left and the gear-change lever in the right hand, and the foot upon the throttle pedal, the control of the Oldsmobile is one of the most simple of its kind, and can be acquired by a total novice in a very short time.

A word or two should be said with regard to the jump-spark ignition of the engine, which is of the simplest description. Two sets of four-volt dry cells are supplied in conjunction with a trembling coil, and the firing is controlled by a neat and simple make and break commutator K placed on the half-time shaft (fig. 4). This, of course, is readily controlled from the seat.

In conclusion, and from actual driving experience, we are bound to say that for price and efficiency the 5 h.p. Oldsmobile is hard to beat, and is, moreover, a car which, as a runabout, is giving satisfaction to a large number of users.

POLICE TIMING.

We have always held that as soon as the stop-watches which have been used all over the country by police officers for obtaining evidence upon which to secure convictions before benches of magistrates were tested they would be found to exhibit one or more of the faults which would exclude them from use by the official timekeepers of either the Automobile Club or the National Cyclists' Union—the National Cyclists' Union particularly, for there is no body more concerned for the entire accuracy of the watches used by their officials than the General Committee of the N.C.U. The test applied by Mr. Swindley to the watch used by Superintendent Marks to time Mr. Liddell's descent of Tartar Hill from a point three hundred and eighty yards from the start and sixty yards from the finish of the measured quarter is one of the tests applied by the above named committee to all watches submitted to them, and to which no small percentage even of high-priced instruments have been known to succumb. A perusal of the evidence given in Mr. Liddell's case on another page details the effect of this test upon the policeman's watch, upon which instrument he has doubtless founded charges against many automobilists and obtained convictions. We do not for a moment suggest that the officer purposely held the watch up during the passage of any car he was timing over a measured distance, but it is quite within the bounds of possibility and probability that he has again and again in his zeal to be correct held the watch ready in his pocket with his forefinger pressed just sufficiently hard upon the plunger at times to stop the hand and let it go on again even more than once during the passage of the car between the timing points. This has been known to occur in timing races with indifferent watches; indeed, as long as twenty years ago it was thought that a mile bicycle record had been erroneously timed in this way. The braking feature is not found alone in such cheap watches as have been supplied to county police by motorphobic county councils out of the rates. *Apropos* of the test made and the evidence given by the hon. official

timekeeper to the Automobile Club at Kingston last week, Mr. W. J. Peall, a well-known member of the Automobile Club, writes us that upon perusing the evidence he took a stop-watch of his own, which cost thirty-five guineas, and tested it as described, to find that he could hold the second hand exactly as Mr. Swindley had done with the constable's watch. Mr. Peall goes on to say, "There can be no doubt that there have been very many unjust convictions in consequence of this. I have carried a stop-watch for years, and until now I had no idea that I might make such ridiculous errors in timing. Mine is a case which shows that a man may in an amateurish sort of way time events (or think he is doing so) for years without discovering the trick his watch may serve him."

Of the fatuity of attempting to time a car from point to point while standing anywhere between these points, we have spoken again and again, and it is extraordinary that men invested with authority as justices of the peace can be permitted by their commonsense to accept such records as evidence.

Now not only the method but the instrument employed has been proved in open court to be capable not only of grave error, but it might be of intentional misuse.



A White steam car in a white land.

THE COST, CARE, AND UPKEEP OF A MOTOR CAR.

A PRACTICAL PAPER OF GREAT GENERAL INTEREST, USEFUL ALIKE TO THE NOVICE AND TO THE PRACTISED AUTOMOBILIST. THIS PAPER WAS READ ON JANUARY 30TH, BEFORE THE MEMBERS OF THE LINCOLNSHIRE AUTOMOBILE CLUB, BY THE AUTHOR, DR. GILPIN, OF BOURNE.

What a number of semi-converts there are to motoring! Which of us has not met the man who says, "Oh, of course they are the coming thing. I've no doubt I shall have a car myself some day, but at present they are too expensive. I shall wait till they get cheaper and a little more reliable."

Well, bring an up-to-date voiturette alongside two smart dogcarts, each with a good-looking cob in the shafts. I am willing to admit that so far as appearance goes the horses look the better value, but their value is not always to be judged by appearance. I mentioned two dogcarts and horses, firstly, because they with their harness would cost about the same amount as a voiturette; and, secondly, because it would take both of them all their time to perform the amount of work that could be got out of the motor car with perfect ease. Indeed, were the car restricted to their best pace—say an average twelve miles per hour and thirty miles per day—I am convinced it would be still going as gaily as ever when the horses were extract of meat.

The £100 Car.

To return to our friend who is waiting till cars get more reliable and cheaper. The motor industry is in its youth, when growth is rapid, yet the last four years, although they have no doubt brought more all-round reliability, due, I believe, quite as much to the increased knowledge of drivers as to improved machines, yet have brought no marked reduction in the price of cars. Looking through *The Autocar* of that date, one finds voiturettes offered at quite as low a figure as to-day. True, we get a better article for the price—higher-powered engine, longer wheelbase, more efficient transmission, less noise and smell, and so on—but the price is still nearer £200 than £150, and our friend is waiting to buy at £100, and I am afraid that he must wait longer yet.

The care of a car! If you want a thing done well, do it yourself; or, let me add, know yourself how it should be done. No horse lover trusts his animals blindly to his groom or coachman. That is the method of the man who uses horses as a necessity; he knows nothing about them, and he pays for his ignorance. The same applies more forcibly still to motoring, and he who says, "I will buy a motor car and hire a man to drive it; I don't want to bother about the thing myself," will not be saving money.

A little time and a little interesting study will enable anyone to master the mechanical details of his car, and teach him what is necessary to keep it in going order. An intelligent man who knows how to wash and clean the carriagework alone is necessary. In the majority of cases you will find that man anxious to do more, and it rests with yourself to teach him, if you wish, properly to lubricate, replenish tanks, mend punctures, repair tyres, or grind valves, and so on. But—and it is a big *but*—always know more than he does. A man at the mercy of his mechanic has my sympathy, for he is not a *motorist*.

Purchasing a Car.

In purchasing a car, as in other matters, smallness of cost does not always mean cheapness. The voiturette vendor of to-day knows that even the novice has certain vague terms floating through his mind as indicating the desiderata of a car. Silent, of course, very fast—tell him it is a bit slow, and the car is damned—three speeds and reverse, honeycomb radiator, mechanical valves, governed engine, automatic carburetter, magneto ignition, direct drive, artillery wheels, etc. There you are. That is what Messrs. So-and-So call their Eldorado voiturette at £150—£25 less than any other. The novice would be well advised to invest that other £25, and buy the production of some firm which knows from the past what material will wear, and is not afraid to use it in order to lengthen the life of a car and to prevent those breakdowns due to faulty material, and those various irritating little mishaps that are the result of slovenly construction.

Advice to the Novice.

To any novice who intends to take into his own hands the mechanical care of his car, I would suggest that a commencement made with a second-hand car by a maker of good repute would turn out the cheapest introduction to motoring.

An Anti-freezing Mixture.

As one who has to make use of the car in winter at a moment's notice, and who cannot spare time to refill the water tank each time, I make use of glycerine in the proportion of one in four, and have found it quite satisfactory in preventing freezing. The charge (costing about 8s.) will last throughout the winter, and will teach you at the same time to promptly repair a leaky pump or water joint.

Tyres.

Tyres—pneumatic I mean, for I have had no experience of solids—are an expensive item, but I must say they have not proved the nightmare to me that some writers to *The Autocar* describe. It is good policy to overhaul them frequently, clean out cuts with naphtha, and solution them up, take off the covers and look for stretched seams in the canvas, and put an extra thickness of canvas over such places, and so avoid a burst on the road, and at the same time remove the particles of road grit. Replace the tyre, being liberal with French chalk. It is no good having a cover retreaded when it is quite worn out. Whilst on the subject of tyres, I may here mention that, so far as my experience goes, they have a very much longer life on a gear-driven car with live axle than on one driven by side chains, and the faster the pace the greater is the wear in proportion.

Ball Bearings.

If one's car runs on ball bearings—and they are not an unmixed blessing—it should be made a rule to jack the wheels up every few hundred miles to ascertain the condition of the bearing, and if there is the least doubt as to the free running the wheel

should be taken down and the balls wiped and examined, and any scratched or uneven ones replaced by fresh ones.

The Gearing.

The change-speed gear box should be opened periodically to see that it holds a sufficient quantity of lubricant, and it would be a good thing if all boxes were fitted with a plug underneath, so that one could drain off the lubricant occasionally and wash out the box with a little paraffin. The lubricant need not be wasted; it should be heated to make it thin, and then, the fine particles of metal having sunk to the bottom of the receptacle, the purified lubricant could be returned to the gear box.

Starting on a Drive.

Before going out for a run, when all is ready and the engine is throbbing with the pulse of health, take a look at the tyres before you start. It is annoying to find out just when you are well out into the street that you have started with a deflated tyre. I stipulated that the engine should be at concert pitch before starting, because I wish to protest against an utterance by the writer in the "Badminton Volume" on "Motoring." He says: "Finally, remember that if your engine is misfiring or pulling badly, the fault may of its own accord disappear altogether after a little running." Now, I call that slovenly advice.

There is some defect; find it out and remedy it before you start, for, unless the misfiring is to your knowledge caused solely by cold affecting the mixture, running is more likely to mar than mend the trouble, and end up in the (to me) sorry spectacle of a stationary car with its bonnet up and the driver's bonnet down—inside it.

Brakes and Tyres.

As soon as you are fairly started, put your foot on the brake and weigh its capability, and if that is satisfactory do not use it again unless compelled, for the less one uses the brakes the longer the tyres will stand. On a fast, heavy car I have seen a patch of the rubber worn right to the canvas as the result of a very sudden stop. So let us take it for granted that there is an obstruction just the other side of every sudden bend.

Again, on a stony or rutty road it is well to remember that tyres are the costliest item in car upkeep, and to drive slowly; much as the jolting grates on our nerves, the tyres catch it first.

The Upkeep of a Car.

On the subject of upkeep, I would ask you to bear in mind that my ideas—for I cannot be sufficiently accurate to call them calculations—are based upon the running of a car in all weathers and on all conditions of road alike. Since I took to the motor car



THE LIGHT DAIMLER CAR. A few weeks ago, we announced that the Daimler Motor Company had arranged to turn out a limited number of 7 h.p. light cars. An illustration of one of the first of these cars to be turned out is given above, and we can testify to the lady driver's skill in handling it. The engine is a two-cylinder vertical one, while the transmission gear and other details are on the well-known and tried Daimler system. The main dimensions will be found in "The Autocars of 1904," page 169.

(more than three years ago), I have never substituted the horse for my new love, except on one or two occasions when in the night a trap has been sent for me. Then I have made use of it, thinking of my man and his newly-cleaned car, and even on those occasions the tardiness of the journey has made me regret my choice.

On all sorts and conditions of roads tyres will and must wear out. I will not go into details, but, taking a light car, and making a fairly correct estimate of the miles covered, I find that a yearly tyre bill of £25 will cover 6,000 miles, or, in other words, exactly a penny a mile.

Gears also will wear out, and I find that my 6,000 miles are about the length of their life, although, bear in mind, I said my 6,000 miles—not straightaway runs, but constant change of gears resulting from the frequent stops incurred in my professional work. However, if one is able—as one should be—to take down the old and replace the new gears, the cost is not at all a serious item.

Clutch faces will wear out, so will chains, and so on, but I find that, tyres excluded, a £10 note will cover my repairs and renewals for that annual 6,000 miles.

I have drawn up a rough estimate of the expenditure, but the only thing I would mention is that I have taken into account the services of a man at 15s. per week. As a matter of fact, his wages are £1, but, then, he cleans knives and boots, and attends to gardens, and so forth.

Taking, then, 15s. worth weekly of manual labour, and the cost of petrol, oil, paraffin, sponges, cloths, tyres, tubes, accumulators, licenses, repairs, and replacements, I conclude that my annual 6,000 miles cost just over 3½d. per mile.

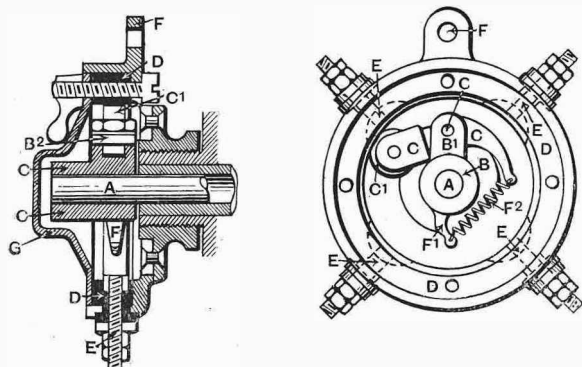
I have as yet said nothing of depreciation, but we may be sure that year by year types of car will more and more approach uniformity, and depreciation will be represented only by wear and tear.

In the days when I used horseflesh, I calculated my travelling expenses at 6d. per mile, and that, compared with the present 3½d. rate, would leave 2½d., or £62 10s. per annum to the depreciation fund.

I leave you to estimate the pros and cons if you wish. When I realise the ease with which I do my rounds, the promptitude with which I can answer an emergency call, and the extra priceless hours of sleep that I gain, I cannot be too thankful for the advent of the motor car.

THE LACOSTE COMMUTATOR.

This simple and effective commutator or contact maker and breaker is now fitted to so many makes of motors that the diagram we are able to give of it here will make its construction and action clear to all. The half-time shaft of the motor is marked



A, half-time shaft
B B¹, jaw-armed collar
B², spindle on which C works
C C¹, jaw-headed lever arm
C¹, roller on C C
D D D, fibre insulating ring

E E E E, primary terminals
F, lug for attaching ignition control gear
F¹, spring arm on collar B
F², spiral spring exerting contact pressure

by the letter A in both figures, and it will be seen that it has shrunk or keyed fast upon it a jaw-armed collar B B¹. On a spindle B² carried between the jaws of the arm B¹ is mounted the curved and

jaw-headed lever arm C C¹. The jaws of this lever arm embrace a friction roller C¹, which, by the tension of the spiral spring F² attached to its single end and the arm F¹, part of the collar B is held with sufficient firmness up against the inner periphery of the fibre ring D D D. In this fibre ring, and properly insulated from all metallic contact by it, are placed the four primary terminals E E E E, which carry segmentally-shaped pieces of brass at their inner ends flush with the inner periphery of the fibre ring D D D. The half-time shaft running from left to right takes the member C C¹ with it, the friction roller C¹ making contact and completing the primary circuit each time it rolls over the brass insertions. This is a particularly simple but well-made contact breaker, which, so far from being upset by the ingress of oil, requires regular lubrication with thin lubricating oil to enable it to run at its best. We may say that we have had a counterpart of the contact breaker here shown in constant work on a four-cylinder car since the end of May last, and it has behaved perfectly during all that time. In connection with the same car, we may also say that we have had the same four Lacoste sparking plugs in use for the same period, and have not yet had to withdraw or replace one. We attribute this partly to luck, but mainly to good all-round design and workmanship in both engine and ignition.

Several summonses were heard at the South-Western Police Court for technical breaches of the Motor Car Act. One motorist's number-plate had black figures on a white background instead of white figures on a black background. In another case the white figures were on red, the magistrate pointlessly remarking, "It sounds like pool—white on red."

It is said that the German Automobile Club will provide an elevated stand to accommodate 10,000 spectators, for viewing the Gordon-Bennett race. The structure will be built entirely of steel, and will span the racing track like a bridge. Thus they are following the grandstand on the Irish course on broad lines.

A MOUNTAIN CLIMBING FEAT.

Last week, as briefly mentioned in *The Autocar*, Mr. Harvey Du Cros, jun., and Mr. Chas. Sangster essayed to drive one of the new four-cylinder 15 h.p. Ariel cars to the summit of Snowdon. They were not quite successful in their attempt, but they would unquestionably have made the summit had not the snowdrifts made it impossible. The ascent, of course, was made from Llanberis, but as the footpath was too narrow for a car the track of the mountain railway was taken. This is extremely rough, and the ballasting consists of slabs of mountain stone of considerable size—a very different surface from that of the neatly packed granite chippings used on ordinary main line railways. The track was in an extremely bad condition. In many cases the ballast had been washed away by the heavy rains and storms from between the sleepers, and at times the bottom of the car came into violent collision with the rack or cog rail between the metals, and more than once it was necessary to lift it out of the depression. The insurmountable difficulty, however, was not encountered till within a short distance of the summit, where the railway passes through a cutting, into which the drifts had driven with such force that it was completely filled up. The car charged this obstruction gallantly enough, but as soon as the back wheels got into it they commenced to revolve without getting a bite. The drifts at length became so deep that any progress at all could only be made by fixing chains around



The back wheels find a soft place in the snow.



Digging a passage through the snow.



One of the tough places.

the tyres to give a bite, but in the deeper snow even these were useless. A gang of men followed the car, and helped the driver and his friend to lift it out of the drift, and also to turn the car round when the ascent was eventually abandoned. No difficulty was experienced with the descent, and, although the brakes were water-cooled, the water did not have to be used for cooling purposes. The brake power, by the way, is a notable feature of the Ariel cars, as we have found many times with our own 16 h.p. In fact, so powerful is the pedal brake that the side brakes are practically never used, except for locking the wheels when the car is standing. A petrol tank was fitted over the engine, so that the steep incline could not interfere with the regular feed of the fuel—a little matter which in the early days of motor mountaineering was more than once neglected, with disastrous results. In its bumping and banging upon the cog rail the sheet steel plate protecting the motor was torn away, as also was the silencer, while the front axle was somewhat bent. The damage, however, was not sufficiently serious to prevent the car being driven back to the works at Birmingham after it had finished with Snowdon. The feat, as a whole, is another demonstration of what a modern motor can do. This will be more forcibly realised when we say that the average gradient of the railway is one in seven. This is stated to be the steepest average of any mountain railway in the world. The maximum rise at any one section is one in four and threequarters. What this

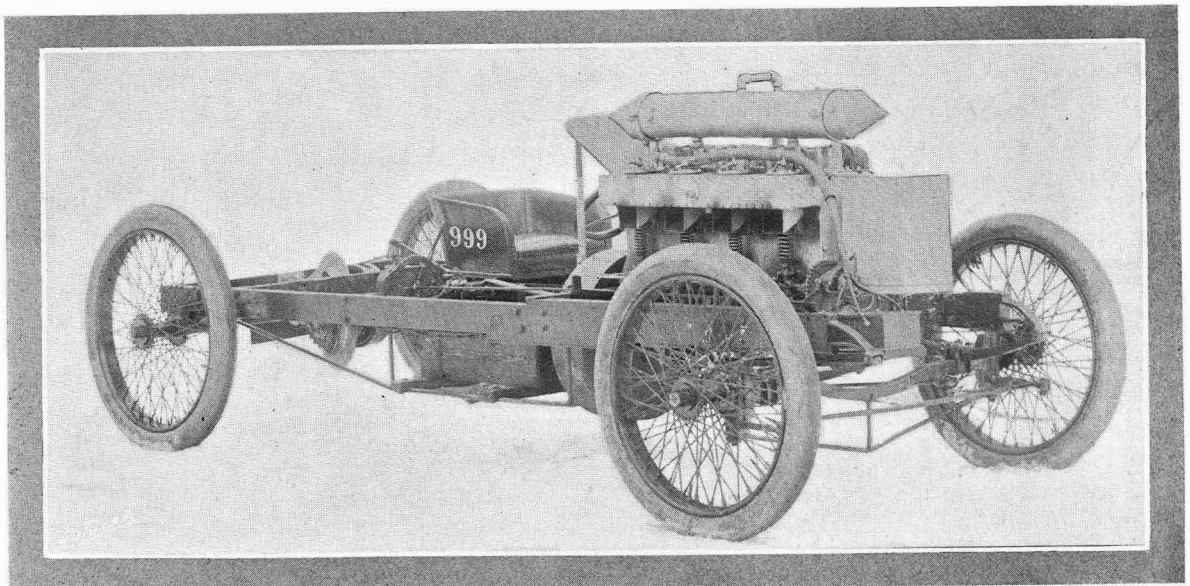
means may be realised when we say that the steepest part of Westerham Hill is 1 in 7.5, and the steepest part of the Sunrising ascent of Edge Hill, Warwickshire, is 1 in 6.42; and, of course, on both these hills, even at their worst, the surface is smoothness itself compared with the sleepers and coarse ballast of the

mountain railway, not to mention the obstruction occasionally offered by the central cog rail. The mountaineering Ariel, by the way (which has the lowest power of the three types of four-cylinder cars made by the company), will be on view at the Crystal Palace Show next week.

THE CLUB AFFILIATION QUESTION.

We are pleased to note from the report which has been published that the conference between the committee of the Automobile Club and the deputation representing the provincial and district automobile and motor cycling clubs which was held a few days since at 119, Piccadilly, augurs well for the success of the forthcoming larger and more representative gathering which will be held to consider the same subject on the 15th of this month. Without going into details, it will suffice to say that the matters of disagreement and dissatisfaction between the parent club and the other bodies were discussed in a friendly way, *seriatim*, and Dr. Walters, the leader of the deputation from the provincial clubs, stated before the deputation withdrew that a great deal of misrepresentation had been removed, and the deputation had found that they were in unison with the club. This is as it should be, and shows the necessity for very careful consideration in these matters. We are not attempting to cast blame on either side when we make this statement, but there is no doubt that the discontented ones had their own way. A few months since a federation of automobile clubs would have been formed, but owing to discussions which have taken place, not only in the provincial clubs themselves, but in the motor press, the matter has been very fully ventilated, and, so far as can be seen at the moment, there appears every likelihood of a scheme of affiliation being accepted by the majority of the clubs, which will result in the Automobile Club being, as it should be, representative of the

whole of the automobile movement. In other words, it will have the support of nearly every provincial and district club throughout the kingdom. This appears to us a very important matter indeed, and one which from one cause or another had not, till the very serious discontent among the clubs broke out last autumn, received sufficient consideration from the parent body. Nearly all this discontent has been due to unsympathetic handling from headquarters, and misunderstandings—sometimes foolish, sometimes groundless, though not always—on the part of the extra-Metropolitan clubs. Both sides have learned a good deal during the last few weeks, and there seems every probability that the lessons will not be thrown away. The date of the conference is a most convenient one for provincial clubmen, as a large proportion of the more active among them will be in London visiting the Crystal Palace Show, so that there appears to be every prospect of the gathering being of a thoroughly representative character. We have only to remind both sides that they must be actuated by a give and take policy. The parent club will of necessity have to make certain concessions which it has not hitherto granted, and the provincial clubs will have to make up their minds not to be hypercritical. In other words, both sides must take a broad statesmanlike view of the position, and work hand in hand for the general good of the movement. The primary cause of dissatisfaction will be removed, as the arrangement to be proposed will provide for adequate representation on the Motor Union committee.



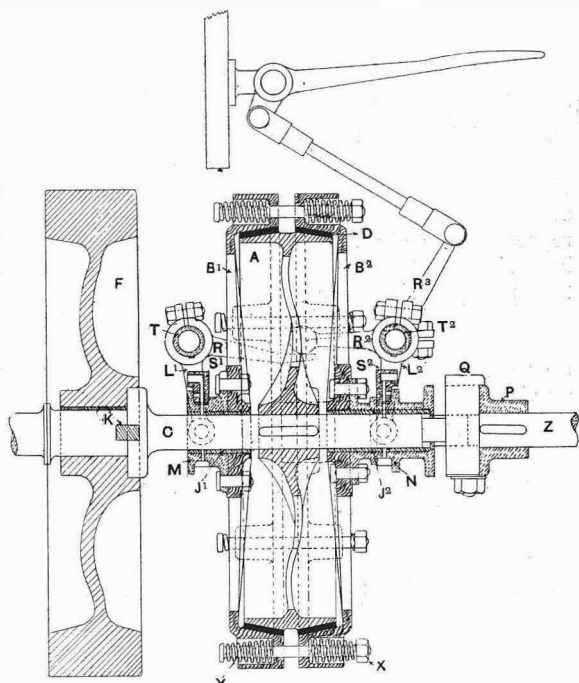
THE 52 H.P. FORD, on which H. Ford recently covered a mile on the frozen surface of Lake St. Clair, Michigan, in 39½s. This time has since been beaten by ½s, by Vanderbilt. The Ford has four cylinders, 7in by 7in, and no change speed or balance gears.

THE RYKNIELD CARS.

In April last year the Ryknield Motor Co. formally opened their extensive and specially-built works at Burton-on-Trent for the manufacture of automobiles. Since that time the company have not been lying idle, though in the meantime they have not come prominently before the public, as they have very wisely devoted considerable time to the designing and producing in its best form each of the components which go to make the complete car. We are not, at the moment, in a position to give a detailed description of the car as a whole, but some of its leading features are enumerated below.

The Ryknield Duplex Clutch.

The clutch, unlike the majority, is independent of the flywheel. It consists of a light clutch drum forming the male portion, and two sheaves forming



The Ryknield double cone clutch.

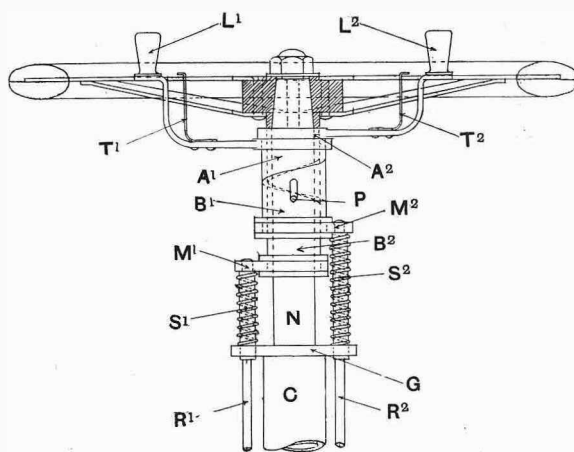
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| A, clutch drum | L ¹ L ² and R ¹ R ² R ³ , bell cranks |
| B ¹ B ² , double internal cone discs | actuating B ¹ B ² |
| C, universally jointed shaft | P, part of universal joint |
| D, clutch lever | Q, channel in P |
| F, flywheel | S ¹ S ² , stirrups attached to L ¹ L ² |
| J ¹ J ² , bearings for B ¹ B ² | actuating B ¹ B ² |
| K, transverse key driving C | T T, bearings for bell cranks |
| M N, collars in which S ¹ S ² work | X Y, clutch springs |

the opposite members, these engaging one on each side. The clutch drum A is keyed to a floating shaft C, one end of which is let into a recess bored into the engine flywheel F, and deriving its motion by means of a transverse key K. The other end abuts upon a cotter Q, which acts also as a distance piece between it and the gearshaft Z, while it is prevented from falling out of place by sliding joint N and P. The part P is keyed to Z, and has two channels cut at right angles—the horizontal one to take the tongue of the shank N, the vertical one being for the cotter Q, this preventing N from sliding out. The sheaves B¹ B² are drawn together

on to the clutch drum by means of twelve springs Y, which are kept in position by pockets, and adjusted by means of nuts and bolts X. To unclutch, the two sheaves B¹ B² are drawn apart by pressing down the pedal which actuates the cross shafts T¹ T² by means of the levers R¹ R² R³, which cause other levers L¹ L² to move outwards, thus drawing B¹ B² away from A by means of the stirrups S¹ S² working in the grooves M and N. To remove the clutch it is only necessary to unscrew the nut and withdraw the cotter Q, allowing the shaft C to slide back and disengage with K and F; then turn the clutch round until the tongue N is in a vertical position, so as to allow the clutch to drop bodily downward out of the stirrups.

The Steering Wheel and Control Levers.

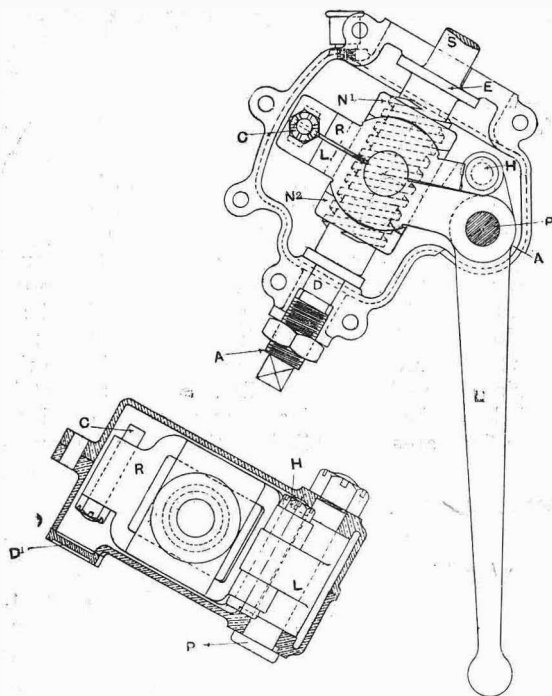
In place of the ordinary aluminium steering wheel the Ryknield is built up with dished steel spokes. These are fixed upon a central steel boss, and combine extreme lightness with strength. The two controlling levers for the firing and carburetter are placed on the wheel, and may be operated without removing the hands from the steering wheel. The levers L¹ L² turn about the steering shaft N, working against the quadrants Q¹ Q², which are solid with the upper part of the wheel, being held tightly in any position by the springs T¹ T². To advance or retard the spark the lever L¹ is attached to a sleeve A¹, which is cut with a spiral face, as is its counterpart B¹. When A¹ moves forward relative to B¹ the latter is moved downward, being



The Ryknield steering wheel and control mechanism

- | | |
|---|--|
| A ¹ A ² , sleeves surrounding steering column | P, pins preventing the sleeves A ¹ A ² from turning |
| B ¹ B ² , collars on A ¹ A ² | R ¹ R ² , control lever connecting rods |
| C, steering standard | S ¹ S ² , spiral springs giving return motion to A ¹ A ² |
| G, flange on C | T ¹ T ² , springs holding L ¹ L ² in position |
| L ¹ L ² , control levers | |
| M ¹ M ² , stirrups working in B ¹ B ² | |

prevented from turning by the pin P. The lower sleeve B¹ has a groove turned in it, to take a stirrup M², which is fixed on the end of the rod. This is a somewhat similar arrangement to that which is used on the Mercedes cars, excepting that the mechanism is mounted upon instead of inside the steering column.



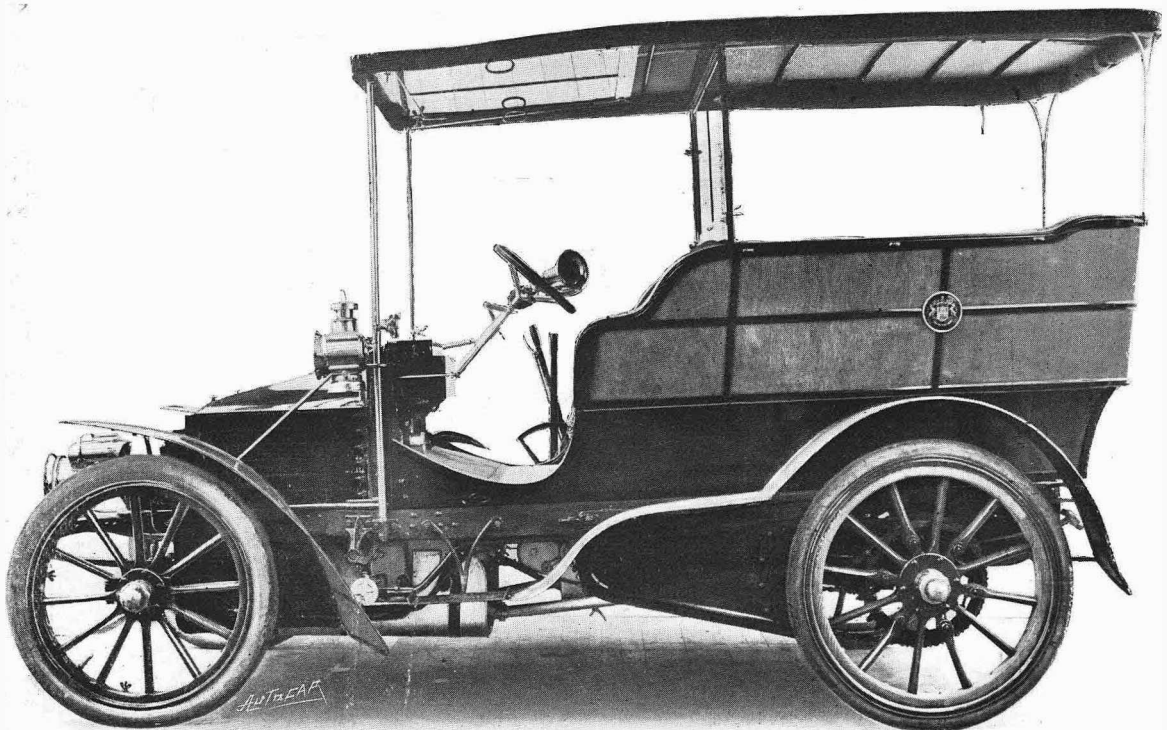
Ryknield steering.

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|---|---|
| A, screw adjustment to steering gear | E, abutment shoulder on steering column |
| A ¹ , bell crank steering lever | H, pivot on which double crank levers N ¹ N ² swing |
| C, wedge bolt separating ends of the levers L and R | N ¹ N ² , double crank lever |
| D, step on which steering column rests | P, bearing on which L turns |
| L, steering arm. | R, part of N ¹ N ² |
| | S, steering column |

The Steering Gear.

A style of steering very frequently employed is the worm and pinion, and as this in course of time gets worn, there is no means of taking up the slack; consequently, when the car is running, the front wheels, instead of being rigidly connected with the steering wheel, have a certain amount of play. This has been eliminated in the Ryknield patent steering, which has two nuts fitting upon a triple thread screw. The two nuts work on radial surfaces on to a combined double crank lever. In fig. 3 these are indicated by N¹ N², L being the crank lever, with the part R hinged at H. Should any wear take place in either the screw or nuts it can be taken up by removing the small cap D¹ in the side of the case, and screwing up one small wedge bolt C, which forces the two ends of lever L and R apart from a fixed centre, thus pressing one nut against the top of the thread, and the other against the bottom. Any play between the screw S and the case can be taken up by the adjustment screw A, which presses the step D upwards, causing the collar E to press against the top of the case.

There are many other interesting features to be found in the Ryknield motor vehicles, which, as we said before, we hope to deal with at some early subsequent date. A point has been made of carefully testing each detail of the car individually, and this, of course, entails a considerable expenditure of time, delaying the production of completed cars somewhat at the commencement. This expenditure of time will, however, enable standard type cars being got through in very quick time.



AUTOCARS IN INDIA. We have from time to time given illustrations of various automobiles which have been despatched by British manufacturers to various parts of the world, thus proving that the growth of automobilism is not confined entirely to Europeans and Americans, and, incidentally, that the merit of the British productions is appreciated. Above we illustrate a six-seated Wolseley car which was recently despatched to an Indian potentate.

CONTINENTAL NOTES AND NEWS.

Delivery Van Trials.

The meeting of makers called by our contemporary *L'Auto* to consider the regulations for the fourth annual heavy car consumption trials agreed to form classes apart for motor waggons and delivery or covered vans, as the latter carry body weight which cannot be classed as "load," and therefore puts them out of comparison with the motor waggons. After due consideration of the practical necessities of the work to be performed by them, it was arranged to divide the delivery vans into three classes:

- (1.) Delivery vans carrying a load of less than 9 cwts. 3 qrs. 8 lbs., which class would cover light fast vans, such as would be used by store-keepers, perfumers, drapers, etc.
- (2.) Delivery vans carrying loads over 10 cwts. up to 1 ton 3 cwts., such as are used by the large stores, viz., the Louvre, the Printemps, and others.
- (3.) Delivery vans carrying loads of over 1 ton 3 cwts.

Delivery vans in the above classes must have a permanently constructed body with enclosed carriage work. Tilted vans should not be included in these classes. Two classes were provided for motor waggons:

- (1.) Waggons carrying a maximum load of 19 cwts. 2 qrs.

- (2.) Waggons carrying a load of over the above weight.

After consideration, it was decided to impose a weight limit to the square metre of platform area, and it was decided that for each ton = 2,200 lbs., a motor waggon platform must offer one and a half square metres of platform area. A motor waggon having a platform area of one square metre would not be permitted a load of more than 13 cwts. 0 qr. 9 lbs., the platform measurements to be in the clear. The determination of the relation of van measurements to load were found more difficult owing to the irregular form of the van bodies. It was ultimately decided to take the cubical content to be obtained by the floor area multiplied by the internal perpendicular height, and the load limitations for vans were therefore set down to be as follows:

- (1.) Vans carrying less than 9 cwts. 3 qrs. to have a minimum cubical area, arrived at as above, of one cubic metre.

For classes (2) and (3), the necessary cubical content, again arrived at as above, must not fall below two cubic metres.

A New Fuel.

The Automobile Club of France has but lately concluded experiments with a carburating agent obtaining distilling alcohol with certain hydrocarbons, and called "Duruptine." An eminent French chemist has not scrupled to describe "Duruptine"



STARTING TO INSPECT THE 1904 GORDON-BENNETT COURSE. A few days since, Mr. Roger Wallace, K.C., the Chairman, and Mr. Julian Orde, the Secretary of the Automobile Club, drove over the Gordon-Bennett course in a Benz Parsifal racing car. They were accompanied by another Englishman in the person of Mr. Ballin Hinde. Our illustration shows the party starting from Homburg. They had a very hearty reception from their German friends, and were favourably impressed with the course, though its suitability for the event will depend not a little on the cutting away of some of the sharpest corners and straightening out two or three dangerous curves. The Benz Parsifal car embodies many interesting features, but these, of course, are not shown in the photograph, with the exception, perhaps, of the light steel lamp holders.

as an ideal motor spirit. It is said that a company is about to be formed with a capital of £48,000 to produce and distribute this spirit. Pure alcohol has hitherto been found impossible of use in an explosion motor, and has had to be mixed with forty or fifty per cent. of petrol. The mixture was made cold, and has been found on the whole more expensive and less effective than petrol. But M. Durupt has devised a method which required the most careful working out of distilling alcohol in company with certain hydrocarbons, the resulting spirit having

been characterised as above quoted, after exhaustive experiments in the club laboratory. We await further details of "Duruptine" with interest.

Gordon-Bennett Drivers.

There are innumerable aspirants for the honour of driving the trial cars in the French eliminating Gordon-Bennett trials. The last request proceeds from an electric tram car driver, who advances his claim on the grounds that he has driven his car for five years without an accident.

OCCASIONAL GOSSIP. By the Autocrat.

It is considered quite bad form in the club if one approaches a certain motor exhibition promoter and quotes the first line of "Bannockburn" in the singular and altered prepositionally to apply.

x x x x

I do not mean to be personal more often than I can possibly help, but I know I shall be echoing the open expressions of a few, and the wishes of many, if I say that, now the resignation of the chairman of the Automobile Club has been announced, members are taking up the suggestion which was made in *The Autocar* last week—that a paid chairman would be an excellent thing for the club in many ways—and everyone seems to select the same man as the one they would like to see official chairman. Need I say that is Mr. Claude Johnson, the ex-secretary of the club? Perhaps someone can nominate a better man for the post, but I confess I cannot. This is, of course, building castles in the air, as I believe Mr. Johnson is far too much occupied to contemplate redevoting himself to the affairs of the Automobile Club.

x x x x

This sale of patronage (how like Pepys it reads) is becoming quite a nuisance. A provincial friend, who promotes a dog show in the West Country, writes me, asking where he can buy it, and what is the proportionate tariff? I have suggested an application to the Kennel Club.

x x x x

Our friends in the United States seem to set an example to some writers at home. Although information was cabled broadcast when Mr. Vanderbilt made a mile record last week, no mention was made of the fact that he drove a foreign car. Too often the practice here is to omit the name of a car when it is of home make, and to blazon it forth when it happens to be of foreign origin. Of course, all automobilists would like to know the name of the car in any case, and, as that is so, it may be interesting to say that it is a 90 h.p. Mercedes.

x x x x

On the other hand, English journalists do not often enthuse hysterically over mediocre performances. They would not describe a man who had never taken part in a first-class race as "the king of speed-makers." I need not say I do not refer in this case to Vanderbilt, who is a genuine sportsman, and one who has won his spurs in the great International races, but to a man who has never done anything off a trotting track, and who seems to insist on being photographed coatless and vestless, with his head tucked under his steering wheel.

Some people seem to think that undue joy is being expressed in motor circles because a great firm of gas-engine manufacturers has taken up the building of motor cars. They point out that a big heavy gas engine is a very different thing from a high-speed petrol motor, which, instead of running at a constant speed as does a gas engine, is called upon to race at one minute, and to run so that it will only just turn directly afterwards. There is a good deal in this contention, and I certainly should not be inclined to overrate the importance of the event; but it seems to me that when a great firm of engineers having a world-wide reputation takes up a new line of manufacture, this very reputation is equivalent to a guarantee that it will not turn out an unsatisfactory article. Of course, if we leave the engineer who has had no experience with motor cars and motor car engines to himself, he will pass through a very costly period of experiment before he obtains very satisfactory results; but this has not been done in the instance referred to, as the car which the firm are producing has been designed by a man who—from a motor designer's point of view—sowed his wild oats long ago, and, having done this, very soon after turned out one of the most reliable cars I have ever owned.

x x x x

Circumstances alter cases, and, speaking generally, I am quite in agreement with those motorists who are frightened of the "outside" engineer when he turns to motor car construction, particularly when, as is so often the case, he speaks disparagingly of the motor man, and infers that the motor car would be a very different thing if the highly-trained engineer took it up. And so it would be—so different that it would probably be unusable by any man who knew what a car should be. It must not be imagined that I am speaking disparagingly of the engineer; but I must confess that my experience as a motorist has long since shown me that motor making, like any other branch of engineering, requires special knowledge and training, and without this a highly-skilled mechanical engineer is not so good a man from the motorist's point of view as a motor maker of average ability who has had experience in his work. I speak with some knowledge in this matter, as in my time I have been unwise enough to buy one or two cars which were the products of outside engineers who were going to set the motor world right. Unfortunately, they taught the motor world nothing, but they learned a great deal themselves, and I helped to pay for their schooling.

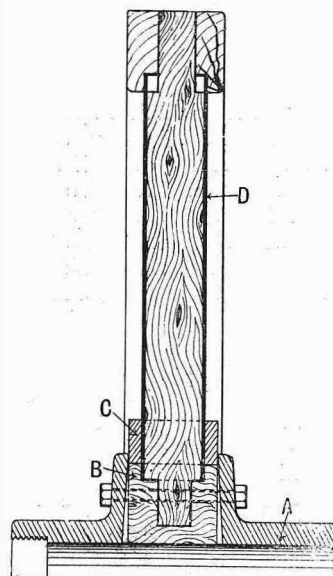
A CASE FOR APPEAL.

A case of considerable importance to motorists was tried at the Norwich Assizes before Mr. Justice Channell and a jury on January 27th. The facts were that Mons. H. Rollet, of 23, Handel Mansions, London, W.C., left his motor car by the roadside on an open country road while he and two friends who were with him went shooting in some adjoining fields. The car was drawn well on to the grass, which at that point was 6ft. 6in. wide, and was placed near the hedge and bank on its proper side of the road, the metal part of which was of ample width (16ft. 4in.) The engine was stopped and the brakes applied for safety. A baker, named Neave, of Burnham Sutton, drove past, and his horse took fright, presumably at the unattended motor car. The trap collided with the car, although it had to pass on to its wrong side of the road to do so. The baker was thrown out and sustained a broken leg. The facts were admitted, but the jury were apparently influenced by prejudice and innuendoes, quite immaterial to the issue, which were imported into the case in the accepted manner. Otherwise, their finding is inexplicable; they awarded the plaintiff £34 9s. 6d. damages. This, in the face of the fact that all through the hearing the judge, whenever he had occasion to speak, reminded them that there was no improper or unreasonable use of the highway by the defendant. Even if there had been, he added, that was not the cause of the accident. It did not arise from an obstruction of the highway, but from something making the highway dangerous. It was just like putting up on the hedge an advertisement relating to someone's pills, which

were to be seen about the country, and which were not altogether ornamental. He, however, had never heard it said that they frightened horses. The question for the jury was whether the defendant ought to have known and seen that the motor car would frighten the horse, and whether he was doing a dangerous thing in leaving it there. Then, at a later stage, the judge put the issue more pointedly: "The sole question was, Was the car left in so dangerous a position that it would be likely to frighten a horse?" In directing the jury, he told them in effect what answer to give: "He could not see how the fact that the defendant left the motor car unattended contributed to the accident. If, instead of the car having been stopped, it had been properly in motion, and on the right side of the road and an accident happened, no action at all could have been brought." Yet, in face of this, the jury found for the plaintiff, as above stated. It was apparently a case of showing sympathy with their neighbour in connection with a stranger whom they may have regarded as an intruding foreigner; they allowed their sympathies to override their judgment. The worst of it is that if such a verdict is allowed to remain unchallenged, it will henceforth be a dangerous thing to leave a motor car, whether attended or not, standing in any public place or by the roadside. The defendant in this action has carried the case to a point at which it concerns not merely himself, but the whole fraternity of motorists, on whom the duty rests of taking it to the Court of Appeal. Already, one motorist has subscribed £5 towards defraying the costs of an appeal.

AN IMPROVED MOTOR CAR WHEEL.

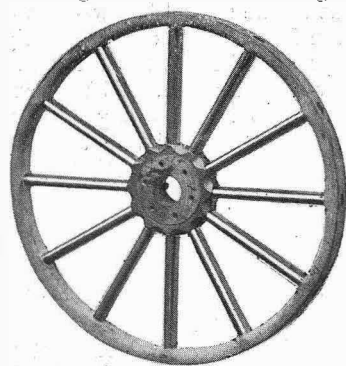
The increasing of the lateral stability of road wheels for all descriptions of vehicles has long been the aim of many inventors, and consequently new types or methods of construction are being from time to time brought before the notice of the public. The illustrations given herewith depict an improved method of constructing automobile road wheels. From the drawing showing the wheel in half section, it will be seen that the wheel proper is of wood, as usual, which is reinforced by, or rather encased in, a metal sheath as to the nave and spokes. The hub proper A consists of two metal flanges mounted upon a bearing sleeve of bronze, having between them the wooden nave B. Into this nave are



Half section of the Harvey wheel
A, steel hub
B, wood nave
C, metal casting
D, weldless metal tube round spoke

recessed the reduced ends of the spokes, through which and the flange bolts are passed, as shown in the drawing. The steel casing C of the spokes is also let into the nave for a certain distance, so that the greatest strength possible can be obtained at the junction of the spoke with the nave. In order to give still greater strength to the spokes, a metal casing is placed around the nave, with its inner periphery slightly below the edges of the hub flanges. At their outer ends the spokes, together with their metal casings, are recessed into the felloes of the wheel. This construction, in conjunction with an oval section spoke, gives an exceedingly strong wheel, particularly laterally, so that the risk of collapse in turning sharply or when travelling round bends at speed is very much reduced. The wheel is being made by Messrs. Ireland and Johnstone, of All Saints' Road, Wolverhampton, who hold the sole rights for its manufacture. The illustration above depicts a rough model wheel.

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The Harvey wheel in its completed form bends at speed is very much reduced. The wheel is being made by Messrs. Ireland and Johnstone, of All Saints' Road, Wolverhampton, who hold the sole rights for its manufacture. The illustration above depicts a rough model wheel.

CORRESPONDENCE.

EDITORIAL NOTICES.

No letters from members of the motor industry will be published when they deal with subjects which may be regarded as advertisements for the writers' or their business interests. At the same time as many of the most practical suggestions come from those engaged in the motor industry their letters will be inserted when possible, though the names of the firms they represent may be expunged, and the initials of the writers substituted.

Letters of a personal nature will be withheld.

The Editor, although accepting no responsibility for the opinions expressed by correspondents, reserves the right to publish a portion of a letter, and to omit any part which he does not consider interesting or essential.

All communications under a *nom de plume* should be accompanied by the name and address of the writer, not necessarily for publication, but to assure the Editor as to good faith.

Enquirers who ask for the experiences of private owners with specified cars, parts, or accessories, are requested to enclose a stamped addressed envelope, so that replies which space will not permit us to publish may be forwarded to them. Circulars or letters from interested parties will not be forwarded.

CHAUFFEURS.

[3494].—Let me say, in reply to "A Bas les Chauffeurs," there are two kinds of chauffeurs—one is the genuine, thoroughly trained mechanic, the other is of the ex-valet-gardener or coachman type. This latter is, I think, the kind of chauffeur your correspondent appears to have engaged. If he had engaged a thoroughly trained mechanic he would not have had the trouble he has had. Experience teaches me that the ex-valet type is too big for his boots, and when seeing him out with his employer one wonders who really owns the car. No one would be more pleased than myself to see this class of men eliminated from the motor industry altogether—they are a great drawback to men who have talent. These "shuvvers" as your correspondent calls them, will work at from 20s. to 30s. per week, whereas a real chauffeur requires £2 to £2 10s. per week. Perhaps this is the reason for so many owners engaging the "shuvver" class. I might mention I am a motor engineer and have tried for some time to get a respectable situation in private service, but have as yet failed to do so, and yet coachmen who have had a week's tuition (paid for) get a post right off. A WON.

[3495].—I should have been more amused than impressed by the letter of the person signing himself "A Bas les Chauffeurs" if it was not for the fact that the effusion in question is calculated to give purchasers of cars mistaken ideas concerning a class of employees who are not all lazy and idiotic. To carry the argument (with regard to razor stropping) to its logical conclusion, the average barber is qualified to become a motor expert by paying £2 for tuition. I will acknowledge that a number of so-called chauffeurs are complete failures, but did your correspondent take the trouble to ascertain the qualifications of the three idiots whom he engaged as professional men? Possibly they may have been grooms who could not strop razors. Judging from my own experience, the wages mentioned do not seem sufficient to cause a rush of practical and competent men to apply for such a situation. If your correspondent really means that he would not hesitate to place the servant he mentions in charge of a modern high-powered car, in my opinion he would himself be deserving of the opprobrious term which he applies to a class containing a majority of trustworthy and competent men. If some of the many gentlemen who are satisfied with the servants who have had charge of their cars would join in this correspondence, it would help to remove the unfair impressions which are produced by such ill-considered letters as that of "A Bas les Chauffeurs."

A PROFESSIONAL CHAUFFEUR.

[3496].—I notice a letter (No. 3486) in your last issue, and which (as a chauffeur myself) I consider a libel on the profession generally. Of course, there are many so-called chauffeurs who have never seen the inside of a well-conducted garage or works, and if 3486 has experienced one of the above variety it is most unfortunate. I hardly think, however, it warrants such a letter in a public paper, and many gentlemen employing chauffeurs who give them the utmost satisfaction will not agree with his views. The genuine chauffeur, that is, one who has served his apprenticeship in a firm or garage, and has gone through all the stages of cleaning, washing, and repairing, takes as much interest in the car as does his master. Speaking on my own behalf, may I say that I worship my coachwork. No. 3486 probably overlooks the fact that by

teaching his "razor-stropper" to drive, etc., he is only converting him into a full-blown "shuvver." If gentlemen would only make more enquiries when engaging a chauffeur they would prevent giving themselves many a disappointment.

The good genuine chauffeur is gradually being ousted from his position by inferior brethren, and is going back to the firms and garages.

PAR LES CHAUFFEURS.

[3497].—I am very much in sympathy with "A Bas les Chauffeurs." He seems to have had very bad luck with those "shuvvers" whom he says he has had in his service. Everybody knows how the motor industry has come to the front in this country during the last few years; in like manner have these "shuvvers" increased; but I doubt if twenty-five per cent. of them had any knowledge of engineering before they learnt to drive a car. In a few cases the employer has sent his man, probably his groom or coachman, into the works to see the car that he was buying constructed. My opinion is the best man is the one who has served a few years in an engineering shop, even though he never has had any experience with a car, for when he has learnt to drive he is ready for any incident that may happen on the road. "A Bas les Chauffeurs'" opinion seems to be that if a man can strop a razor he is qualified to repair a motor. I am afraid he makes a great mistake. Now, if "A Bas les Chauffeurs" has so much confidence in these "coachman shuvvers," who learn the engineering business in less than three months' time, let him set that man to overhaul his car, true up bearings, and so forth, and see what kind of a mess he would make of it. I am inclined to think that would be the time when the local repairer has a look in. If owners would only investigate the previous career of the men they are about to engage and see whether they have had any mechanical experience, they would not hear of such things as bills from the local repairer, except for renewals or spare parts.

A MECHANICAL ENGINEER.

[3498].—Referring to a letter in your last issue, No. 3486, and which is signed "A Bas les Chauffeurs," I might say if he got such a good coachman who can strop a razor he will soon sharpen up his gears for him, especially being taught for £2 in the first instance. The engineer who taught him must have been a first-class motor engineer to have spent all his valuable time in teaching a man, who has been used to horses for a long period, for £2. It must have taken that engineer at least three days to go into every detail of a motor car (not a wheelbarrow). Of course, we all know what teaching a navy or a coachman to drive a motor car is. Show him the wheel and the levers, and the way to clean a plug—that is quite enough; and every time he moves a lever he doesn't know what the real mechanical part of it is. I dare say if he asked his razor-stropper what his gudgeon pin was, he would point to the exhaust box. We can quite understand now why there are so many so-called drivers going about the country, after being taught for £2. His point of view seems to be the wages are not quite so much for a razor-stropper, and he wants a man whom he can tell something, not for the man to be telling him when he is driving a car wrong. Most gentlemen nowadays want to be teaching a first-class mechanic his trade; they don't like to be told themselves. I think "A Bas les Chauffeurs" would have done better if he had kept his lazy idiot (as he calls him). I know that is what they think we are, after teaching them the ins and outs of a car. Give him notice; he is a lazy idiot (no other excuse).

ONE OF THE LAZY IDIOTS.

P.S.—I should have thought that "A Bas les Chauffeurs" could have knocked down expenses £2 by teaching his razor-stropper, after being used to motor cars for over two years, as he says.

AUTOMATIC CARBURETTERS.

[3499].—In a recent issue of your paper a letter appears from a correspondent, Mr. Norman Wells, who compares the Krebs and Napier automatic carburetters, and he sug-

gests that no work is required to open the Krebs air inlet. Surely he must be mistaken. A certain amount of suction must first take place before the extra air inlet can be opened by atmospheric pressure, as he rightly puts it. But the fact of there having to be slight suction to give atmospheric pressure outside the valves, the chance of opening it reduces the compression correspondingly as the reduction of volume and compression reduces the power of the motor.

In regard to his suggestion that the water used to open the Napier valve absorbs pressure, this is incorrect, as we use the normal pressure that already exists in the cylinder head to open the extra air inlet. If it does absorb any power it absorbs not more than that actually absorbed with the ordinary pressure gauge to show whether the pump is working, which must be, of course, taken as infinitesimal.

C. T. RIDDALLS.

[3500].—So much has been written *re* the merits of the Napier hydraulic and other automatic carburettors that I wonder no one has commented on what seems to be a fatal drawback to a carburetter relying for its efficiency on such an outside source as the rate of flow of the cooling water.

Even if the flow of water remains constant or rather only varies with the engine speed, the mixture of petrol vapour and air can also only vary with that speed.

Taking, for example, the two cases of an engine driving its load on a level road, and driving the same load on the same gear at the same speed up an incline, it will be obvious that in the latter case more gas will be needed than in the former, but the amount of air admitted to the carburetter will be the same, with an hydraulic control, in both cases, because the engine happens to be running at the same speed. Therefore the mixture cannot be correct in both cases.

As the mixture of petrol vapour and air should only vary in proportion to the quantity used, I fail to see how any device which relies for its working on anything but the suction of the engine can control the mixture satisfactorily.

Y 72.

[3501].—Your correspondent W. Blamires (letter 3485) appears puzzled, and it is small wonder that he is. The varying explanations of the principles of carburation which appear from time to time in the motor press would almost lead one to suppose that the writers did not themselves understand these principles, or that if they did they were willing to offer anything rather than a lucid explanation. I know very little myself, but as far as I do know I will try to be clear.

As a first principle, there is a quality of mixture necessary to be obtained to produce the best explosion irrespective of quantity. Deviations in the proportion of petrol to air bring about loss of power, waste of fuel, and sooting, the latter being specially the case with paraffin. To say that a stronger mixture is needed at starting and kindred statements to this are pure nonsense and very misleading.

In a plain float-feed spray apparatus it is possible to so adjust the size of the petrol jet and the air inlet as to give the correct quantity and quality of mixture for any particular speed of the engine. For obvious reasons this adjustment is made for the lowest speed of the engine.

Now, when the engine is made to increase its speed it draws in more air; and, as a consequence of the increased vacuum more petrol is drawn in too; but for some reason, which no doubt some of your learned correspondents will be anxious to explain, the increase in the quantity of petrol issuing from the jet exceeds the increase in the quantity of air. In other words, air is (in carburettors) relatively more sluggish than petrol, which is a peculiar and unfortunate fact. So to obviate this additional air is admitted so as not to pass the petrol jet, to balance the excessive increase in petrol, and at the same time to reduce to a small extent the degree of suction past the jet, thus preventing the greater increase in petrol supply than is needed to form the required constant quality of mixture. The additional air is controlled either by hand or by an automatic valve, the name of which latter contrivance is rapidly becoming legion.

Mr. J. B. Dunlop has, I hear, invented a contrivance placed in the jet itself to obviate the excessive increase of flow of petrol, and besides this I could not help smiling on reading, I forget where, that the makers of the Sthenos

carburetter found that the screw inside their jet had a retarding effect on the petrol, which tended otherwise to flow too quickly at high engine speeds. Surely they have made the screwed portion of the adjusting spindle longer than in the original designs? Again, is the fact that the Longuemare needs so little attention due to the somewhat tortuous passage that the petrol has to pass through on its way from the float chamber to the upper orifice of the spray jets?

Monsieur Walcker appears to have hit on a new idea (if such exist), which is to design a carburetter with a small air inlet and a small petrol jet for a low speed of the engine, and then with increased speed to bodily enlarge it in size (for this is what in effect happens), but the enlargement has to be effected with as little resistance as possible, so as not to upset the balance of the apparatus, hence his long weak spring. The Bollée cars, too, employ a multiple carburetter which serves the same purpose.

Amongst all these comparatively complicated automatic devices it seems odd that the old Daimler type of carburetter, which cannot be adjusted except by diving under the bonnet, starts always with the air regulator wide open, and appears to work well irrespective of the speed of the engine, is still in existence on various cars, and presumably giving satisfaction. Of its economy I cannot speak, not knowing, though I believe it does not give at all bad results.

When a really perfect and automatic carburetter is produced it has only to be placed very close to the engine and to be kept warm enough, and paraffin can be used satisfactorily as a fuel.

While on this subject it seems a pity that the float-feed chamber is not more generally "improved away"; also that the old Daimler plan of drawing all the air that goes to the carburetter from a box of a certain size is not more generally retained. The amount of mixture blown out into the air, if there is nothing to catch it, that it may be used next stroke instead of being wasted, is more than many people appear to think; this quite apart from defective closing of inlet valves.

I regret that I have found it necessary to introduce names. They are not with any view to advertisement.

G. F. SQUIRE.

TO INCREASE POWER.

[3502.] I should like the experience of some of your readers who have tried to increase the power of the old nattern Daimler engine. My car is a 7 h.p. double-cylinder M.M.C., and I would like, if possible, by means of compression plates or otherwise, to increase the power of the engine. Would automobilists kindly give their experience, and if they have put on compression plates, state thickness and method of attachment, and if any reliable data as to increase were gained.

D. ADAMSON PARKYN.

UNLIGHTED VEHICLES.

[3503].—Whilst driving between Uxbridge and Hillingdon some days ago at about eight o'clock at night I came suddenly up to the back of a timber cart, which was carrying no light either behind or in front. A bulk of timber about seven feet long was projecting behind, and had I not had good lamps and good brakes I should most probably have impaled the front of my car.

I drove on towards the next police station for a constable, but meeting one on the road requested him to go back and take the man's name and address, which he did, with the result that he was fined last Monday at the Uxbridge Police Court.

I think, having regard to the restrictions placed upon motorists in the shape of lights and numbers, it is the duty of every car owner to protect himself and his fellows by insisting, so far as is possible, that other road users shall carry out their obligations. It is a very serious thing that a man driving a car, as in this case, worth about £600, should have to run the risk of smashing it up (and possibly himself incidentally) because drivers of slow vehicles insist on crawling along in the middle or on the wrong side of the road without a light.

I shall in future give in charge every driver of any horse vehicle I come across on a dark night without a light, as I am quite sure that a motor car would only get a very short distance under similar circumstances before it was pulled up.

I should like here to record the kindly attitude which the police in the Uxbridge division have always evinced towards motorists, and also the fact that in an adjoining division the magistrates have issued the pronouncement that, having regard to the restrictions contained in the new Act, they will inflict severe penalties on drivers of horse vehicles who infringe the laws of the road.

W. T. LORD.

TYRES.

[3504.]—I have been following with interest the correspondence as to solids v. pneumatics. It may be true that solid tyres are essential on purely business motor cars, but I do not think that there can be any two opinions as to the use of pneumatics for pleasure. It is true that when the covers are just on worn out one has a very bad time with them, and I have spent as much as six hours in one day repairing bursts and tying them up with gaiters and so on.

These troubles, however, need only be few and far between if the tyres are kept in order and renewed with sufficient frequency. On my 12 h.p. Napier I ran the first 2,700 miles without a puncture or touching my tyres in any way. Last week I changed a driving tyre which burst three times on the road home and was utterly worn out. This had been on since August 19th last, and had run about 3,000 miles through all this winter weather and over the newly stoned roads without ever being touched. Trouble so occasional as this is surely well compensated for by the increased comfort and safety of pneumatics.

On the other hand the expense is terrible, and I reckon that my car has cost me between twopence and threepence a mile for tyres alone.

RUSSELL.

[3505.]—I think my experience with pneumatic tyres may be useful to your correspondents. Mine is a heavy car, and as I drive a good deal without a chauffeur, I have a wholesome dread of puncture. I therefore wrote to Messrs. Canon, Heaton, and Co., for their advice, and they strongly recommended me to allow them to put on their best quality bands, making up the tread to one inch thick.

I have had this done, and the result has been most satisfactory in every way, and I find that their rubber does not cut up nearly so much as that of my other tyres.

Possibly the thick tread may lessen the speed, but I have not noticed it; but I certainly have noticed that I am not so liable to side-slip as I was.

Solids would be out of the question for a car like mine, and I can confidently recommend those motorists who have powerful cars and who dread punctures as much as I do to have their treads thickened by some first rate rubber firm.

H.W.M.

JUSTICE?

[3506.]—On January 17th I purchased a new regulation tail lamp, for which I paid £1. The lamp was trimmed and lighted by the manager of the garage. I started for home, and the lamp was observed by the manager to be giving a good light. After going about two miles I was stopped by a policeman, who told me I had no light behind. I got down and looked: the lamp was out. Result, I was fined 10s. and costs, 19s. 6d. in all, though I took every precaution to comply with the law and proved the lamp was alight fifteen minutes previously; also I had no knowledge whatever the lamp was out, as I could not see it. Is this justice?

DISGUSTED

AN UNPLEASANT EXPERIENCE.

[3507.]—Motorists are often credited with being selfish. At one time I thought it a pity that they should be styled so without a reason being given. However, after a little experience of my own, I am not at all surprised at them being called selfish, nor can I blame them. My small matter is as follows: About November last, while driving up Knightsbridge, a powerful motor car drove past me at a good rate of speed for so crowded a part, with the result that to avoid a passenger the car was turned into a cab, and the lamps on the car were broken. I made it a duty to see the owner of the car, and lent him one of my lamps to get home with, as anyone else would have done. Now, sir, comes the sequel. After waiting for the return of my lamp for about three

weeks, I wrote the owner three letters, sent one wire, with no reply to either. Finding out the garage where the motor was stabled, I wrote them, with the result that I had my lamp returned this January with the front door smashed, blacked with soot, and sixpence to pay for carriage of lamp to my works. I have had to pay 3s. for repair of lamp.

Can anyone blame me in future, if I see anyone in trouble with his motor, etc., if I pass by on the other side?

I hope for the sake of us all that the above experience is, like Crusoe, alone on the island. W. T. BASHFORD.

PRACTICAL EXPERIENCES.

[3508.]—I had hoped that someone with greater experience than mine would have replied to Norman (letter 3369), but as no one has done so I may say I bought a 10 h.p. Duryea Surrey (second hand) eight months ago. I gave £240 for it, and the makers charged me £18 for a general overhaul, telling me incidentally it had been very badly used by its last owner. However, after their attention it has given me very little trouble indeed; no more, in fact, than I should expect to get with any decent car. Like every other car, it wants regular attention, and that I have given it. I find I can average about twenty miles on a gallon of Pratt's B petrol. I have had no trouble with lubrication, and I consider the transmission perfect, though I have broken my chain once. It was much worn when I bought it.

The only weak point is the cooling system, and that is all right if you know how to use it. You have to be very careful not to race the engine, or it will overheat, but if you are content to jog along at a steady pace without a lot of fast work you get no trouble. At least such has been my experience. I am very pleased with my car, and consider its principles to be far more correct than the usual type, and have already decided to order one of the new ones, which, although having the extra complication of a pump and radiators, is, I should say, all the better for it, and as the latter are practically out of sight they are not objectionable.

Once it is got into, the Duryea is a very delightful car to drive.

I may say that I am entirely uninterested financially in the manufacture of the car.

A. ANDERSON.

BENZOL AS A MOTOR FUEL.

[3509.]—In your issue of January 16th there is an article on "Benzole as a Motor Fuel," raising a most interesting question, which, however, is much too complicated to discuss in detail in a letter.

The writer of the article in question can hardly, I think, be practically acquainted with either petroleum motor spirit or benzole. It is stated in the article that a motor spirit of .700 specific gravity boils between 130° and 350° F. This is very far from being accurate—at any rate so far as the Carburine motor spirit is concerned, which has a total evaporating point guaranteed below 250° F.

It is also interesting to note that the boiling point of ninety per cent. benzole is about 176° F., that is, 40° higher than the boiling point of a first-rate petroleum motor spirit.

It is certainly not my wish to discourage the use of benzole as a motor spirit, but it is useless to disregard the obvious difficulties that lie in the way, the chief of which are: (a) The high initial boiling point of benzole. (b) The quantity of carbon and sulphur contained in benzole.

It is exceedingly doubtful whether the producers would realise as good a price for their benzole if sold for motor spirit as they do at present for other purposes.

PHILIP TENNANT.

RECKLESS DRIVING: A PROTEST.

[3510.]—I trust that you will find space for a protest against the disgraceful manner in which some motorists drive along the Kew Road, Richmond. This road runs from Kew Bridge to Richmond, and is one of the favoured routes from London into Surrey. In many parts it is under thirty feet wide, and has fourteen side roads running into it in about a mile, with the addition of a tramline usually in a more or less greasy state. The majority of motorists drive along it with reasonable care, but there are many who drive at a speed that is disgraceful, thirty, thirty-five, and forty miles per hour being not uncommon.

On Saturday, January 30th, about one o'clock a green Mercedes was driven along this road at fully the latter speed, dashing from side to side to get round a 'bus, and then a tramcar, and throwing sheets of mud and slush on to the foot passengers. At this high speed it cleared the tram by a few inches. Had there been the slightest swerve a bad accident would have resulted. As it was it thoroughly scared the driver of the tramcar; also many of the passengers.

Although in Surrey the police in this district are perfectly fair to motorists, I have not heard of a single prosecution for furious driving along this road, even with the ample provocation given. I know for a fact that a number of the residents intend to petition the police to stop the abuse if it is continued during the coming season, and then we shall have the usual police trap, and most likely the innocent law-abiding motorists will suffer for the reckless cad.

Trusting this warning will have a beneficial effect.

A RICHMOND MOTORIST.

EXPERIENCE WANTED.

[3511.]—Perhaps some of your correspondents would give their experience of Dunhill's new headlight—whether it gives the light the makers say, and if you can shut it off without waste and light it up again.

I should also be glad to know if anybody has used Palmer tyres (the new ones), and with what result, and if they wear better and are freer from punctures than others.

BT 2

CRITICISMS OF FRENCH CARS.

[3512.]—I am much interested in the letter signed by "Mem. Inst. C. Engrs." criticising what he saw at the Paris Salon, but there is a far more scathing criticism which is applicable to nine-tenths of both French and English cars in another letter in your same issue. I refer to the letter "G.A.C.E." who to make his driving wheels bite the road carried "two heavy pigs of ballast in the tonneau, but it was never comfortable." From the horsepower of the car it is evidently not an antiquated one, and if further evidence were required, the three chassis illustrated in other parts of your paper give it. In none of those chassis would the weight on the driving wheels be equal to that on the front wheels, though, perhaps, it might do so if a driver and heavy tonneau were placed on the chassis, but I rather fancy not. What the exact proportion of weight on the front and driving wheels of a car should be is a point that experiments in time may show, but that that proportion ought to be as nearly constant when the car is empty and full is common sense if the car is to run equally well in both cases.

My sweeping criticism on the engine in front is somewhat borne out by the non-skidding advertisements that are to be found in your paper, showing that the fault of the design is not visited on the head of the designer but on the tyre maker who has failed to keep stable an ill-balanced car without the aid of spikes, etc. If some owners of cars would next time they pass a weighbridge have the front and driving wheels of their cars weighed separately and would send you the results for publication they would be extremely interesting reading, and would throw a great deal of light on side-slip.

D.E.A.

INCOMPETENT EXPERTS

[3513.]—I noticed a letter in your paper on this subject on January 16th. Before I moved to town I undertook practically all my own repairs; now I have neither the time nor the appliances for any but small repairs. Consequently, when any repair is necessary I simply don't know where to go to, for after a recent experience I am shy of these so-called experts. I took the car to a large firm in town; my car was driven on the road (this was quite unnecessary). The work was so badly done, or rather things were made worse, that I had the next day to do it all over again myself; brasses, instead of being fitted, were scraped up with a half-round file from the look of them; flings left on the bearings, and so on. A suit of overalls, a leather cap, and an offensive manner seem to be the only things necessary to constitute an expert. I am inclined to think that the anthropoid "Consul" could give some of these persons points.

R.

NAMES FOR CARS.

[3514.]—The suggestion of your correspondent, J. H. A. Macdonald, anent the naming of automobiles is, at any rate, striking. But why does he stop at autocars? May I, following out his idea, suggest that every private carriage, whether self-propelled or not, should bear a fancy name inscribed on a neat plate in L.G.B. regulation lettering, and that every pedestrian when in the public streets should carry, hung round his neck, a similar plate with his nickname, or other mark of recognition, indited thereon. This would serve as a useful means of identification should he be so thoughtless as to let himself get entangled in the bottom-hammer of your correspondent's "Sweet Seventeen (h.p.)," or whatever name he allocates to his car.

RIDENS.

TO BELT USERS.

[3515.]—It will be a blessing to all owners of belt-driven cars to know of a belt that will not stretch or slip under any condition of roads or hills. This, I think, can be found in the new one brought out by Messrs. R. and J. Dick. It is of canvas, with leather face on one side, firmly cemented, the leather being thinner than the canvas. I have had one in use for more than a fortnight, and have never had to touch it, though the conditions have been most trying. There is no level road here (Isle of Wight), and in this weather the roads are very soft and sudden, with long stretches of unrolled gravel. I have never had my leather belt that would stand for more than a day without attention, and I had to be constantly taking belts off and shortening them. For some months I have used two, one over the other, as explained recently in *The Autocar*. This was very effective, but rather clumsy.

The advantages of this mode of transmission are great if the belt be effective, as there is much less loss of power, less shock to the engine, and, by shifting gradually between loose and driving pulley, a wide range of speed can be attained without changing gear. It is especially useful in traffic and when turning corners.

The other type of Dick belt, made of canvas with gutta-percha face on one side, stretches very little, but its grip is rather too severe at times, and it is apt to pull out at the fastenings.

I may add that I am a believer in solid tyres, and find the only fault in them is that they slow the car a good deal in soft gravel roads. There is no vibration whatever in my car up to twenty miles per hour.

CHAS. PERCY DEAN

RECHARGING ACCUMULATORS.

[3516.]—I was surprised to read your recommendation relative to having accumulators charged in the usual way through local agents in preference to employing primary batteries. I have used Boron cells, bought through an advertisement in your—to me—invaluable paper, with marked success, and with better results than I ever had when charged locally. To say nothing of the convenience, I have found the result better.

Agents are often careless, and my accumulators have been returned uncharged or not sufficiently charged, with consequent trouble on the road.

My local agent returned me a burst tyre as unmendable. A firm advertising in your paper did it up admirably at a very moderate price.

O. W. GORDON.

SUMMARY OF OTHER CORRESPONDENCE.

FLINTS ON THE ROADS. A. P. sends a box of flints which were extracted from the back tyres of his car after driving through St. James's Park from Buckingham Palace gate to Pall Mall. These point to a state of affairs which the authorities should not countenance, as the laying down of such material is to the detriment of all road users alike, though undoubtedly the motorist suffers the most. This is a case which the Motor Union could take up with advantage to the public at large.

[Owing to pressure on our space a number of letters are unavoidably withheld.—Ed.]

Flashes.

We have been requested by Messrs. Vatcha Bros., of Girgaum Road, Bombay, to ask British motor manufacturers to forward them their latest catalogues and price lists.

* * *

Mr. R. G. Knowles's recently-published book of reflections and stories contains the following quaint caution: "When a motor race is in progress, do not cross the track. You may hurt the feelings of a chauffeur, and die before you have time to apologise."

* * *

At Fribourg a motor car is reported to have skidded into a milk waggon and upset three hundred gallons of milk. It is also reported that the cats of the town gathered in large numbers to enjoy an unrestricted meal.

* * *

Mr. C. R. Garrard, who drove from London to Birmingham a few days since in a dense fog, discovered a new use for tramlines. When he reached the Midland capital the fog was so dense that he had the greatest difficulty to avoid the kerb, though running dead slow. He found, however, by putting one of the lamps low down, he was just able to keep the right course by following the tramline.

* * *

Two unfortunate wayfarers who had been staying at a workhouse in Kent absconded the other day without doing their allotted task, and were pursued by police in a horse vehicle. The honour—if such it can be called—of their capture, however, belongs to Mr. Whitehead, who, driving past in his Abingdon car, proffered his services, took a police officer on board, and tracked down the runaways after pursuing them through several villages.

* * *

Summoned at Highgate for driving a motor car without a number, Mr. Lewis Stroud explained that he was not a passive resister. He was stopped on the road at various places, and his explanation that he had applied for but had not received a number "satisfied everyone but this policeman." It also satisfied the magistrates.

* * *

By the way, "The Autocar Log Book," published by Messrs. Charles Letts and Co., the diary specialists, in conjunction with the proprietors of *The Autocar*, contains a pocket in the cover which is very useful for carrying one's driving license. It is a very good plan to keep a diary of drives—nothing elaborate, but just enough for one to be able to identify dates and places, as it is impossible to trust to memory always, and if a mistake were made by some constable in taking the number of a car, the diary would probably be very useful to the automobilist who was wrongly accused.

Mr. F. A. La Roche, an American automobilist, is stated to be having a racer of 180 h.p. constructed in the Darracq factory at Puteaux from designs prepared by himself.

* * *

Two new species of tropical plants are reported to be notable yielders of rubber. In one case, the rubber is said to be of "unsurpassed quality"; in the other the producer rejoices in the name of "guttajoolatong," which sounds somewhat puncturesome.

* * *

Messrs. J. Alarston, Ltd., the makers of the Sunbeam car, will show something quite distinct from their usual pattern at the forthcoming Crystal Palace Show. This will take the form of an 18 h.p. six-cylinder car, fitted with two speeds only and reverse. The frame will be of pressed steel, and under-frame of similar material carrying the engine and gear box.

* * *

With reference to our notice on the Forman engine in the last issue of *The Autocar*, the normal speed should have been given as 1,250 revolutions per minute, the makers guaranteeing it to develop 12 h.p. at this speed.

* * *

Several correspondents have written with regard to the ascent of the Great Orme's Head, Llandudno, referred to last week, expressing the opinion that this is nothing of a feat. It is evident from their letters, however, that they refer to the drive round the Great Orme's Head. This drive is well engineered, and there is certainly nothing which can be called severe from a

climbing point of view, but the incline referred to is the very steep direct road on to the summit, which lies considerably to the east of the Happy Valley gate on the drive round the Great Orme, and we should advise no motorists to attempt it unless they are very sure indeed of the holding powers of the brakes backward.

* * *

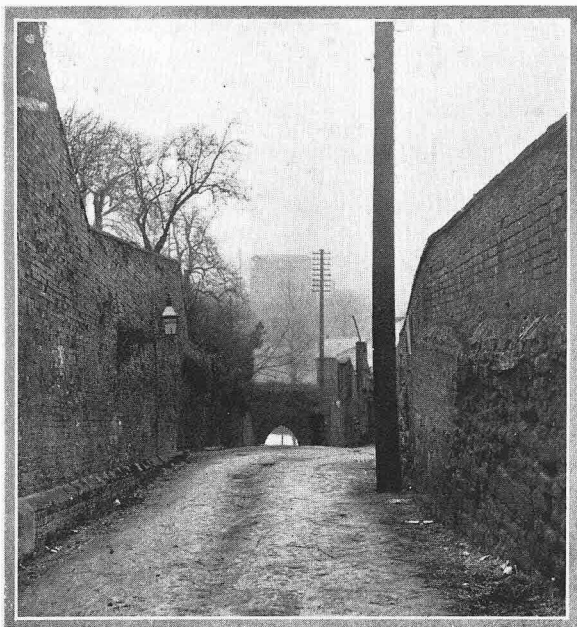
It will probably be interesting to many to know that they can obtain brass footplates to screw on the edge of the body at each side of front foot-board, also brass beading suitable for going round dashboards or other part of the body, from Messrs. W. Galloway and Co., Sunderland Road, Gateshead.

* * *

One of the most amusing instances in connection with side-slip of which we have heard was mentioned by a reader who is the happy possessor of a very antique, short-based car, with a marvellous propensity for pirouetting on grease. One day, when the old machine had surpassed itself by turning three complete circles on a greasy tramline, bringing up in unpleasant proximity to an electric tram, the driver of the car proudly remarked to the tram driver, "You can't do that."

"THE AUTOCAR" DIARY.

- Feb. 6.—Entries close for A.C.G.B. and I. Quarterly Trials.
- " 6.—Midland A.C. Annual Dinner.
- " 9.—Burnley and District A.C. Annual Meeting.
- " 10.—Royal United Service Institution. Lecture, "Motor Traction in War," by Major N. H. Balfour.
- " 11.—Glasgow University Engineering Society. Lecture, "Recent Developments in Internal Combustion Engines," by Mr. L. Rottenburg.
- " 11.—A.C.G.B. and I. Paper, "The British Automobile Industry," by Mr. T. C. Aveling.
- " 12.—A.C.G.B. and I. Quarterly Trials.
- " 12 to 24.—Crystal Palace Motor Car Show.
- " 15.—Conference: A.C.G.B. and I. and Provincial Clubs.
- " 20 to Mar. 6.—Turin Motoring and Sports Show.
- " 23-27.—Hull Motor Car and Cycle Show.
- " 25.—Glasgow Univ. Eng. Soc. Lecture, "Motor Vehicles for Goods Transport," by J. E. Thornycroft.
- " 25.—Yorks A.C. Discussion on Motor Cars.
- " 27.—Midland A.C. Paper, "Wire Wheels Tyred," by F. W. Lancaster.
- " 29.—Entries close for A.C.G.B. and I. Side-slip Trials.
- " 29.—Scottish A.C. (W. Section). Discussion, "The Cost, Upkeep, and Care of an Autocar."
- Mar. 12.—Midland A.C. General Meeting and Dinner.
- " 19-26.—Motor Car Show, Agricultural Hall.
- June 17.—Gordon-Bennett Cup Race.



We have referred more than once to the extraordinary accident at Shrewsbury, when Mr. Tudor Owen's car ran away with him down the steep hill to the Traitor's Gate at Shrewsbury, and plunged into the Severn. This illustration gives some idea of the steepness of the descent, while the one below shows the sheer drop from the towing path into the river. It will be remembered that the car was practically none the worse for the accident, and was driven fifty miles after the removal of the damaged tonneau and straightening out of the steering pillar.

Westrumite has been used with great success in the big warehouses in Albany Street of Messrs. Friswell's, Ltd., as great difficulty was found in keeping the cars free from dust which rose from the concrete floors.

* * *

In the last issue of the *Lancet* Dr. C. T. W. Hirsch, in commending the 8 h.p. two-cylinder Brown car to his professional brethren, mentions incidentally that it climbed a winding hill of one in four near Woolwich.

* * *

Mr. Richard Sutton Clifford, jun., was summoned at Loughborough on Wednesday last week for driving a motor car at a speed dangerous to the public, having regard to all the circumstances of the case, including the nature, etc., of the highway, or the amount of traffic which might reasonably be expected to be upon the highway. The case was defended by Mr. Clifford, sen., at considerable length. The summons alleged four convictions, whereas in Section 10 of the Summary Jurisdiction Act of 1848 only one conviction could be charged at one information. From the police evidence it appeared that the car was proceeding at a speed of from twelve to fifteen miles an hour, and that it skidded sideways into the gutter. The defence was that the car was an old 3½ h.p. vehicle, that the clutches were worn, thereby causing a great deal of noise, and the defendant was a careful and experienced driver. As this was the first case under the new Act, the magistrates concluded to inflict a fine of twenty shillings only, and costs. But the defendant's solicitor intimated that an appeal would be lodged.

The South-Eastern and Chatham Railway Co. have agreed to run special fast trains between Victoria Station and the Crystal Palace every week day during the continuance of the exhibition as follows: Down, 12.30 p.m. and 4.25 p.m.; up, 3.40 p.m. and 6.10 p.m. These trains, which are in addition to the ordinary service, will perform the journey in well under half an hour.

* * *

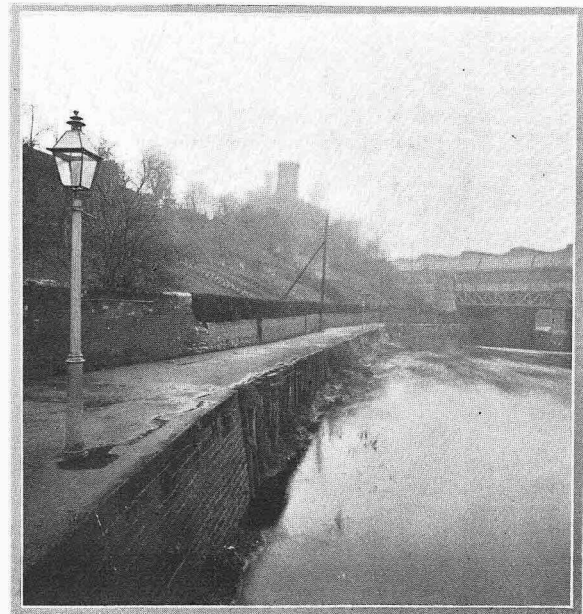
A new speed indicator is being brought out by Messrs. Smith and Sons, Ltd., of 9, Strand, W.C., who are already well known in the motor world through their dashboard and other styles of particularly reliable and robust timekeepers. The new indicator is claimed to be unaffected by dirt or dust, and we hope to see the early specimens at the show next week.

* * *

Mr. William Lea, of Liverpool, informs us that he sold nineteen Darracq cars during last month, and most of them to people who had previously owned Darracqs. This is certainly a good record, not only on account of the fact that January—and particularly last January is not a month to encourage the contemplation of new cars, but it is always satisfactory to hear of the owner of a particular make deciding again to have a car of the same sort when buying a new one.

* * *

It will be interesting to many to know that Panhard and Levassor have recently established a school of motoring at their London works in Edgware Road, Willesden Lane, N.W. Expert and competent teachers are retained not only to give lessons in practical driving and handling of a car, but also to impart technical instruction from direct inspection of the parts and their functions in the works. Classes are formed each month, and arrangements are made not only to teach owners or prospective owners, but separate classes are held for the instruction of those who wish to become professional drivers, or who are sent by their masters to acquire the necessary knowledge. We understand, too, that the terms are very reasonable.



Phoenix Motors, Ltd., Blundell Street, Caledonian Road, King's Cross, N., inform us that they now have a department for the repair of motor cars, and facilities for charging electric cars.

* * *

We are informed that the Anchor Hotel, which is opposite the Town Hall at Horsham, is particularly recommended to automobilists, there being all accommodation required for those who drive motor cars.

* * *

Owing to delay in the receipt of materials for their new cars, we understand the Cremorne Motor Manufacturing Co. will be unable to show at the Crystal Palace, and having an offer of space at the Agricultural Hall their vehicles will be on exhibition there.

* * *

One evening last week, when the roads were exceedingly heavy, we enjoyed an eighteen-mile drive with Mr. Pinsent on one of the new 12 h.p. water-cooled Lanchesters. The car possesses all the features which have given the Lanchester its delightful running, but the more powerful engine has afforded a marked reserve of power. As an instance of this, we may mention that with two up and against a strong head-wind, and the roads in about as holding a condition as they could be, the car took Meriden Hill, on the main Holyhead road between Yardley and Allesley, on top speed. This hill, which is far too long to rush, afforded a very good test of the power of the car, and although the engine was necessarily slowed considerably by the work it had to overcome, it retained its power in a remarkable manner, and picked up speed the moment the grade began to ease.

* * *

A comparison. In an action for damages brought before Judge Bacon, a French motorist was asked if he had a license to drive. The Frenchman pulled out two—one a "mean-looking slip of paper something like a dog license" (English), the other a handsome three-folding document in the form of a pocket-case, one of the flaps of which held his photograph (French).

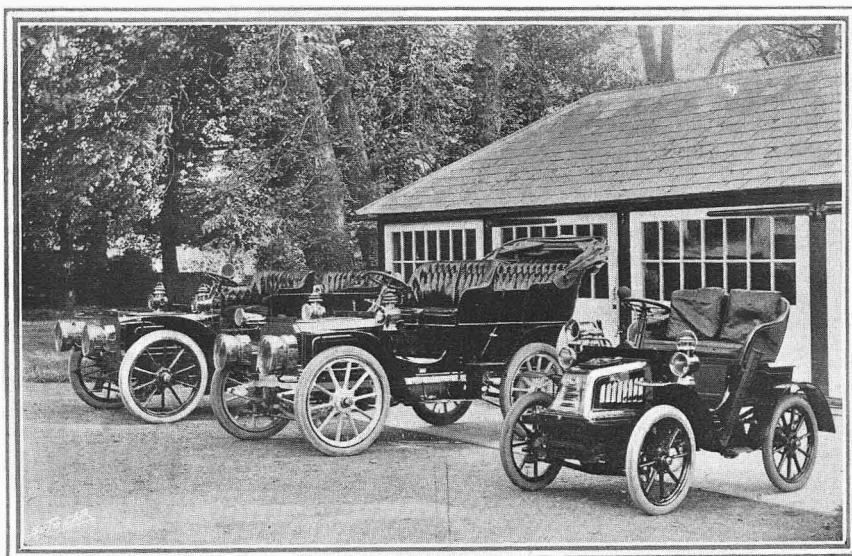
* * *

Colonel Templar, superintendent of the War Office Balloon Department, has patented a double wheel to prevent side-slip. To all intents and purposes the idea consists of two wheels at each end of an axle instead of one. The effect is, of course, precisely the same as though a single wheel were used with two tyres side by side some few inches apart. We believe the idea is much older than Colonel Templar imagines, and we should scarcely have thought it would have been worth while to patent it.

It appears from police returns that in the city of New York 366 lives per annum, or an average of one per day, are sacrificed on the public streets. Of this total street cars caused 172 deaths, waggons and trucks 146, sundry accidents (including runaway horses) 38, while 9 were attributed to automobiles.

* * *

As we frequently receive enquiries from constructors of motors as to where they can obtain piston rings made with accuracy and care, it will save their time and ours if we mention that the Standard Piston Ring and Engineering Co., Ltd., Wentworth Street, Sheffield, make a speciality of this work. The rings are made from a special quality of cast-iron, and in order to ensure equality of pressure against the cylinder all round they are turned in a special jig, which ensures that they shall be a perfect circle on their periphery when sprung into the cylinder.



A STUD OF PEUGEOTS. The cars illustrated above are the property of Mr. Alwyn Foster, of Coombe Park, Reading. The car in the background is a 12 h.p. tonneau, the centre one a 12 h.p. phaeton, and the near one a Baby Peugeot. The happy possessor of these cars has an automobiling experience extending over a period of about five years, during which time he has driven many kinds of cars. Messrs. Friswell, Ltd., are justly proud of the fact that the entire stud now consists of Peugeots.

Damage amounting to between £1,500 and £2,000 was done on Wednesday evening last week by a fire which occurred at Mr. E. C. Crisswell's motor garage and repairing shops at Newmarket.

* * *

Mr. W. K. Vanderbilt is reported to have covered a flying mile on the hard sandy beach at Ormond, Florida, on his Continental-tyred 90 h.p. Mercedes in thirty-nine seconds. This is a new machine which was exhibited in the Paris Salon, and if the timing and distance were accurate the speed works out approximately at ninety-two miles per hour.

* * *

The Autocar stand at the Crystal Palace Motor Show is No. 174, 175, 176, and 177, but the numbers will scarcely matter, as it cannot be missed. It will surround the statue of Lord Roberts, which stands in the centre of the Great Nave. The Autocar containing the guide to the show will be obtainable at this stand on the opening day—Friday next, February 12th—and, of course, a week later there will be the show report itself.

SOME QUERIES AND REPLIES.

We are always pleased to reply to queries, even if they be of an elementary and untechnical description, under this heading. Only a selection of those which are of general interest will be published, though all will be answered direct through the post, for which purpose a stamped and addressed envelope should be enclosed.

When advice concerning different makes of cars is sought, each vehicle should be given an identifying number.

Letters should be addressed The Editor, "The Autocar," Coventry.

AUTOMATIC AIR VALVES.

I have a simple automatic air inlet valve, the opening of which depends on the suction of the engine against the resistance of a spiral spring. I find that on some days the mixture is good but on others bad on account of the resistance of the spring always being the same whatever the state of the atmosphere. What I wish to know is how an auxiliary air inlet, worked from the dashboard, would work, and also if it would be necessary to use a weaker spring? Is there any formula to calculate what tension of the spring is necessary for a certain size cylinder?—W. HAGGIE.

An automatic extra air intake valve to the engine would certainly be greatly improved by an attachment whereby the tension of its spring could be readily adjusted by the driver to admit of its opening being controlled to suit certain atmospheric conditions. With such a device the spring could with advantage be weaker than where no such control as you suggest is fitted. There is no simple formula which would be of any great assistance to you for calculating the tension of the spring necessary, though the velocity of the mixture through the induction pipe could be calculated on the basis given by M. Henri Waleker in his article on the principles of automatic carburation which appeared in *The Autocar* of January 9th (p. 37).

EXTRA AIR TO CARBURETTER.

I have a 9 h.p. double-cylinder car, and have run it over 1,000 miles, and my petrol consumption averages seventeen to twenty miles per gallon. I have noticed that while the engine is running the petrol drips from a hole at the bottom of the spray chamber. I have examined the needle valve and find it in good condition. I have tried elevating the spray nipple, also reducing the size of the hole, and tried with several holes in top of nipple without any improvement. When I tried a fine spray the engine was very hard to start, and I could only get a good result by using a rich mixture, and then the dripping commenced. The fault appears to me to be that the engine sucks too much petrol through the spray and the result is that not all being vaporised a portion runs to waste through the hole. Do you think the fault lies in the carburetter, or could the lift of the inlet valve in anyway be connected with the oversuction of petrol? They are mechanically operated inlet valves.—NOVIER.

It is evident that sufficient air is not being taken in to the engine to give a properly proportioned mixture, there being a higher percentage of petrol vapour than is necessary for the complete combustion of the charge and the most economical working. The fault would appear to be in the diameter of the induction pipe being too small. Thus the velocity of the air drawn past the spray nipple is comparatively great, causing a high suction on the nipple and drawing from it more petrol than can be absorbed by the air passing to the engine.

As you do not mention the diameter of the inlet pipe this can only be advanced as a theory. The reducing of the orifice of the nipple should to a certain extent act as a check on the suction, though it would, of course, be very difficult to start the engine, as the highest velocity in the induction pipe would only be reached when the engine was running at full speed. Therefore, when starting, sufficient suction cannot be exerted on the jet at the slow speed to enable the engine to start up with ease. The fitting of an extra air valve to the induction pipe between the carburetter and the inlet valve, so that a certain amount of pure air can be drawn in with the petrol charged air passing through the carburetter, would reduce the suction upon the nipple by decreasing the velocity of the air passing by the nipple. Thus more than the requisite amount of petrol would not be drawn through

by the intruding charge. Therefore, there would be no waste. A plain hole of, say, $\frac{1}{8}$ in. diameter might be bored in the induction pipe and covered by a spring clip lubricator, the hole being closed for starting purposes and opened when the engine has commenced to run.

This is, of course, a simple and crude method of making the alteration. The best way of doing it would be to fit a small automatic valve as before stated.

THE PERIOD OF IGNITION.

I have an English built Benz car by Arnold, in which I have enlarged the inlet and exhaust valves, making all joints tight, and doing away with the air valve on the back of the cylinder cover and compression plate. I have given the car a trial, but unfortunately with little success. The ignition arrangement is perfect. I am not troubled in the least with misfires. The brass segment on the wipe contact is $\frac{1}{2}$ in. long, which gives contact at a quarter of the piston stroke. However, I get no power with the top speed, it failing at the slightest gradient. The slow speed is good, and all bearings are free. I have sat behind when the car was running on the road, but cannot discover what makes the loss of power. I have tried various inlet springs, but to no result. Compression is perfect. I am told that .680 spirit is not much used. I have been using .725 and over. Is this correct? The carburetter is exactly the same as the original Benz governed by a float feed. I have tried different heights of petrol. E.W.

With regard to your Benz car, the timing is incorrect, if we read your description aright, for in it you say the wipe contact is one inch long, and gives contact at a quarter of the piston stroke. We presume that you mean at one quarter of the outward stroke of the piston. In this case a large amount of the expansive force of the charge is lost before the mixture is ignited, and therefore there is a tremendous loss of pressure in the cylinder, and a corresponding loss of power, which is further contributed to by the removal of the compression plate, this reducing the pressure of the compressed charge. As a matter of fact, the contact should be arranged so that the circuit is completed before the piston reaches the end of its compression stroke by some $\frac{2}{3}$ ths of an inch, when running at high speed with the spark fully advanced. For starting purposes, the contact should occur so as to produce a spark when the piston is not more than one inch on its outward stroke. In normal running, the ignition should take place immediately the crank has passed over the dead centre. This, by reason of the fact that the gaseous mixture contained in the cylinder under pressure takes an appreciable time to thoroughly ignite, and to exert its full expansive powers upon the piston. Therefore, if the piston has already travelled some distance on its outward working stroke, there must of necessity be a loss of power. The .680 s.g. spirit is not largely used now, owing to its high price and the ability of motors to work on spirit of .720 s.g.

Referring to the enquiry of "Economist" in *The Autocar*, January 23rd, re consumption of petrol, 10 h.p. Gladiator. I presume he means by screwing up handle underneath carburetter that he is giving less hot exhaust to the carburetter jacket. I drive a 12 h.p. 1903 four-cylinder Gladiator (automatic valves). When I took to it the consumption was great, but I have made a big improvement by fixing a throttle which was not connected when I had car. My carburetter is an ordinary Longuemare. Present consumption, fifteen miles per gallon, and no matter how carefully I drive I cannot do more. Could I improve this by fixing an automatic carburetter?—WORCESTER-SHIRE.

THE WORKING OF THE NEW ACT.

Objections to the Ten Miles Speed Limit.

The local authorities which have applied to the Local Government Board for the imposition of the ten miles speed limit are Dover, Ealing, Oxford City, Winchester, St. Helens, Wallsend, Leigh, Deal, and Preston. It must be understood that the resolutions passed by various rural district councils up and down the country are subject to the winnowing effect of county councils before reaching the Local Government Board, as county and borough councils are the only local authorities which have any *locus standi* in the matter. The applications that have been made so far have emanated from borough councils, and it is significant that no county council has yet applied for the restrictive speed limit. Those local authorities which are in closest touch with the Local Government Board are becoming increasingly tolerant towards motorists. This may be attributed in no small degree to the educative influence of the President of the Local Government Board, who by his sympathetic attitude towards motorists has softened the once prevailing prejudice in those quarters. In the same way, the county councils in their turn are doing their best to bring rural district councils to a more reasonable frame of mind, though it must be admitted the task is a hard one, and it is still incumbent upon motorists to help in the process.

In the meantime, motorists in all districts where speed limits are sought should make sure that objections are lodged with the Local Government Board against such applications. There is no set form to be observed in the making of such representations, and we should imagine that the less formal they are the more effective they will become. They should state definitely and with the utmost precision any local facts which would make the imposition of a speed limit undesirable. Objections of a general character may be briefly stated, but the greatest emphasis should be placed upon local circumstances.

West Riding of Yorkshire.

The West Riding County Council make certain suggestions for the guidance of motorists as to the position in which identification plates shall be placed, though there does not appear to be any warrant in the Act or the Local Government Board regulations to support them in some of the suggestions. They even go to the extent of enforcing their suggestions, notwithstanding the fact that in many cases they entail the fixing of extra lamps at night for illuminating purposes beyond those usually carried. The suggestions are:

"Both front and back plates should be placed as far as possible (1) where they can be readily distinguished, (2) in a central position, and (3) above the floor line of the car. They should not be placed where they are liable to be obscured by the opening of a door or by a projecting portion of the car, nor so low as to be liable to be splashed or covered with mud or dust. They should not, for instance, be placed: (1) Upon a door or other movable portion of the car, or (2) at the side of a door next the hinges, or (3) below the floor board of the car, or (4) on the lamps themselves unless a separate lamp is fixed for the special purpose of illuminating the identification mark. If a painted design is used instead of a plate it must be painted upon a plain vertical surface, not, for instance, upon the broken surface of a radiator. In all cases care must be taken that the identification mark, whether on a plate, or painted or otherwise shown on the car, is placed in such a position as to be readily discernible when the car is travelling at its maximum speed."

Amongst other points to be noted are the following: (1.) The character of the roads in the district, especially if they are main arterial roads. (2.) The immunity of the district from accidents, and whether any complaints have been made against motorists. (3.) In regard to the *personnel* of the local council, it should be stated, where possible, whether any of its members have exhibited prejudice against motorists (supported by extracts from violent speeches); whether any of the members are practical motorists or not. (4.) Whether offers have been made by local motorists to demonstrate to the local council the reliability of motor cars, and if so how such offers have been received. (5.) Mention places of similar size and conditions where the speed limit has not been applied for.

As a point bearing generally upon the applications, it might be represented that the imposition of a ten-mile speed limit would lead motorists to suppose that it would be safe to travel at that speed through the district, whereas if left to their own devices they would moderate their pace as in their judgment the occasion required. Very little good would be gained by reminding the Local Government Board, as some memorialists do, of what that department has done by way of recommending the non-imposition of the ten miles speed limit until the effect of the penalising clauses of the Act have been tried. The objections, of course, would come primarily from motorists, but where possible the co-operation of other inhabitants should be secured, so as to make the objections as representative as possible. Tradespeople, for instance, might be induced to represent the view that to impose such restrictions would drive motorists (and the trade that they bring) from the town or the district, and in districts where any trade is carried on connected with the motor industry—no matter how remotely—the co-operation of the working classes might be obtained.

Stoke (Staffs.)

At the Stoke (Staffs.) Town Council, a committee has recommended the council to apply for the ten-mile speed limit throughout the borough, except along Flash Lane to the Newcastle boundary. They also recommend that the Staffordshire County Council be asked to pay for the caution and notice boards which the adoption of such a limit entails. It is not likely, however, that the Staffordshire County Council will comply with this demand, seeing that they have themselves decided not to erect such notice boards within their own area because of the great expense involved.

Bury.

At Bury (Lancashire), a committee of the town council has recommended the Corporation of the borough to adopt the ten miles speed limit within a radius of three-quarters of a mile from the centre of the town. Local automobilists are doing their utmost to prevent the acceptance of this recommendation, as the proposed three-quarter-mile radius cuts thirty-seven main streets and roads, to say nothing of back streets.

First Case in Kent.

The first case in Kent under the new Act occurred the other day. Richard Hills, of Maidstone, a chauffeur, was summoned before the Tonbridge magistrates for driving a motor car without identification marks. The defence was that Hills had been advised that it did not matter about the numbers being on the car until the County Council clerk had forwarded them. The magistrates held that the law had not been intentionally broken, and dismissed the case on payment of the costs.

THE AUTOCARS OF 1904.

Compiled Specially for the Use of Visitors to the Show.

CARS UNDER £200.

H.P.	NAME OF CAR.	No. of Cylinders.	Diameter of Cylinders	Length of Stroke.	Revolutions per minute at which h.p. claimed is developed.	Transmission, Chain or Gear.	No. of Speeds.	No. of Seats.	Weight, unladen, with standard type of body.	Price in £ s.	NAME OF FIRM AND ADDRESS.
9	Beaufort Phaeton	1	4 1/2 in.	4 1/2 in.	900	Gear	3	2	11 cwt.	115 10/-	Beaufort Motor Co., 14, Baker St., London, W.
6 1/2	B. and L. Car	1	90 mm.	100 mm.	1,600	Gear	2 or 3	2	9 cwt.	157 10/-	S. R. Bailey and Lambert, 217, Piccadilly, W.
6	Regal	1	100 mm.	110 mm.	1,500	Gear	2	2	7 cwt.	141 15/-	O. C. Selbach, 66, Gt. Russell St., W.C.
8	Regal	1	4 1/2 in.	3 in.	1,000	Gear	2 or 4	2	10 cwt.	178 10/-	O. C. Selbach, 66, Gt. Russell St., W.C.
6 1/2	Richardson	1	80 mm.	95 mm.	1,000	Chain	2	2	7 cwt.	190	J. R. Richardson and Co., Saxilby, nr. Lincoln.
6	Micasset	1				Chain	2	2	9 cwt.	165	Farman Automobile Co., 100-104, Long Acre, W.C.
9	Eagle Tandem	1				Chain	2	2	7 cwt.	170	Eagle Engineering and Motor Co., Altrincham.
6	Eagle Tandem	1				Chain	2	2	6 1/2 cwt.	160	Eagle Engineering and Motor Co., Altrincham.
4 1/2	Eagle Tandem	1				Chain	2	2	5 1/2 cwt.	150	Eagle Engineering and Motor Co., Altrincham.
5	Eagle Runabout	1				Chain	1	1	3 1/2 cwt.	100	Eagle Engineering and Motor Co., Altrincham.
4	Eagle Carrier	1				Chain	2	1	4 1/2 cwt.	125	Eagle Engineering and Motor Co., Altrincham.
3	New Orleans	1	100 mm.	100 mm.	850	Belt	2	2	6 cwt.	80	New Orleans Motor Co., Twickenham.
6	De Dion-Bouton	1	90 mm.	110 mm.	1,700	Gear	2 or 3	2	8 cwt.	200	De Dion-Bouton, 10, Gt. Marlborough St., W.
5	Locomobile Standard No. 2	2	2 1/2 in.	3 1/2 in.	Steam	Chain	Variable	2	8 cwt.	190	Locomobile Co., Sussex Place, South Kensington
2 1/2	Sunbeam Mabley	1	7 1/4 in.	7 1/2 in.	1,800	Belt & Chain	2	2	4 1/2 cwt.	120	John Marston, Ltd., Wolverhampton.
8	Utile-Simplex	1	4 1/2 in.	4 1/2 in.	1,800	Gear	2	4		150	Utile Motor Mfg. Co., Station Av., Kew Gardens.
6	Brushmobile	1	4 in.	5 in.	900	Chain	2	2	5 cwt.	150	Brush Electrical Eng. Co., Belvedere Rd., S.E.
3-6	Waverley (electric)	2	cells, 48	volts, 5	to 15 m.p.h.			2		199 10/-	Locomobile Co., Sussex Place, South Kensington
10	Minerva	2	9 1/2 in.	11 1/4 in.	1,200	Chain	3	4		250	Minerva Motors, Ltd., 40, Holborn Viaduct, E.C.
6 1/2	Cadillac Runabout	1	5 in.	5 in.	800	Chain	2	2	11 cwt.	183 15/-	Anglo-American Co., 19 and 21, Haddon St., W.
6	Vauxhall Light Car	1	4 in.	5 in.	900	Chain	2 and rev.	2 or 3	6 cwt.	150	Vauxhall Ironworks Co., Wandsworth Rd., S.W.
6	Speedwell Light Car	1	90 mm.	110 mm.	1,000	Gear	3	2	9 cwt.	131 5/-	Speedwell Motor Co., 151, Knightsbridge, S.W.
6	Speedwell Light Car (A)	1	90 mm.	110 mm.	1,000	Gear	4	2	10 cwt.	142 15/-	Speedwell Motor Co., 151, Knightsbridge, S.W.
9	Speedwell Light Car	1	100 mm.	120 mm.	1,000	Gear	4	2	11 cwt.	183 15/-	Speedwell Motor Co., 151, Knightsbridge, S.W.
6	Belsize Junior	1	4 1/2 in.	5 in.	7 h.p. at 1,000	Chain	3 and rev.	2	6 1/2 cwt.	175	Belsize Motor Co., Clayton Lane, Manchester.
6	Vulcan	1	3 1/2 in.	4 in.	1,000	Gear	3 and rev.	2	5 cwt.	105	Vulcan Motor Co., Howe's Side St., Southport.
10	Vulcan	2	3 1/2 in.	4 1/2 in.	1,200	Gear	3 and rev.	2	10 cwt.	200	Vulcan Motor Co., Howe's Side St., Southport.
6	Star	1	4 in.	4 in.	950	Chain	3 and rev.	2	7 cwt. (about)	175	Star Engineering Co., Wolverhampton.
6	Brown	1	4 in.	4 in.	1,200	Chain	3 and rev.	2		175	Brown Bros., Great Eastern St., E.C.
8	Darracq	1	11 1/2 in.	11 1/2 in.	1,500	Gear	3 and rev.	2	12 cwt.	195	A. Darracq and Co., 483, Oxford St., W.
6 1/2	Royal Humberette	1	3 1/2 in.	4 in.	1,500	Gear	3	2	7 cwt.	167	Humber, Ltd., Beeston, Notts.
6	Humberette	1	3 1/2 in.	4 in.	1,500	Gear	2	2	6 cwt.	147	Humber, Ltd., Beeston, Notts.
6	Wolsley Voiturette	1	4 1/2 in.	5 in.	800	Chain	3 and rev.	2		175	The Wolsley Co., Advertiser Park, Birmingham.
7	Swift Light Car	1	90 mm.	110 mm.	1,800	Gear	3	2	9 cwt.	200	The Swift Motor Co., Coventry.
5	Oldsmobile	1	4 1/2 in.	6 in.	700	Chain	2 and rev.	2	7 cwt.	150	Jarrott and Lettis, 45, Gt. Marlborough St., W.
6	Firefly Voiturette	1				Gear	3	2		150-165	Firefly Motor Co., 72, High St., Croydon.
	Firefly (6 cwt.) Van	1				Gear	3	2		150	Firefly Motor Co., 72, High St., Croydon.
6	Siddeley Light Car	1	4 1/2 in.	5 in.	800	Chain	3	3	9 cwt.	175	Siddeley Autocar Co., 70-80, York St., S.W.

CARS OVER £200 AND NOT EXCEEDING £350.

9	Beaufort Tonneau	1	4 1/2 in.	4 1/2 in.	900	Gear	3	2	11 cwt.	220 10/-	Beaufort Motor Co., 14, Baker St., London, W.
6 1/2	Clement	1	8 1/2 in.	110 mm.	1,400	Gear	3	4	13 1/2 cwt.	210	E. H. Lancaster, 3, Leicester St., W.C.
6 1/2	Cadillac Tonneau	1	5 in.	5 in.	800	Chain	2	2	11 1/2 cwt.	210	Anglo-American Co., 19 and 21, Haddon St., W.
6 1/2	Cadillac Delivery Van (B)	1	5 in.	5 in.	800	Chain	2	2	12 1/2 cwt.	210	Anglo-American Co., 19 and 21, Haddon St., W.
	Baker Electric Runabout					Chain	3	2	650 lbs.	204 15/-	Anglo-American Co., 19 and 21, Haddon St., W.
	Baker Imperial					Chain	3	2	750 lbs.	283 10/-	Anglo-American Co., 19 and 21, Haddon St., W.
10	Pick	2	3 1/2 in.	4 in.	1,500	Chain	3	4	15 cwt.	304 10/-	Pick Motor Co., Blackfriars Works, Stamford.
10	Speedwell Light Car	2	90 mm.	105 mm.	900	Gear	4	1	13 cwt.	236 5/-	Speedwell Motor Co., 151, Knightsbridge, S.W.
5	Roots Oil Motor Car (C)	1	4 7/8 in.	5 in.	750	Gear	3	2 or 3	10 cwt.	220	Roots Motor Co., Chicheley St., S.E.
10	Duryea Phaetonette (D)	3	4 1/2 in.	4 1/2 in.	700	Chain	2	2	8 cwt.	250	The Duryea Co., Coventry.

(A).—The 6 h.p. Speedwell with three seats is sold at £168; with four seats at £178 10s.; and the 9 h.p. is sold with three seats at £189, and four seats at £199 10s.

(B).—Space for goods, 3 ft. 6 in. x 2 ft. 1 in. x 3 ft. 2 in.

(C). The Roots 5 h.p. engine is horizontal, the power stated is developed at 750 r.p.m., but engine may run up to 900. The price given is for the car fitted with solid tyres. The chassis is also supplied with bodies and wheels suitable for agricultural purposes, for ploughing, threshing, chaffcutting, etc., and, by detaching a pulley, for self-propelling or tractor purposes.

(D). The 10 h.p. is fitted with other bodies. Phaeton with two seats, weight 9 cwt., at £295; Rumble Phaeton, three seats, 11 cwt., £325; Folding Front Phaeton, four seats, 10 cwt., £325; Dogcart, four seats, 10 cwt., £335.

H.P.	NAME OF CAR.	No. of Cylinders.	Diameter of Cylinders.	Length of Stroke.	Revolutions per minute at which h.p. claimed is developed.	Transmission, Chain or Gear?	No. of Speeds.	No. of Seats.	Weight unladen, with standard type of body.	Price in £ s.	NAME OF FIRM AND ADDRESS.
12	Duryea Phaetonette ..	3	4 in.	4 in.	600	Chain	2	2	11½ cwt.	300	The Duryea Co., Coventry.
7	Daimler ..	3	97 mm.	120 mm.	720	Chain	3	4	15 cwt. (about)	300	The Daimler Motor Co., Coventry.
7	Panhard and Levassor (E)	3	3 in.	4 in.	1,200	Chain	4	4	12½ cwt.	340	C. S. Rolls and Co., Lillie Hall, S.W.
10	Vulcan ..	3	4 in.	4 in.	900	Chain	3	4 or 5	14 cwt. (about)	275	Vulcan Motor Co., Howe's Side St., Southport.
7	Star ..	3	100 mm.	100 mm.	850	Chain	3	4		320	Star Engineering Co., Wolverhampton.
8	Brown ..	3	3½ in.	4 in.	900	Gear	3	4		315	Brown Bros., Great Eastern St., E.C.
8	Brown ..	3	90 mm.	110 mm.	1,400	Gear	3	4	13 cwt.	285	A. Darracq and Co., 483, Oxford St., W.
9	Darracq ..	3	112 mm.	120 mm.	1,200	Gear	3	5	15 cwt.	350	A. Darracq and Co., 483, Oxford St., W.
12	Darracq ..	3				Gear	3	5		270	Lemaire and Thackthwaite, 7, Maddox St., W.
7	Renault ..	3	3 in.	3 in.	1,000	Gear	3	4	12 cwt.	262 10/-	Renault Ltd., Beeston, Notts.
8½	Humber ..	3	4 in.	4 in.	900	Chain	3	4		330	The Wolseley Co., Birmingham.
8	Wolseley Tonneau ..	3	88 mm.	140 mm.	900	Gear	3	4	11½ cwt.	350	The Swift Motor Co., Coventry.
9	Swift ..	3	100 mm.	110 mm.	1,400	Gear	3	4	11 cwt.	280	Dennis Bros., Guildford, Surrey.
9	Dennis ..	3	85 mm.	90 mm.	1,200	Gear	3	2	13½ cwt.	250	Firefly Motor Co., 72, High St., Croydon.
9	Firefly (12 cwt.) Van	3	100 mm.	130 mm.	1,450	Chain	3	4	10 cwt.	275	Siddeley Autocar Co., 79-80, York St., S.W.
8	Peugeot ..	3	100 mm.	130 mm.	1,450	Chain	3	4	10 cwt.	285	Motor Mfg. Co., 95, New Bond St., W.
8	M.M.C. (automatic inlet valve)	3	90 mm.	130 mm.	720	Chain	3	4	17 cwt.	300	Motor Mfg. Co., 95, New Bond St., W.
7	M.M.C. (m.o.v.) ..	3	4 in.	6 in.	1,000	Gear	3	2	12 cwt.	262 10/-	Albany Mfg. Co., Willesden Junction, N.W.
10	Albany Silent Safety Car	3	95 mm.	110 mm.	1,250	Gear	3	4	15 cwt.	360	The Simms Mfg. Co., Kimberley Rd., N.W.
10	Simms-Welbeck (E)	3	110 mm.	100 mm.	1,500	Gear	3	4	15½ cwt.	385	The Simms Mfg. Co., Kimberley Rd., N.W.
12	Simms-Welbeck (E)	3	100 mm.	130 mm.	1,200	Chain	3	4	13½ cwt. (about)	400	The Western Motor Syndicate, 14, Mortimer St., W.
12	Chenard and Walcker Voiture Légère	3	88 mm.	140 mm.	1,200	Gear	3	4	12½ cwt.	350	E. H. Lancaster, 3, Leicester St., W.C.
9	Clément ..	3	91 mm.	114 mm.	1,200	Chain	3	5		340	Minerva Motors, Ltd., 40, Holborn Viaduct, E.C.
15	Minerva ..	3	105 mm.	120 mm.	900	Chain	3	4	13½ cwt.	350	Motor Car Emporium, 1, Addison Road North, W.
12	Dürkopp ..	3	4 in.	5 in.	900	Chain	3	4	14 cwt.	350	S. R. Bailey and Lambert, 217, Piccadilly, W.
12	Herald ..	3	85 mm.	100 mm.	1,200	Gear	3	4	10½ cwt.	300	Mann and Overton, 7a, Lower Belgrave St., S.W.
8	Georges-Richard Brazier	3	90 mm.	100 mm.	1,200	Chain	3	5	13 cwt.	262 10/-	J. E. Hutton, Ltd., 81-83, Shaftesbury Avenue, W.
7	Panhard and Levassor (chassis)	3				Chain	3			305	O. C. Selbach, 66, Gt. Russell St., W.C.
12	Royal ..	3	80 mm.	100 mm.	1,000	Gear	3	4	11 cwt.	250	Brit. Auto. Com. Synd., Long Acre, W.C.
7	Panhard and Levassor (chassis without tyres)	3	90 mm.	120 mm.	1,300	Gear	3	4	11½ cwt.	275	Brit. Auto. Com. Synd., Long Acre, W.C.
8	Talbot ..	3	88 mm.	110 mm.	1,300	Gear	3	4	17 cwt.	350	Brit. Auto. Com. Synd., Long Acre, W.C.
11	Talbot ..	3	110 mm.	130 mm.	950	Gear	3	4	16½ cwt.	310	Farman Automobile Co., 100-104, Long Acre, W.C.
12	Argyll ..	3	100 mm.	110 mm.	900	Gear	3	2	11 cwt.	235	Eagle Engineering and Motor Co., Altrincham.
10	Eagle Tonneau ..	3	100 mm.	120 mm.	1,600	Gear	3	4	11 cwt.	294	Eagle Engineering and Motor Co., Altrincham.
9	Eagle Light Car ..	3	83 in.	4 in.	1,000	Chain	3	4	12 cwt.	285	New Orleans Motor Co., Twickenham.
9	New Orleans ..	3	100 mm.	120 mm.	1,500	Gear	3	4	15 cwt.	301 10/-	De Dion Bouton, 10, Gt. Marlborough St., W.
10	De Dion Bouton ..	3	88 mm.	130 mm.	1,100	Gear	3	4	12 cwt.	275	The Pick Motor Co., Stamford.
9	Pick ..	3				Chain	Variable	4	11 cwt.	300	Hozier Eng. Co., Bridgeton, Glasgow.
9	Argyll ..	3				Chain	Variable	2	10 cwt.	210	Hozier Eng. Co., Bridgeton, Glasgow.
10	Argyll ..	3				Chain	Variable	2	10 cwt.	210	Locomobile Co., Sussex Place, South Kensington.
7	Locomobile Runabout ..	3				Chain	Variable	2	10 cwt.	210	Locomobile Co., Sussex Place, South Kensington.
7	Locomobile Light Surrey No. 5	3				Chain	Variable	2	10 cwt.	210	Locomobile Co., Sussex Place, South Kensington.
10	Locomobile Stanhope ..	3	3 in.	4 in.		Chain	Variable	2	10 cwt.	210	Locomobile Co., Sussex Place, South Kensington.
7	Renault ..	3	100 mm.	120 mm.	1,500	Gear	3	4	12 cwt.	320	Roadway Autocar Co., Newmen St., Oxford St., W.
12	Tyne ..	3	100 mm.	120 mm.	1,500	Gear	3	4	12 cwt.	275	W. Galloway and Co., Gateshead-on-Tyne.
10	Heron ..	3				Gear	3	4	13 cwt.	300	J. J. Horne, Moseley, Birmingham.
12	Heron ..	3				Gear	3	5	16 cwt.	325	J. J. Horne, Moseley, Birmingham.
3-6	Waverley Surrey (electric)	3	40 cells	80 volts			up to 15 m.p.h.	4		320	Locomobile Co., Sussex Place, South Kensington.
3-6	Waverley Stanhope (electric)	3	30 cells	60 volts			up to 15 m.p.h.	2		300	Locomobile Co., Sussex Place, South Kensington.
3-6	Waverley Chelsea (electric)	3	30 cells	60 volts			up to 15 m.p.h.	2		250	Locomobile Co., Sussex Place, South Kensington.
3-6	Waverley Physician's Car (electric)	3	24 cells	48 volts			up to 15 m.p.h.	2		240	Locomobile Co., Sussex Place, South Kensington.
6-12	Waverley Delivery Waggon (electric)	3	40 cells	80 volts			up to 12 m.p.h.			320	Locomobile Co., Sussex Place, South Kensington.

(E). The Panhard prices given by different firms will be found to vary. In some cases the discrepancy is explained by the car being priced complete with body, or else for chassis only, or chassis without tyres. Mr. Harvey Du Cros's prices for these vehicles were not received in time to include in the table.

(F). White Steam Car transmission is through live axle, and universal joints to sun and planet gear. The price of chassis is £375, and the car fitted with limousine body, £475.

H.P.	NAME OF CAR.	No. of Cylinders.	Diameter of Cylinders.	Length of Stroke.	Revolutions per minute at which h.p. claimed is developed.	Transmission, Chain or Gear?	No. of Speeds.	No. of Seats.	Weight unladen, with standard type of body.	Price in £s.	NAME OF FIRM AND ADDRESS.
10	Miesse Steam	2	1 in.	3 in.	1,000	Chain		4 or 5	19 cwt.	430 10/-	Turner's Motor Mfg. Co., Wolverhampton.
10	Beaufort Tonneau	2	4 in.	5 in.	850	Gear	3	4	14½ cwt.	396 18/-	Beaufort Motor Co., 14, Baker St., London, W.
12	Beaufort Princess Car	2	4½ in.	5 in.	850	Gear	3 and rev.	5	15½ cwt.	448 7/-	Beaufort Motor Co., 14, Baker St., London, W.
10	Beauville	2	110 mm.	110 mm.	1,000	Gear	4 and rev.	4	16 cwt.	360	The Motor Car Co., 168, Shaftesbury Avenue, W.C.
10	Baker Stanhope	2	3 in. & 5 in.	3½ in.	300	Chain	3	2	950 lbs.	367 10/-	Anglo-American Co., 19 and 21, Haddon St., W.
12	White Steam Car	2	105 mm.	130 mm.	900	Gear	up to 40 m.p.h.	4	1,300 lbs.	420	White Steam Cars, 35-37, King St., W.
9	Richardson	2	55 mm.	92 mm.	700	Gear	4	4	17 cwt.	367 10/-	J. R. Richardson and Co., Saxilby, near Lincoln.
12	Gardner-Serpollet Steam	2	3½ in.	4½ in.	900	Chain	3	4	15 cwt.	400	Speedwell Motor Co., 131, Knightsbridge, S.W.
12	Brooke	2	3½ in.	4½ in.	900	Chain	3	4 or 5	19 cwt.	450	J. W. Brookes and Co., Adrian Works, Lowestoft.
12	Brooke Light Car	2	3½ in.	4½ in.	900	Chain	3	4	16 cwt.	450	J. W. Brookes and Co., Adrian Works, Lowestoft.
10	Duryea Coupé (G)	2	4 in.	4 in.	750	Chain	2	2	11½ cwt.	360	The Duryea Co., Coventry.
10	Duryea Surrey	2	4 in.	4 in.	750	Chain	2	2	15 cwt.	400	The Duryea Co., Coventry.
10	Rykfield Tonneau	2	4 in.	4 in.	1,000	Gear	2	4	15 cwt.	367 10/-	Rykfield Engine Co., Burton-on-Trent.
10	Rykfield Station Luggage Cart	2	4 in.	4 in.	1,000	Gear	2	2	14½ cwt.	335	Rykfield Engine Co., Burton-on-Trent.
10	Rykfield Light Delivery Van	2	4 in.	4 in.	1,000	Gear	2	2	20 cwt.	340	Rykfield Engine Co., Burton-on-Trent.
8	Panhard and Levassor (H)	2	4 in.	4 in.	1,000	Chain	4	4	19 cwt.	465	C. S. Rolls and Co., Lillie Hall, Fulham.
12	Korle	2	4 in.	4 in.	1,400	Chain	4	4	18 cwt.	400	Rice and Co. (Leeds), Ltd.
15-20	Belsize	2	4 in.	5 in.	19 h.p. at 900	Gear	4	4	17 cwt. (about)	495	Belsize Motor Co., Clayton Lane, Manchester.
12	Star	2	3½ in.	4 in.	900	Chain	4	4	15 cwt. (about)	500	Star Engineering Co., Wolverhampton.
12	Light Star	2	3½ in.	4 in.	900	Chain	4	4	15 cwt. (about)	420	Star Engineering Co., Wolverhampton.
12	Brown	2	3 in.	4 in.	900	Chain	4	4	17 cwt.	500	Brown Bros., Great Eastern St., E.C.
15	Darracq	2	90 mm.	120 mm.	1,000	Gear	3	5	17 cwt.	460	A. Darracq and Co., 483, Oxford St., W.
10	Renault	2	4 in.	4 in.	900	Gear	2	4	16 cwt.	380	Lemaire and Thackthwaite, 7, Maddox St., W.
7	Panhard	2	4 in.	4 in.	900	Chain	2	4	16 cwt.	360	Lemaire and Thackthwaite, 7, Maddox St., W.
10	Thornycroft Car	2	4 in.	5 in.	800	Chain	4	4 or 5	16 cwt.	410	The Thornycroft Steam Wagon Co., W.
12	Wolsley Tonneau	2	4 in.	5 in.	900	Chain	4	4	16 cwt.	400	The Wolsley Co., Adderley Park, Birmingham.
12	Pipe	2	80 mm.	125 mm.	900	Chain	4	4	21½ cwt.	390	The London Motor Car Co., 33-37, Wardour St., W.
12	Albion	2	4 in.	5 in.	1,000	Gear	3	4	16 cwt.	400	The Albion Motor Car Co., Scotstoun, Glasgow, W.
12	Ilex Simplex	2	4 in.	4 in.	1,000	Gear	3	5	16 cwt.	383 5/-	Rex Motor Manufacturing Co., Coventry.
12-14	Dennis	2	105 mm.	140 mm.	800	Gear	3	4	25 cwt.	420	Dennis Bros., Guildford, Surrey.
12-14	Dennis One Ton Van	2	105 mm.	140 mm.	800	Gear	3	2	25 cwt.	451 10/-	Dennis Bros., Guildford, Surrey.
	Firefly (20 to 25 cwt.) Van	2	4 in.	4 in.	850	Chain	4	2	16½ cwt.	400	Firefly Motor Co., 72, High St., Croydon.
	Firefly (40 cwt.) Van	2	4 in.	4 in.	850	Chain	4	2	17 cwt.	500	Firefly Motor Co., 72, High St., Croydon.
12	Siddeley Car	2	4 in.	4 in.	850	Chain	4	5	17 cwt.	450	Siddeley Autocar Co., 79-80, York St.,
10	M.M.C.	2	100 mm.	130 mm.	1,050	Chain	3	4	17 cwt.	395	Motor Mfg. Co., 95, New Bond St., W.
9	James and Browne Standard Tonneau	2	4 in.	6 in.	700	Chain	4	4	17 cwt.	392-400	James and Browne, 395, Oxford St., W.
9	James and Browne Light Covered Van	2	4 in.	6 in.	700	Chain	4	4	18 cwt.	360	James and Browne, 395, Oxford St., W.
20	Minerva	4	94 mm.	114 mm.	1,200	Chain	3	5	12½ cwt.	400	Minerva Motors, Ltd., 40, Holborn Viaduct, E.C.
12	Georges-Richard Brazier	2	104 mm.	100 mm.	1,200	Gear	4	4	12½ cwt.	400	Mann and Overton, 7a, Lower Belgrave St., S.W.
8	Panhard and Levassor (chassis)	2	4 in.	4 in.	850	Gear	4	4	12½ cwt.	425	J. E. Hutton, 81-83, Shaftesbury Avenue, W.
10	Panhard and Levassor (chassis)	2	4 in.	4 in.	850	Gear	4	4	12½ cwt.	490	J. E. Hutton, 81-83, Shaftesbury Avenue, W.
12-14	Brooke	2	4 in.	4 in.	850	Chain	3	4	12½ cwt.	450	J. E. Hutton, 81-83, Shaftesbury Avenue, W.
8	Panhard and Levassor (chassis without tyres)	2	4 in.	4 in.	850	Chain	4	4	12½ cwt.	348	Brit. Auto. Com. Synd., Long Acre, W.C.
10	Panhard and Levassor (chassis without tyres)	2	4 in.	4 in.	850	Chain	4	4	12½ cwt.	448	Brit. Auto. Com. Synd., Long Acre, W.C.
12	Argyll	2	90 mm.	120 mm.	1,300	Gear	4	4	14 cwt.	425	Farnham Automobile Co., 100-104, Long Acre, W.C.
12	New Orleans	2	85 mm.	110 mm.	900	Gear	3	4	16 cwt.	398	New Orleans Motor Co., Twickenham.
10	De Dion-Bouton	2	90 mm.	110 mm.	1,500	Gear	3	4	14 cwt.	385	De Dion-Bouton, 10, St. Marlborough St., W.
12	De Dion-Bouton	2	100 mm.	110 mm.	1,500	Gear	3	4	16 cwt.	445	De Dion-Bouton, 10, St. Marlborough St., W.
12	Argyll	2	90 mm.	120 mm.	1,100	Gear	3	4	16 cwt.	425	Hozier Engineering Co., Bridgeton, Glasgow.
10	Locomobile Dos-a-Dos	2	3 in.	4 in.	Steam	Chain	Variable	4	12 cwt.	400	Locomobile Co., Sussex Place, South Kensington.
10	Locomobile Surrey	2	3 in.	4 in.	Steam	Chain	Variable	4	12 cwt.	410	Locomobile Co., Sussex Place, South Kensington.
10	Renault	2	100 mm.	110 mm.	1,500	Gear	3	4	15 cwt.	410	Roadway Autocar Co., Newman St., Oxford St., W.
9	Gladiator	2	88 mm.	140 mm.	1,200	Chain	3 or 4	2 or 4	13 cwt.	350-360	S. F. Edge, 14, New Burlington St., W.
12	Gladiator	2	105 mm.	130 mm.	1,200	Chain	3 or 4	4	14 cwt.	395	S. F. Edge, 14, New Burlington St., W.
15-19	Ariel	4	3 in.	3 in.	1,450	Gear	4	4	17 cwt.	495	Ariel Motor Co., Birmingham.

(G) These cars are all driven by single chain from two speed gear drum driving direct on top speed.

(H) There appears to be a marked reluctance on the part of the Panhard agents to disclose the engine dimensions. This does not apply to one but to all.

The Autocars of 1904.

CARS OVER £350 AND NOT EXCEEDING £500 - (continued).

H.P.	NAME OF CAR.	No. of Cylinders.	Diameter of Cylinders.	Length of Stroke.	Revolutions per minute at which h.p. claimed is developed.	Transmission. Chain or Gear?	No. of Speeds.	No. of Seats.	Weight unladen, with standard type of body.	Price in £ s.	NAME OF FIRM AND ADDRESS.
12-15	Standard Double Phaeton ..	2	5in.	3in.	1,200	Gear	4	4	15 cwt.	367 10/-	Standard Motor Co., 128, Much Park St., Coventry.
10	Norfolk ..	2	3½in.	4½in.	800	Chain	3	4	15 cwt.	385	Cooke and Wade, Cutlers' Hall, Sheffield.
12	Norfolk ..	2	3½in.	4½in.	800	Chain	3	4	15 cwt.	395	Cooke and Wade, Cutlers' Hall, Sheffield.
12	Cremorne Steam Car ..	2	3½in.	5in.	400	Chain	1	5	19½ cwt.	500	Cremorne Motor Mfg. Co., Lots Rd., Chelsea, S.W.
16	Heron ..	2	5in.	5½ in.	700	Gear	3	4	20 cwt.	450	J. J. Horne, Moseley, Birmingham.
10	Lanchester Touring Car ..	4	100 mm.	140 mm.	850-900	Gear	3	4	19½ cwt.	500	Lanchester Engine Co., Sparkbrook, Birmingham.
10	Brushmobile ..	4	85 mm.	120 mm.	900	Chain	3	4	14 cwt.	400	Brush Electrical Eng. Co., Belvedere Rd., S.E.
14	Brushmobile ..	4	85 mm.	120 mm.	900	Chain	3	4	17 cwt.	500	Brush Electrical Eng. Co., Belvedere Rd., S.E.
6-12	Waverley Brougham (electric)			40 cells, 80 volts.			up to 15 m.p.h.	4		395	Locomobile Co., Sussex Place, South Kensington.
	Waverley Special (electric)			48 cells, Edison battery, 60 volts.			up to 16 m.p.h.	2		490	Locomobile Co., Sussex Place, South Kensington.

CARS OVER £500 AND NOT EXCEEDING £700.

20-24	Simms-Weilbeck ..	4	95 mm.	110 mm.	1,500	Gear	3	4	17 cwt.	600	The Simms Mfg. Co., Ltd., Kimberley Rd., N.W.
30	Simms-Weilbeck ..	4	110 mm.	110 mm.	1,500	Gear	3	4	17½ cwt.	650	The Simms Mfg. Co., Ltd., Kimberley Rd., N.W.
12	Clement ..	4	88 mm.	130 mm.	1,000	Gear	4	1	15½ cwt.	550	E. H. Lancaster, 3, Leicester St., W.C.
10	Clement (L) ..	4	84 mm.	120 mm.	1,000	Gear	4	1	14 cwt.	650	E. H. Lancaster, 3, Leicester St., W.C.
20	Winton Touring Car ..	4	5in.	6in.	1,000	Chain	2	5	1,075 lbs.	624 15/-	Anglo-American Co., 19 and 21, Heddon St., W.
16	Germain Standard (Chassis) ..	4	95 mm.	130 mm.	850	Chain	4	5	15 cwt.	550	Germain Motor Cars, 1, Hanover Court, W.
10	Gardner-Serpollet Steam ..	4	75 mm.	72 mm.	700	Chain	4	4	18 cwt.	550	Speedwell Motor Co., 151, Knightsbridge, S.W.
15	Gardner-Serpollet Steam ..	4	75 mm.	90 mm.	700	Chain	4	4	20 cwt.	700	Speedwell Motor Co., 151, Knightsbridge, S.W.
12	Roots Oil Motor Car (K) ..	4	5in.	6in.	750	Gear	4	4, 6, or 8	1 ton (about)	640	The Roots Motor Co., Chicheley St., S.E.
15	Brooke ..	4	3in.	4in.	900	Chain	3	4 to 6	17 cwt.	650	J. W. Brooke and Co., Adrian Works, Lowestoft.
20	Ryknield Touring Car ..	4	4in.	4in.	1,000	Chain	4	4 or 5	20 cwt.	680	Ryknield Engine Co., Burton-on-Trent.
16	Daimler (L) ..	4	90 mm.	130 mm.	800	Chain	4	4 or 5	20 cwt. (about)	650	Daimler Motor Co., Coventry.
10	Panhard and Levassor ..	4	4in.	5in.	900	Chain	4	4	18 cwt. (about)	550	C. S. Rolls and Co., Lillie Hall, Fulham, S.W.
15	Panhard and Levassor ..	4	4in.	5in.	900	Chain	4	4	22 cwt. (about)	600	C. S. Rolls and Co., Lillie Hall, Fulham, S.W.
18	Star ..	4	4in.	5in.	900	Chain	4	4	18 cwt.	550	Star Engineering Co., Wolverhampton.
24	Spyker ..	4	110 mm.	120 mm.	1,000	Gear	3	4 or 5	19 cwt.	650	The Elsworth Co., Manningham Lane, Bradford.
12-16	Spyker ..	4	110 mm.	120 mm.	1,000	Gear	3	4 or 5	19 cwt.	650	The Elsworth Co., Manningham Lane, Bradford.
20-24	Milnes-Daimler Lorry (to carry 2½ tons) ..	4	112 mm.	120 mm.	1,000	Gear	4	2	19 cwt.	580	The Elsworth Co., Manningham Lane, Bradford.
12	Milnes-Daimler Lorry (to carry 3 tons) ..	4	112 mm.	120 mm.	1,000	Gear	4	2	19 cwt.	580	The Elsworth Co., Manningham Lane, Bradford.
16	Milnes-Daimler Lorry (to carry 5 tons) ..	4	112 mm.	120 mm.	1,000	Gear	4	2	19 cwt.	680	The Elsworth Co., Manningham Lane, Bradford.
24	Darracq ..	4	3in.	4in.	900	Gear	3	5	18 cwt.	603 15/-	A. Darracq and Co., 483, Oxford St., W.
14	Renault ..	4	4in.	4in.	900	Gear	2	4	18½ cwt.	650	Lemaire and Thackthwaite, 7, Maddox St., W.
10	Panhard ..	4	4in.	4in.	900	Chain	4	4	18 cwt.	550	Lemaire and Thackthwaite, 7, Maddox St., W.
14	Humber ..	4	4in.	4in.	900	Gear	4	4	18 cwt.	603 15/-	Humber, Ltd., Beeston, Notts.
20	Thornycroft Car ..	4	4in.	4in.	900	Gear	3	4 or 5	18½ cwt.	650	The Thornycroft Steam Wagon Co., London, W.
16	Wolsley Tonneau ..	4	4in.	4in.	900	Chain	4	4	18 cwt.	550	The Wolsley Co., Adderley Park, Birmingham.
24	Wolsley Tonneau ..	4	4in.	5in.	800	Chain	4	4	18 cwt.	650	The Wolsley Co., Adderley Park, Birmingham.
16	Pipe (M) ..	4	90 mm.	130 mm.	900	Chain	4	5	18 cwt.	640	London Motor Garage Co., 33-37, Wardour St., W.
24	Rex Simplex ..	4	4in.	4in.	1,000	Gear	3	5	22 cwt.	682 10/-	Rex Motor Manufacturing Co., Coventry.
12-15	De Dietrich ..	4	90 mm.	120 mm.	700	Chain	4	5	17 cwt. (about)	650	Jarrott and Letts, 45, Gt. Marlborough St., W.
20-24	Dennis ..	4	95 mm.	110 mm.	1,100	Gear	3	4 or 5	21 cwt.	650	Dennis Bros., Guildford, Surrey.
20	Dennis ..	4	88 mm.	130 mm.	950	Gear	3	4 or 5	18½ cwt.	630	Dennis Bros., Guildford, Surrey.
16-20	Dennis ..	4	88 mm.	110 mm.	950	Gear	3	4	17½ cwt.	550	Dennis Bros., Guildford, Surrey.
24	Wilkinson de Cosmo ..	4	100 mm.	130 mm.	900	Gear	3	5	19½ cwt.	650	The Cadogan Motor Co., Sydney St., Chelsea.
16	Fiat ..	4	110 mm.	110 mm.	1,000	Chain	4	5	17½ cwt.	695	Fiat Motors, Ltd., 37, Long Acre, W.C.
18	Siddeley Car ..	4	4in.	4in.	1,000	Chain	4	5	17½ cwt.	650	Siddeley Autocar Co., 79-80, York St., S.W.
20	M.M.C. (automatic inlet valves) ..	4	100 mm.	130 mm.	1,100	Chain	3	5	20 cwt.	700	Motor Mfg. Co., 95, New Bond St., W.
12	James and Browne Tonneau ..	4	3in.	4in.	800	Chain	4	4	17½ cwt.	535	James and Browne, 395, Oxford St., W.
18	James and Browne Tonneau ..	4	4in.	6in.	700	Chain	4	4	18 cwt.	650	James and Browne, 395, Oxford St., W.
12	James and Browne Landaulet (N) ..	4	3in.	4in.	800	Chain	4	4	18 cwt.	600	James and Browne, 395, Oxford St., W.
16	Albany Silent Safety Petrol Car ..	4	3in.	4 ½ in.	800	Chain	4	4	16 cwt.	525	The Albany Mfg. Co., Willesden Junction, N.W.

(L).—Special Landaulette body.

(K).—Roots 12 h.p. engine is vertical; 13 h.p. is developed at 750 r.p.m. (See also Note B.)

(L).—The 16 h.p. Daimler Chassis is sold separately at £550.

(M).—The Pipe cars, of 15, 20, and 30 h.p., are fitted with magneto clutch.

(N).—The 12 h.p. James and Browne is fitted as Single Brougham at £595; Double Landaulette, £625; Double Brougham, £620.

H.P.	NAME OF CAR.	No. of Cylinders.	Diameter of Cylinders.	Length of Stroke.	Revolutions per minute at which h.p. claimed developed.	Transmission. Chain or Gear.	No. of Speeds.	No. of Seats.	Weight, unladen, with standard type of car.	Price in £ s.	NAME OF FIRM AND ADDRESS.
16	Miesse Steam	3	2 in.	3 in.	1,000	Chain		4, 5, or 6	24 cwt.	640 10/-	Turner's Motor Mfg. Co., Wolverhampton.
12	De Dietrich (Turcat-Mery)	4	90 mm.	104 mm.	800	Chain	4	5	18 cwt.	650	Burlington Carriage Co., 315-317, Oxford Street
15	Beaufort Princess Car	4	4 in.	5 in.	750	Gear	3 and rev.	5	18½ cwt.	546	Beaufort Motor Co., 14, Baker St., London, W.
16	Durkopp	3	94 mm.	130 mm.	900	Chain	3	5	850 kilogs.	550	Motor Car Emporium, 1, Addison Road North, W.
20	Durkopp	4	94 mm.	130 mm.	900	Chain	3	5	875 kilogs.	600	Motor Car Emporium, 1, Addison Road North, W.
24	Durkopp	4	105 mm.	130 mm.	800	Chain	4	6	950 kilogs.	700	Motor Car Emporium, 1, Addison Road North, W.
16	Georges-Richard Brazier	4	85 mm.	100 mm.	1,200	Gear	4	4	14 cwt.	550	Mann and Overton, 7a, Lower Belgrave St., S.W.
15	Panhard and Levassor (chassis)	4				Gear	4			630	I. E. Hutton, 81-83, Shaftesbury Avenue, W.
24	Regal	4	100 mm.	110 mm.	1,000	Gear	4	5	18 cwt.	525	O. C. Selbach, 66, Gt. Russell St., W.C.
15	Panhard and Levassor (chassis, without tyres)	4				Chain	4			580	Brit. Auto. Com. Synd., Long Acre, W.C.
16	F.I.A.T. (chassis, with tyres)	4				Chain	4			575	Brit. Auto. Com. Synd., Long Acre, W.C.
14	Talbot	4	80 mm.	120 mm.	1,000	Gear	4	4	15½ cwt.	535	Brit. Auto. Com. Synd., Long Acre, W.C.
20	Talbot	4	90 mm.	120 mm.	1,000	Gear	4	4	16½ cwt.	680	Brit. Auto. Com. Synd., Long Acre, W.C.
24	Richardson	4	100 mm.	120 mm.	900	Gear	4	4 or 5	19 cwt.	650	I. R. Richardson and Co., Saxilby, nr. Lincoln.
16	Micrusset	4	130 mm.	150 mm.	850	Chain	4	5	20 cwt.	650	Farnham Automobile Co., 100-104, Long Acre, W.C.
24	Eagle Tonneau	4	110 mm.	130 mm.	950	Gear	3	4	18 cwt.	535	Eagle Engineering and Motor Co., Altrincham.
15	New Orleans	4	100 mm.	110 mm.	900	Gear	4	4 or 5	18 cwt.	561	New Orleans Motor Co., Twickenham.
	Martini (chassis)	4	100 mm.	130 mm.	1,100	Chain	4	5	19 cwt.	620	Deasy and Co., 217, Piccadilly Circus, W.
16	Argyll	4	88 mm.	130 mm.	1,100	Gear	3	4	16 cwt.	550	Hozier Engineering Co., Bridgeton, Glasgow.
14	Renault	4	90 mm.	120 mm.		Gear	3	4	17 cwt.	630	Roadway Autocar Co., Newman St., Oxford St. W.
12	Mors	4	87 mm.	135 mm.	1,000	Chain	4	4	17 cwt.	570	Roadway Autocar Co., Newman St., Oxford St. W.
14	Gladiator	4	88 mm.	130 mm.	1,200	Chain	4	4	16 cwt.	545	S. F. Edge, 14, New Burlington St., W.
12	Lanchester Touring Car	2	5 in.	5 in.	700	Gear	3	4	20½ cwt.	550	Lanchester Engine Co., Sparkbrook, Birmingham.
16	Lanchester Touring Car	2	5 in.	5 in.	780	Gear	3	4	19½ cwt.	660	Lanchester Engine Co., Sparkbrook, Birmingham.
18	Maudslay Chassis	3	5 in.	3 in.	800	Chain	4	4	18½ cwt.	682 10/-	Maudslay Motor Co., Coventry.
14	Brushmobile	4	85 mm.	120 mm.	900	Chain	4	4	17 cwt.	600	Brush Electrical Eng. Co., Belvedere Rd., S.E.
16	Brushmobile	4	100 mm.	140 mm.	900	Chain	4	4	22 cwt.	700	Brush Electrical Eng. Co., Belvedere Rd., S.E.
12	Sunbeam	4	80 mm.	120 mm.	1,000	Chain	4	4	16 cwt.	512	John Marston, Wolverhampton.
18-22	Ariel (chassis)	4	3 in.	4 in.	1,450	Gear	4	5	18 cwt.	555	Ariel Motor Co., Birmingham.
20-26	Ariel (chassis)	4	4 in.	4 in.	1,250	Gear	4	5	19½ cwt.	675	Ariel Motor Co., Birmingham.
12	Decauville	4	90 mm.	100 mm.	900	Gear	3 and rev.	4	16½ cwt.	550	The Motor Car Co., 168, Shaftesbury Avenue, W.C.
14	Decauville	4	95 mm.	100 mm.	900	Gear	3 and rev.	4	18 cwt.	600	The Motor Car Co., 168, Shaftesbury Avenue, W.C.
16	Decauville	4	100 mm.	110 mm.	900	Gear	3 and rev.	4	19 cwt.	650	The Motor Car Co., 168, Shaftesbury Avenue, W.C.

CARS OVER £700.

16	De Dietrich (Turcat-Mery)	4	104 mm.	120 mm.	800	Chain	4	5	19½ cwt.	760	Burlington Carriage Co., 315-317, Oxford Street
24	De Dietrich (Turcat-Mery)	4	120 mm.	120 mm.	800	Chain	4	5	22 cwt.	950	Burlington Carriage Co., 315-317, Oxford Street
24-28	De Dietrich (Burgatti)	4			750	Chain	4	5	21 cwt.	950	Burlington Carriage Co., 315-317, Oxford Street
30-35	De Dietrich (Burgatti)	4			750	Chain	4	5	25 cwt.	1,100	Burlington Carriage Co., 315-317, Oxford Street
24	Beaufort Tonneau	4	4 in.	5 in.	850	Chain	4 and rev.	7	23 cwt.	795 18/-	Beaufort Motor Co., 14, Baker St., London, W.
18	Chenard and Walcker Car de Luxe	4	100 mm.	130 mm.	1,200	Gear	3	5	20 cwt. (about)	750	Weston Motor Syndicate, 14, Mortimer St., W.
20	Clément	4	103 mm.	130 mm.	1,000	Chain	4	4		725	E. H. Lancaster, 3, Leicester St., W.C.
24	Germain Standard (chassis)	4	115 mm.	140 mm.	850	Chain	4	5	19 cwt.	740	Germain Motor Cars, 1, Hanover Court, W.
35	Germain Standard (chassis)	4	140 mm.	160 mm.	850	Chain	4	5	20 cwt.	1,100	Germain Motor Cars, 1, Hanover Court, W.
24	Léon Bollée	4	106 mm.	130 mm.	750-1,000	Chain	4	4 to 8	19½ cwt.	965	Speedwell Motor Co., 151, Knightsbridge, S.W.
40	Léon Bollée	4	130 mm.	150 mm.	750-1,000	Chain	4	4 to 8	22 cwt.	1,450	Speedwell Motor Co., 151, Knightsbridge, S.W.
18	Daimler (O)	4	95 mm.	130 mm.	800	Chain	4	4, 5, or 6	20 cwt. (about)	750-825	Daimler Motor Co., Coventry.
22	Daimler	4	95 mm.	135 mm.	720	Chain	4	4 or 5	21 cwt. (about)	725-825	Daimler Motor Co., Coventry.
28	Daimler	4	110 mm.	150 mm.	750	Chain	4	5 to 10	24 cwt. (about)	950-1,150	Daimler Motor Co., Coventry.
18	Panhard and Levassor	4				Chain	4	4		800	C. S. Rolls and Co., Lillie Hall, Fulham, S.W.
24	Panhard and Levassor	4				Chain	4	4		1,035	C. S. Rolls and Co., Lillie Hall, Fulham, S.W.
35	Panhard and Levassor	4				Chain	4	4		1,310	C. S. Rolls and Co., Lillie Hall, Fulham, S.W.
30-36	Spyker	4		128 mm.	1,000	Gear	3	4 or 5	20 cwt.	800	The Elsworth Co., Manningham Lane, Bradford.
60	Spyker	6			1,000	Gear	3	2 or more under 1,000 kilos.		1,600	The Elsworth Co., Manningham Lane, Bradford.
28-32	Darracq (P)	4	120 mm.	130 mm.	1,000	Gear	3	4	22 cwt.	700	A. Darracq and Co., 483, Oxford St., W.

(O).—The 18 h.p. Daimler Chassis is supplied separately at £650 to £700; the 22 h.p. Chassis to £700; and the 28 h.p. Chassis at £850 to £900.
(P).—All Darracq Cars have direct drive on top speed.

H.P.	NAME OF CAR.	No. of Cylinders.	Diameter of Cylinders	Length of Stroke.	Revolutions per minute at which h.p. claimed is developed.	Transmission. Chain or Gear.	No. of Speeds.	No. of Seats.	Weight unladen, with standard type of body.	Price in £ s.	NAME OF FIRM AND ADDRESS.
18-22	Mercedes	4				Chain	4	4	1,100		Lemaire and Thackthwaite, 7, Maddox St., W.
24-28	Mercedes	4				Chain	4	4	1,300		Lemaire and Thackthwaite, 7, Maddox St., W.
35-40	Mercedes	4				Chain	4	4	1,500		Lemaire and Thackthwaite, 7, Maddox St., W.
60	Mercedes	4				Chain	4	4	800		Lemaire and Thackthwaite, 7, Maddox St., W.
15	Panhard	4				Chain	4	4	2,200		Lemaire and Thackthwaite, 7, Maddox St., W.
25	Humber	4	4 1/2 in.	5 1/2 in.	900	Gear	4	5	840		Timber, Ltd., Beeston, Notts.
20	Pipe	4	100 mm.	135 mm.	900	Chain	4	5	750		London Motor Garage, 33-37, Wardour St., W.
30	Pipe	4	120 mm.	140 mm.	900	Chain	4	5	1,000		London Motor Garage, 33-37, Wardour St., W.
16-22	De Dietrich	4	104 mm.	120 mm.	700	Chain	4	4	18 cwt. (about)	760	Jarrott and Lettis, 45, Gt. Marlborough St., W.
24-30	De Dietrich	4	120 mm.	120 mm.	700	Chain	4	4	19 1/2 cwt. (about)	960	Jarrott and Lettis, 45, Gt. Marlborough St., W.
35-40	De Dietrich	4	120 mm.	120 mm.	700	Chain	4	4	21 cwt. (about)	1,300	Jarrott and Lettis, 45, Gt. Marlborough St., W.
28-30	Dennis	4	110 mm.	120 mm.	1,200	Gear	3 and rev.	5	23 cwt. (about)	750	Dennis Bros., Guildford, Surrey.
24	Fiat (Q)	4	125 mm.	125 mm.	1,200	Chain	4 and rev.	5	18 1/2 cwt.	895	Fiat Motors, Ltd., 37, Long Acre, W.C.
20	M.M.C. (m.o.v.)	4	100 mm.	130 mm.	1,100	Chain	4	5	20 cwt.	750	Motor Mfg. Co., 95, New Bond St., W.
40	Durkopp	6	105 mm.	120 mm.	750	Chain	2	2	990 kilogs.	1,250	Motor Car Emporium, 1, Addison Road North, W.
24	Georges-Richard-Brazier	4	104 mm.	100 mm.	1,200	Gear	4	4	16 cwt.	750	Quinn and Overton, 7a, Lower Belgrave St., S.W.
18	Panhard and Levassor (chassis)	4				Gear	4	4	750		J. E. Hutton, 81-83, Shaftesbury Avenue, W.
60	Mercedes	4				Gear	4	4	2,500		J. E. Hutton, 81-83, Shaftesbury Avenue, W.
18	Mercedes	4				Gear	4	4	1,200		J. E. Hutton, 81-83, Shaftesbury Avenue, W.
21-28	Mercedes	4				Gear	4	4	1,350		J. E. Hutton, 81-83, Shaftesbury Avenue, W.
38-40	Mercedes	4				Gear	4	4	1,550		J. E. Hutton, 81-83, Shaftesbury Avenue, W.
24	F.I.A.T. (chassis, with tyres)	4				Chain	4	4	735		Brit. Auto. Com. Synd., Long Acre, W.C.
27	Talbot	4	110 mm.	130 mm.	1,000	Chain	4	4	19 1/2 cwt.	920	Brit. Auto. Com. Synd., Long Acre, W.C.
16	F.I.A.T.	4	110 mm.	130 mm.	1,500	Chain	4	4	17 1/2 cwt.	750	Farman Automobile Co., 100-104, Long Acre, W.C.
16-22	Rochet-Schneider	4	100 mm.	140 mm.	800	Chain	4	5	18 cwt.	725	Morgan Donnc, 27, St. John's Sq., Clerkenwell.
24-35	Rochet-Schneider	4	110 mm.	150 mm.	900	Chain	4	6	20 cwt.	910	Morgan Donnc, 27, St. John's Sq., Clerkenwell.
14	Mors	4	105 mm.	145 mm.	1,200	Chain	4	4	17 1/2 cwt.	800	Roadway Autocar Co., Newman St., Oxford St., W.
19	Mors	4	105 mm.	145 mm.	1,200	Chain	4	4	21 cwt.	905	Roadway Autocar Co., Newman St., Oxford St., W.
24	Mors	4	105 mm.	145 mm.	1,200	Chain	4	4	23 cwt.	1,005	Roadway Autocar Co., Newman St., Oxford St., W.
18	Gladiator	4	95 mm.	140 mm.	1,100	Chain	4	4	17 cwt.	745	S. F. Edge, 14, New Burlington St., W.
15	Napier (chassis only)	4	3 1/2 in.	4 in.	1,000	Chain	4	4	15 cwt.	700	S. F. Edge, 14, New Burlington St., W.
18	Lanchester Touring Car	2	5 1/2 in.	5 1/2 in.	780	Gear	3	5	19 1/2 cwt.	720	Lanchester Engine Co., Sparkbrook, Birmingham.
25	Maudslay (chassis)	3	5 in.	5 in.	800	Chain	4	4	21 cwt.	47 10	Maudslay Motor Co., Coventry.
18	Maudslay Double Phantom	3	5 in.	3 1/2 in.	800	Chain	4	4	23 cwt.	13 15	Maudslay Motor Co., Coventry.
25	Maudslay Waggouette	3	5 in.	5 in.	800	Chain	4	8	35 cwt.	1050	Maudslay Motor Co., Coventry.
40	Maudslay (racing body)	6	5 in.	3 1/2 in.	800	Chain	4	4	26 1/2 cwt.	1260	Maudslay Motor Co., Coventry.
60	Maudslay (racing body)	6	5 in.	5 in.	800	Chain	4	4	27 1/2 cwt.	1,470	Maudslay Motor Co., Coventry.
18-22	Brushmobile	4	98 mm.	120 mm.	900	Chain	4	4	22 cwt.	750	Brush Electrical Eng. Co., Belvedere Rd., S.E.
18	Napier (chassis only)	6	4 in.	4 in.	900	Chain	3	4 or 6	19 cwt.	1,050	S. F. Edge, 14, New Burlington St., W.
20	Napier (chassis only)	4	5 in.	5 in.	900	Gear	3	4	19 cwt.	1,200	S. F. Edge, 14, New Burlington St., W.
24	Napier (chassis only)	4	4 in.	6 in.	750	Chain	4	Any No.	22 1/2 cwt.	900	S. F. Edge, 14, New Burlington St., W.
30-35	Ariel (chassis)	6	4 in.	4 in.	1,250	Gear	3	5	21 cwt.	875	Ariel Motor Co., Birmingham.

(Q).—Fiat Chassis are supplied separately; 16 h.p. at £650, and 24 h.p. at £850.

TOO LATE FOR CLASSIFICATION.

Since the foregoing tables were completed the following returns have come to hand:

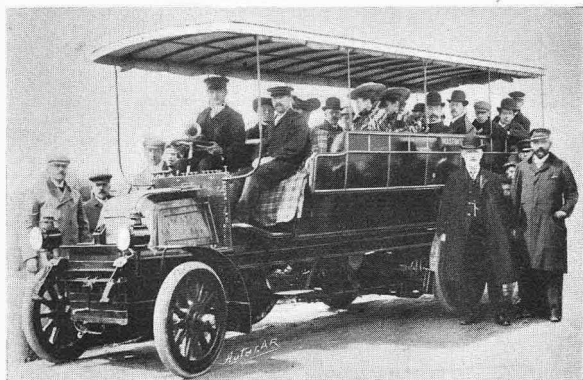
Panhard and Levassor cars: 7 h.p. £350, 8 h.p. £450, 10 h.p. £500; new type Centaur engine £575, 15 h.p. £750, 18 h.p. £850, 24 h.p. £1,050, 35 h.p. £1,400. Harvey Du Cros, 14, Regent Street, S.W.—12-16 h.p. Wilson-Pilcher car 4-cylinders, 3 1/2 in. x 3 1/2 in., 900 r.p.m., gear transmission, four speeds, five seats, weight 20 cwt., price £735; 18-24 Wilson-Pilcher, six-cylinders, 3 1/2 in. x 3 1/2 in., 900 r.p.m., gear transmission, four speeds, five seats, weight 21 cwt., price £892 10s.—Sir W. G. Armstrong,

Whitworth, and Co., 32, Great Peter Street, Westminster.—Single-cylinder Elswick, 4 in. x 5 in., 1,500 r.p.m., gear transmission, three speeds, two seats, weight 8 cwt., price £141 15s.; two-cylinder Elswick, 4 in. x 5 in., 1,200 r.p.m., gear transmission, four speeds, four seats, weight 12 cwt., price £225; four-cylinder Elswick, 4 in. x 5 in., 1,000 r.p.m., chain transmission, four speeds, four seats, weight 16 cwt., price £450; four-cylinder Elswick, 4 1/2 in. x 5 in., 800 r.p.m., chain transmission, four speeds, number of seats to order, weight 19 1/2 cwt., price £650. Elswick Motors, Ltd., Newcastle-on-Tyne.—

12 h.p. Drummond, two-cylinders, 4 in. x 5 in., 700 r.p.m., gear transmission, three speeds, four seats, weight 19 cwt., price £340. Dumfries Brass and Iron Foundry, Dumfries.—9 h.p. single-cylinder Mathieu, 110 mm. x 150 mm., 1,000 r.p.m., gear transmission, three speeds, four seats, 12 cwt., price £250; 16 20 h.p. Mathieu, four-cylinder, 90 mm. x 90 mm., 800 r.p.m., gear or chain transmission, four speeds, five seats, 15 cwt., price £560. L. A. Beckett, 31-32, King William Street, E.C.—12 h.p. Phoenix, two-cylinders, three speeds, gear transmission, price £350. The Phoenix Motor Co., Southport

RAILWAY COMPANIES AND THE MOTOR PROBLEM.

On Thursday evening last, Mr. George Montagu, M.P., read a paper on the above subject before the Automobile Club. The object of the paper was to point out what has been done and what is contemplated by the railway companies in the near future in relation to this question. The author mainly confined himself to the passenger aspect of the question, as he suggested that very little had been done by the companies in the substitution of motors for horses in the collection and distribution of goods carried. The expense of distribution from waggons



A full load on the G.W.Ry. Helston and the Lizard car.

on branch lines owing to shunting operations was enormous. It had been stated that in this respect the Midland Railway performed every year 14,000,000 miles of shunting. Where goods of various kinds have to be delivered to separate buyers from the same waggon, thus requiring breaking bulk, it would be more economical to handle such goods by motors on roads. The enormous increase of the travelling public had brought about a terrible state of congestion, and much difficulty was experienced in dealing with it. This has caused railway managers to look for a possible solution in the self-propelled vehicle, and the use of motor coaches running upon rails was now creeping in, chiefly to supersede trains on local branch lines. The author was, however, of opinion that before long they would be resorted to to relieve the congested traffic on main lines. One reason of this congestion was running trains of varying speeds on the same metals. Motor coaches carrying sixty to seventy passengers, with perhaps a trailer or two, could be used for stops at intervals of ten to fifteen miles at speeds that would not block the fast traffic. The car principle had for the first time been acknowledged as a solution of railway transit. The notion that there must be a separation of power from trains must be got rid of. The fast traffic railway problem would be solved by the separation of speeds. Simultaneously with the arrival of the motor coach was the proposal to run electric cars on the mono-rail principle at high speeds. Mr. Montagu then compared this present system of batches of expresses with the mono-rail principle of cars at seven minutes intervals, greatly to the advantage of the latter. The motor coach could be most successfully substituted for local services on small branch lines, with enough engine power to take trailers if required. Owing to the great control possible by the car, signalling might ultimately be dispensed with on branch lines, and, going a step further, branch lines might be found made up flush with asphalt surfaces, on which motor cars might run, the companies receiving tolls, without endangering the passage of the motor coach, if, indeed, this was retained. Again, much saving could be effected by the running of motor coaches in place of the heavy suburban trains in the slack hours of the day, when these heavy trains run practically empty at great loss and wear and tear.

The first motor coach to appear was designed by Mr. Drummond, of the L. and S.W., last year, for the working of a short branch line between Fratton and Southsea. Great economy has been effected since its introduction. The cost of running is 2.3d. per mile, as against 8d. to 1s.

for the ordinary engine and coaches; coal consumption 6.5 lbs. per mile, as against 20 lb. for the ordinary system. The first coach was originally designed with a vertical boiler, but Mr. Drummond has now adopted a horizontal boiler as standard pattern. The new cars will travel sixty miles without a fresh supply of water, and carry sufficient coal for the day. They will run at thirty miles an hour.

On the Great Western, motor coaches have been designed for special work. In the Stroud Valley they have to contend with gradients of one in seventy-five and one in 100, and have as high an acceleration as 1.5. Their facility for obtaining a speed of thirty miles an hour with rapidity is very marked, and they can take ten trailers if needed. Two of these are now running in the Stroud Valley, and twelve more have been ordered. It is contemplated using them for small branch work, and also for running during the crowded times of the day between the ordinary suburban trains, and during the slack hours. Already they are carrying many more people than the trains.

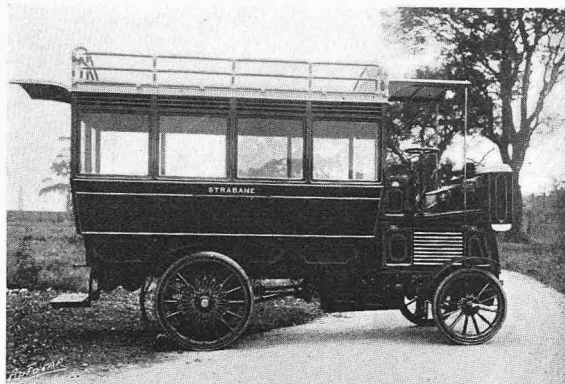
The Taff Vale Railway has also been running motor cars between Cardiff, Penarth, and Cadocston, a distance of nine and a half miles.

Experiments have been going on with petrol cars on the North-Eastern Railway in this direction between East and West Hartlepool. The difficulties of starting these heavy coaches and of changing the gear of so rigid a machine, led to a more flexible device being adopted—a petrol engine driving a dynamo, which in turn drives motors on each of the four axles of the two bogies. This system is much the same as that of the Fischer omnibus. The cars are 52 ft. long, one-third of the space occupied by the engine room (90 h.p. petrol engine). The seating capacity equals fifty-two, all one class. There are twenty-six seats with reversible backs, and the car weighs thirty-two tons.

The Caledonian Railway are experimenting similarly to the North-Eastern, but their cars will be driven by petrol engines direct. Should these cars prove successful, and they should be more economical than steam cars, there is little doubt that they will be adopted in the future.

Motor coaches have to be constructed, as in the case of the Great Western, for service on special parts of their roads, and therefore would be more powerful for stiff gradient work, and of greater capacity for long distance, or of smaller power for short distance work, as is shown in the Brighton and South-Western car; but the policy of using trailers should be dropped. Economy must ensue from each coach being of sufficient power for its own propulsion, and that alone.

Speed gears marked a difficulty in connection with the motor coach driven by a petrol engine, but since the



One of the Earl of Leitrim's Stirling 'buses.

N.E.R.'s experiments, combining petrol and electricity, Mr. Drake, manager for Messrs. Stirling, of Edinburgh, had invented a special gear which facilitated starting, and after attainment of ten to twelve miles per hour the top speed could be at once introduced, giving acceleration to thirty or forty miles per hour.

Many railway companies were waiting while watching the motor experiments of others, and upon the Liverpool and Southport line recently electrified, the running of

single cars during the slack portions of the day was contemplated. With electricity, the advantage of two or three cars possessing motors on a train of seven or eight were obvious, as such cars could be run singly or the train divided to exactly suit requirements.

The G.W.R. was eminently suited for motor experiments, owing to the possession of a series of small branch lines tapping the main system, while the road motor car could be used as a feeder from towns at short distances from, but not tapped by, the system. The L. and S.W.R. intended running others on the Basingstoke and Alton light railway. The Midland Railway were contemplating experiments with motors, and the G.E.R. were seeking powers to run motor cars, but details were not obtainable.

The Caledonian had run two Milnes-Daimler waggons for some two years. They had, however, been much impressed by the Stirling motor coach, and would very probably put some in service. This company were the first to use motors for parcels and light goods deliveries. The N.E. service between Beverley and Beeford (fourteen miles), inaugurated last summer, had now been extended to Driffield. There were four services each way per day, timed to meet the train service; fares from 4d. to 1s. 10d.; 4d. for 56 lbs., 8d. for 112 lbs. of luggage. This was the first regularly advertised motor service in connection with a railway.

Lord Leitrim's "Coast Line Motor Way" had done much to assist the development of the beautiful country in

Donegal by regular motor services in connection with the trains. The cars ran between Strabane Station and Rosapenna, thirty-eight miles, and connect at the former place with the G.N. and Donegal Railways, *via* Londonderry, at hours suiting English and Scottish boat services. His Lordship had at his own expense steam rolled the entire length of road used by his motors. The cars—Stirling's—had run from July to end of October, bar one day, without any trouble whatever. His Lordship was the first to carry the mails. The road competes with the railway service, which is very roundabout. Next season fares will be reduced, and through tickets issued to Rosapenna.

The G.W.R. are doing good work in opening up Cornwall and Devon by means of road vehicles. Two services—Helston and the Lizard and Marazion and Newlyn—had been in effect some time. The cars were 20 h.p. Milnes-Daimlers, accommodating twenty people, and the purchase of some double-decked cars to take thirty-four was in contemplation. The Helston and Lizard service met London trains, and it was proposed to run services from Penzance to St. Just, Mullion to Helston, Saltash to Carrington, and Modbury to Yealmpton. On the latter route the G.W. would meet with private competition. On the Helston service during the summer, only one train was missed, while the Cornishman and the Dutchman were met every day. Of the thirty cars ordered, eighteen are of 20 h.p. and twelve of 16 h.p.

TYRE ADHESION AND MOTOR RACING.

By Mervyn O'Gorman.*

The Question of Horse Power.

A horse which exerts a pull of about 375 lbs. uninterruptedly for an hour on a load and does a distance of one mile in the hour is working at the rate of one horse-power. If for any reason (such, for example, as the weight being too small or the road too slippery for his hoofs to adhere to the ground) he is unable to exert as much as 375 lbs. pull when covering one mile per hour, he is thereby prevented from working at the rate of one horse-power.

The same applies to a motor car engine. In this case, even when the road is not slippery, there may occur a condition which does not appear with horse traction to the same extent, viz., that the tyres fail to adhere to the ground, owing to the designer having placed insufficient weight on the driving wheels. In such a case it might be impossible for the engine to exert the pull (or "push-off" in this case) of 375 lbs. without skidding the wheels, and thus it would be impossible for it to work at the rate of one horse-power. With under-powered motor cars this difficulty does not occur, but to develop 10 h.p. on the rim of the road wheel while covering the ground at the rate of one mile per hour, the engine must exert a push on the road of 3,750 lbs. This is, on touring cars of ordinary weight, impossible, because the weight on the back wheels is invariably less than 3,750 lbs., while the adhesion with the road is only a fraction of the weight on the back wheels. As the speed rises, however, the push necessary for the development of, say, 10 h.p. goes down until we find that at ten miles per hour a push of 375 lbs. means 10 h.p. It is useful to tabulate the facts for various horse-powers thus: To develop—

1 h.p.	when travelling at 1 m.p.h., a pull of 375 lbs. must be exerted.
10 h.p.	" " " 1 m.p.h., " 3,750 lbs. " "
10 h.p.	" " " 10 m.p.h., " 375 lbs. " "
20 h.p.	" " " 20 m.p.h., " 375 lbs. " "
30 h.p.	" " " 30 m.p.h., " 375 lbs. " "
40 h.p.	" " " 40 m.p.h., " 375 lbs. " "
40 h.p.	" " " 20 m.p.h., " 750 lbs. " "
40 h.p.	" " " 1 m.p.h., " 15,700 lbs. " "

This tabular method of stating the case (for which the author is entirely indebted to Mr. Lyons Sampson) makes very clear the fact that if the speed and power go up proportionately to one another the "push-off" exerted by the driving tyre on the road surface remains the same, but until the speed of the car has had time to increase the "push-off" will need to be exceedingly great. Thus a 40 h.p. car if it could start work with the activity of forty horses would, while it was only moving at one mile per hour,

exert no less a push than 40×375 lbs. = 15,700 lbs. This tremendous push off is rendered impossible by the fact that the wheels of a car weighing 2,000 lbs. only grip the ground strongly enough to exert about $\frac{1}{50}$ lbs. push. Beyond this point they skid.

Weight available for Adhesion.

Enough has been said to show that a high powered motor car engine when the car is moving slowly cannot develop its full power unless the road wheels are capable of biting the ground sufficiently hard to transmit the torque. As a rule, only about 0.6 of the weight of the car is on the driving wheels, and of that only 0.625 is available for the bite or adhesion (owing to the average co-efficient of friction between rubber and road being 0.625). So a 10 h.p. car weighing 2,000 lbs. cannot exert its full 10 h.p. when the car is starting, nor, indeed, till it is travelling at five m.p.h. To enable it to do so it would be necessary to increase the adhesion between the road and the tyres by some such means as putting a larger share than usual of weight on the back wheels. It is found in practice that once a 2,000 lbs. car is started it only requires (apart from the energy expended on internal friction) a very small pull to keep it going at ten m.p.h. on a good surface on the level, viz., something less than three per cent. of the weight (or, say, 60 lbs. pull) which is well within the limit of adhesion of the wheels (750 lbs.).

Acceleration.

All these considerations are chiefly of importance in two practical cases (1) at the start of any car, and (2) in considering how far it is useful to use much larger powers than 40 h.p. or 60 h.p. on cars weighing 1,000 kilogs. From Mr. Sampson's figures, it appears that with the construction now fashionable the "forward" engine is undoubtedly disadvantageous for quick acceleration, however good it may be for the tyres (by spreading the weight). Large powers are therefore not only useless for short journeys and town travelling (which is obvious from other points of view), but may also prove not to be the best design, even for racing, if the competitions are over short distances measured from a standing start. The best illustration of this fact which occurs to one's mind is the Phoenix Park speed trial of 1903, where all cars having enough power at the start to exceed their adhesion (calculated approximately as above) stood almost motionless for a few seconds after the signal to start had been given. They skidded their driving wheels and cut out a groove in the ground. One competitor alone seemed to appreciate this fact, and, in spite of the extra weight and windage, preferred to carry an additional man at the back "to keep

* An extract from Mr. O'Gorman's forthcoming book on Motor Car Management by permission of the publishers, Messrs. Constable & Co.

the back wheels down," as he termed it. He was thereby correcting an error of design of the car (from the point of view of rapid acceleration). His designer had given him a great engine, capable of great effort, and doubtless from observation he knew that he could not use half his power at starting, although at starting he wanted it all.

Distribution of Weight.

It would be wrong to contend that on all cars having the weight distributed as at present a 60 h.p. engine is useless, but it is unquestionable that the output of such an engine is not available at starting, or, indeed, at any speed under thirty m.p.h., although the whole of it is more wanted than at any other time. The objection to

imitating railway practice and loading one pair of wheels excessively is very great because it imperils the safety of the rubber tyres. The remedy which suggests itself is to imitate another railway method of using all the adhesion, viz., to drive all four wheels.

This conclusion is arrived at reluctantly because of the increased complication. Such a four wheel driver would almost inevitably become a four-wheel "steerer" with differential gears in each axle as well as a differential in the linkage of front and back axles.

Who shall say, however, that an electrical or pneumatic transmission will not combine the advantages of independent driving of the wheels with complete control of the change of speed, and be the racer of the future?

CLUB DOINGS.

Sheffield and District A.C.

The first annual general meeting of the above club held last week was well attended. Mr. Herbert Barber presided. The following officers were elected for the ensuing year: Vice presidents, Messrs. Harvey Foster, Herbert Barber, Duncan Gilmour, and James Barber; treasurer, Mr. E. F. Coupe; honorary secretary, Mr. F. B. Cawood; committee, Messrs. A. J. Blyde, W. Coldwell, C. A. Clarke, S. E. Fedden, E. H. Hill, Benj. Hind, W. James, J. W. Needham, J. T. Thompson, and J. R. Wade. On Saturday, February 27th, the car section will meet at the Town Hall at 2.30 p.m. for Castleton.



View outside Madison Square Garden at 10.30 a.m.
Photo from "The Automobile," New York.

Lincolnshire A.C.

Before the members of the above club on Friday last week, Dr. Gilpin, of Bourne, read a paper on "The Cost, Care, and Upkeep of a Motor Car." The bad weather spoilt the attendance; otherwise the proceedings were successful. A dinner preceded the paper, and in the discussion which followed, Capt. Colc. Mr. C. W. Pennell, Dr. Husband, Mr. Wright, Dr. Cragg, Mr. Holland, and Dr. Lowe took part. The greater part of Dr. Gilpin's paper is reproduced on page 149.

Scottish A.C. (Western Section).

At a meeting of the Western Section of the Scottish Automobile Club, held in the Windsor Hotel, Glasgow, on February 1st, Mr. John Adam presiding, Mr. Robert Drummond, C.E., F.S.A. (Scotland), read a paper on "The Evolution of Road Making in Scotland." The present road system was instituted in 1617, when the Justices of Peace were constituted the road authority. The era of road making ended with the advent of railways about 1840. He pointed out the tendency of some road boards to neglect the main lines, and urged, in view of the increasing use of the road and of the new forms of locomotion, that these should be treated as of first importance. He took the view that small area authorities were to be discouraged, and that great advantages accrue from the whole roads in a county being under one control. He blamed to a slight extent the steam roller for aggravating the dust nuisance, but the fault was due to a proper binding material not being used. The material giving off least dust, and also the best results in binding new metal, was the half-worn material taken from the old surface. To obtain this the road should be regularly scarified and the loose material

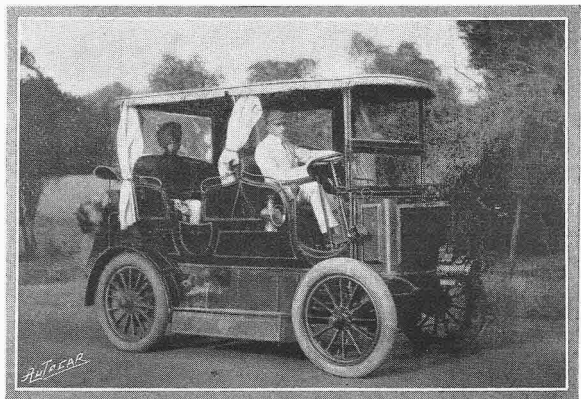
laid aside. He advocated greater attention to sweeping and cleaning of roads in dry weather, both as a dust preventive and in the interests of economy, as dust was much more readily removed than mud. The experiments with oil were explained and discussed, and the club, it was suggested, should bear the expense of local experiments. A discussion followed.

Burnley and District A.C.

A paper was read to the members of the above club on Tuesday, the 26th ult., by Mr. Burton, of Blackburn, electrical engineer and motor car dealer, on "Electric Ignition." Mr. Burton dealt in turn with the various systems of ignition, and gave some interesting details as to the composition and working of the coil. He expressed his opinion that in a very short time the coil would be abandoned. An interesting discussion followed, in which Messrs. G. H. H. Clements, T. G. Parkinson, and the hon. secretary (Mr. S. Lawson) participated. Another paper is promised shortly by Mr. Harold Smith, on "The Latest Improvements in Cars."

The Motor Union.

A meeting of the General Committee of the Motor Union was held on February 1st at 119, Piccadilly. Representatives of the Automobile Club, the Nottingham, East Surrey, and Kent Auto Cycle Clubs, etc., were present. Upwards of £40 was voted to defend members of the Union, including two charged with offences under the new Act. It was decided to file notices of objection to the applications by the borough councils of Blackpool and Newbury for a ten miles limit of speed within their districts. The propriety of taking steps to secure legislation for the universal lighting of vehicles upon public roads was considered, and Mr. Rees Jeffreys was requested to prepare a report. The secretary of the Union was instructed to prepare, after consultation with the honorary secretaries of the bodies represented on the General Committee, a list of questions for Parliamentary candidates for the consideration of the committee.

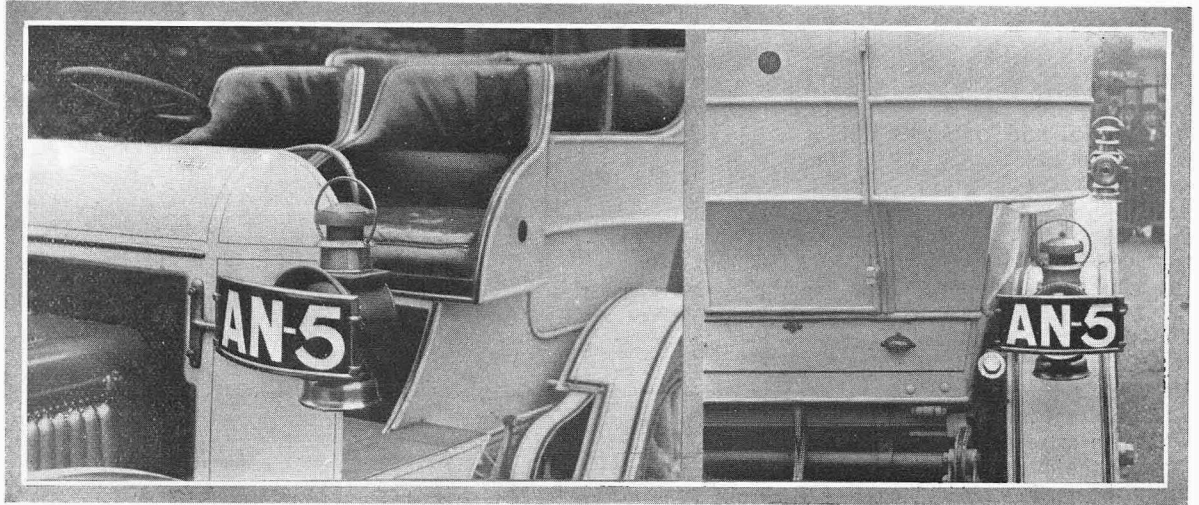


THE AUTOCAR IN INDIA. There are but few places in India where it is possible to be cut off from the white man, but the independent state of Rewah is one of the few. The Maharajah of Rewah is, however, not by any means behind the times, as he is the possessor of an 18 h.p. British-built Gardner-Serpollet car, an illustration of which is given above. The vehicle was supplied by the Motor Transport and Supply Co. of India, who sent us the photograph.

NEAT NUMBERS.

Mr. E. Montague Edward has devoted himself to designing number plates which, while conforming to every requirement of the regulations, shall not disfigure the car, and we think our readers will agree, from the photographs we here reproduce, that he has been successful. His car is a Daimler, painted pure white, and he naturally resented the idea of disfiguring it by attaching black tablets in the usual manner; so he designed and had

thickness and clearance. The curved glass tablet is arranged to slide into a brass rabbeted beaded frame, the top portion being removable but retained rigidly by two set-screws. This frame is fixed to the rim of the lamp disc, thus making a thoroughly sound and workmanlike job. Consequently the lamp can be opened for lighting or cleaning purposes without the slightest difficulty, and, of course, owing to the transparency of the opal, it is as efficient by



manufactured what he calls a day and night sign. The illustration on the left shows the near side front lamp, and the other one the tail lamp. The device, it will be seen, is an extension of the disc rim in both cases. The identifying letters and number are clearly shown white on black. The sign itself is quadrant formed of stout opal or white glass, a portion of which is enamelled black, so that the numerals are left solid white of the regulation

night as well as by day, for the light from the lamp illuminates the transparency. A ruby disc can be inserted in the centre of the black sign, but this is not necessary, as the off-side front upper lamp is usually provided with a ruby disc, showing the necessary light backward. Messrs. Young and Martin, Caledonian Works, Stratford, E., are authorised to supply these fittings, the price for a pair complete, with a reserve couple of glasses, being 21s.

A VICTORY FOR THE MOTOR UNION.

An Inspector's Faulty Watch.

On Thursday, January 28th, Mr. H. Liddell, of Lynwood, Addison Crescent, was summoned by Superintendent Marks, who has made himself somewhat notorious in Surrey in connection with motor cases before the Kingston Bench, for driving his car down Tartar Hill off the Fair Mile on the Portsmouth Road into Cobham Street at a greater speed than twenty miles per hour on January 17th. The Superintendent had had a length of 440 yards measured down the hill, and asserted that he could see when a car passed the white post on the summit, although he was posted 380 yards away, and also when it passed another mark 60 yards away. The constable timed Mr. Liddell's car to cover the measured distance under 36 2/5s., which was equal to twenty-four miles per hour.

Mr. Staplee Firth, who defended, cross-examined the officer, who admitted that he was in plain clothes, that the car was not driven recklessly, and that there were no children about. Mr. Firth severely tested the constable's evidence as to the possibility of correctly starting a stop watch on a moving vehicle as it passed a white post 380 yards away up a hill, and again as it passed another point 60 yards away. In reply to a question, Marks admitted that he held his watch in his hand in his coat pocket, and the defendant was not driving to the danger of anyone. The police sergeant who stopped the car said he judged the speed as the car rounded the corner. After Mr. Liddell's car had been stopped and the superintendent and Mr. Liddell were engaged in conversation, a gentleman who was passing at the time was asked for his opinion of the speed at which the car had descended the hill, and estimated it at fifteen miles per hour.

Mr. Harry J. Swindley, the honorary official timekeeper to the Automobile Club, was asked by the Chairman to examine Superintendent Marks's watch. This was handed

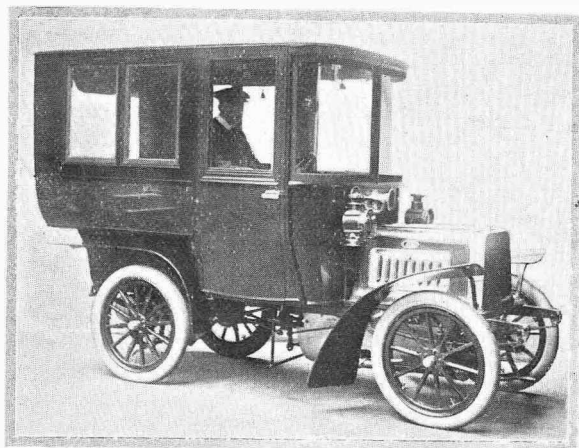
to him, and after he had tested it Mr. Firth asked: "What do you think of it?" "It is a worthless instrument for the purpose," replied the witness.—"Oh, how do you find that?"—"I have applied the test which is always applied when a timekeeper applies for appointment to either the Automobile Club or the National Cyclists' Union. A watch which performs as this watch performs would not be passed by any body appointing timekeepers. After pressing the plunger to start the stop watch I find that a very slight pressure of the finger on the plunger suffices to hold the chronograph second hand quite still, and this hand goes on again as soon as the pressure is released. Therefore it is quite possible to time a man to cover five miles in 5s. with this watch." The witness started the watch again, and holding it out before the Magistrate's Clerk said, "Isn't the second hand standing still?" "Yes," said the Magistrate's Clerk. "Now, hasn't it gone on again?" continued the witness. "Yes," said the clerk. "Take the watch and do it yourself." The Magistrate's Clerk took the watch, and after operating turned to the bench, and remarked that he could hold the second hand still, and that it required only a little pressure to do it.

Mr. Swindley, continuing, said he had no doubt Superintendent Marks held his watch in his hand in his pocket with his finger on the plunger ready to press it the moment he imagined the car had passed the end of the measured distance. It was the way a watch would be held, and that he had at times put quite enough pressure upon the plunger to stop the movement of the second hand in its course while the car was actually between the measured points. That would, of course, show a car to be covering that distance in much less time than it actually did.

The Chairman, turning to witness, "Thank you, that evidence has been of great assistance to us."

THE INTERNATIONAL LAUNCH RACE.

The entries for the Harmsworth Challenge Cup for the International race for motor boats closed on February 1st. The entries are as follow: Two from the holder (Mr. S. F. Edge), three from J. E. Hutton, Ltd., one from Messrs. Thornycroft, and one from Lord Howard de Walden. Then, in addition to these seven to defend the cup for Great Britain, there are three foreign entries—one from MM. Clément, one from Pitre and Co., and the third is a Gardner-Serpollet steam launch entered by Legru and Gardner. The Talbot and Pitre boats are both driven by petrol engines, and we hear that there is a likelihood of the Talbot hull being stamped from a single sheet of steel, somewhat after the manner of the Darracq frame. As seven boats have entered to defend the British title, there will have to be an eliminating race to decide upon the three which shall represent England in the race itself. The race (not the test) will take place on July 30th. There is still a possibility of further entries, as, although the time expired on February 1st, we believe so long as the challenge is dated prior to that date it would be accepted, so that Germany or the United States may yet take part in the International launch race. It would be extremely interesting to see an American team in the contest, particularly the naphtha motor driven boats, in which they claim to excel.



♣ A 12 h.p. Argyll car with a new design of brougham body

In case it should be suggested that they are copying us, it is only fair to Messrs. Miller and Co., of 19, Hanover Court, W., to say that they are compiling a list of motor vehicles for 1904, which they will shortly circulate. We have seen the manuscript for this list, and it appears to be a very complete one. We mention the matter, not because we look upon this list as a new idea, but merely to absolve the firm who will shortly be publishing theirs from the suggestion of copying. We may say that we have had this list in view for several years, but have not been able to compile it, more pressing matters having intervened. So far as first publication of anything of this sort is concerned—and, after all, that is what counts—we believe the club *Journal* holds the record.

BRUSSELS AUTOCAR SHOW.

The third exhibition of automobiles in Brussels opened on Saturday last in the hall of the Parc du Cinquantenaire. The galleries were removed and still there was barely room. If the success of an exhibition is to be judged by the number of visitors this was successful indeed. Twenty thousand people were present on the opening day. The King and Prince Albert, both ardent automobilists, have announced their intention to inspect the exhibition. The exhibits were, of course, much the same as had been seen at the Paris Show. M. Mettwie, the Commissioner General, and his staff, are greatly to be congratulated on the arrangements, which are in every respect excellent.

New Patents.

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

SPECIFICATIONS PUBLISHED JANUARY 28TH.

The following specifications were printed and published on the 28th January, 1904. All notices of opposition to the grant of patents on the several applications should be filed not later than the 13th March, 1904.

1903.

- 337.—H. Bremer. Elastic tyre with chain band arranged circumferentially round it.
- 344.—A. G. Melhuish. Two-stroke motor.
- 374.—P. L. and J. Renouf. Motor, gear, and steering mechanism for cars.
- 435.—M. H. Smith. Pivoted steering pillar.
- 472.—A. W. Wall. Clutch and rear driving pulley for motor cycles.
- 560.—P. L. Renouf and E. B. Tillam. Motor, free-engine, and two-speed gear for motor cycles.
- 753.—C. H. Gray and T. Sloper. Flattened cord fabric for tyres.
- 1,219.—H. Crouan. Automatic spray carburetter.
- 2,172.—A. Craig. Locking device for cam-operated speed gear.
- 4,220.—Humber, Limited, F. Easom, and J. Sanson. Friction clutch for chain-driven motor cycles.
- 4,736.—E. Perkins and J. A. Rowcliffe. Differential gear and means for locking same.
- 4,799.—E. Perkins and J. A. Rowcliffe. Change speed gear for motor cars.
- 26,498.—J. Spyker. Circular water jacket.
- 26,499.—J. Spyker. Steering pivot for motor cars.
- 26,720.—J. H. Bishop. Safety starting handle device to prevent damage by backfires.

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