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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"THE AUTOCAR" SUBSCRIPTION RATES.

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Notes.

Alcohol as a Motor Fuel.

The majority of patriotic and thinking automobilists are much interested in the question of a home-made fuel for motor cars, and since Dr. Ormandy's paper was read before the Automobile Club their thoughts have been directed still more pointedly to the subject. We have already said we consider the matter is one of national importance, and we have also expressed the opinion that it should be taken up by the Automobile Club, not merely with a view to obtaining a competing fuel to petrol so as to keep down the price of petrol, nor as a sop to the agriculturist, although neither of these sides can be ignored, but as a fitting work for the national club. The British club should not only do all it can for British automobilism, but it should do its best in all matters within its scope for Great Britain and Ireland. It may be argued that Great Britain and Ireland can look after themselves without the assistance of the club, but if this spirit had actuated the pioneers of automobilism or the founders of the club—or, for the matter of that, the founders of *The Autocar*—things would have been in a very much less advanced stage than they are to-day in the automobile world; in fact, it is a question whether there would be any autocars in Great Britain at all. Therefore, we again urge the club to take up the matter of alcohol fuel for motor cars. It must not be imagined that the distillers of alcohol are uninterested in this matter. We know that more than one of the largest firms of distillers in Great Britain are keenly alive to the question. They have had the matter of supplying alcohol for motive power under their consideration for a long time, and they have only been deterred from going further into it by the difficulty in finding a denaturing agent which would satisfy the excise department, and so avoid paying duty on alcohol which was undrinkable, and which was only intended for power purposes. The distillers, powerful though they are in their own way, cannot approach the authorities in the same manner that the Automobile Club could. Moreover, the club has it within its power to organise a movement in favour of a home-made fuel, which would have far wider effect than anything which could be done by the distillers themselves, as the influence of the club, when properly directed, is very great, and with the large number of influential people within its ranks there should be no difficulty in giving the home-made fuel movement a thoroughly good start. When this start is once given we believe the co-operation and support which will be forthcoming will surprise a good many people. It is no good shirking the work because it is difficult. It will never become less difficult till it is squarely tackled, and then the difficulties will one by one be overcome.

Brakes.

The motor accidents which have been recorded within the past few days may be summarised, with one or two exceptions, as being entirely due to failure of the brakes. Now, at the time of the Edge Hill accident it will be remembered that the brakes of the car were blamed. Strangely enough, a machine of the same make figured in the Harrow accident, and we understand that the cause of the brakes failing to act was the same in each case—that is to say, the owner or his driver had simply not taken the trouble to adjust them. Every motorist knows that from time to time the brakes must be adjusted—*i.e.*, as the bands or blocks wear and the drums and rings wear, the rods which apply the brakes are too long, and they require shortening. In all brakes a provision is made for this, and it is only a matter of a few minutes with a spanner to shorten the rods so that the brakes act properly. If this is not done, the pedal goes down to the floor, or the handle right forward as far as it can go, without

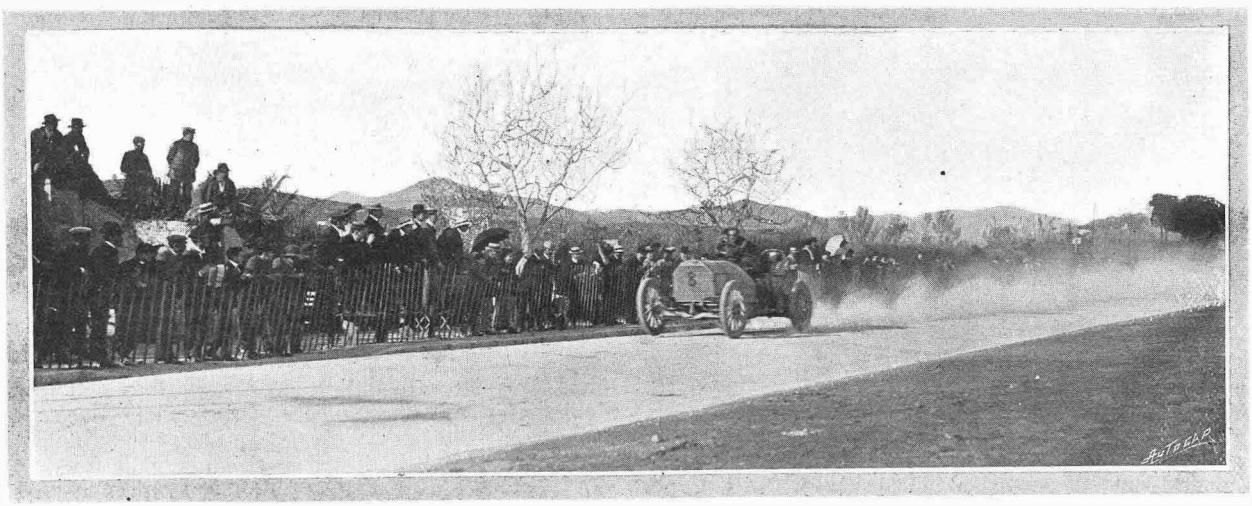
the brakes being powerfully applied. Now, it appears nothing can be done to make people adjust their brakes if they will not, and the want of the moment is a brake which is absolutely proof against carelessness or almost criminal neglect. It is almost impossible to produce such a thing, but it is generally accepted that the best brake, all other things being equal, is the one which requires the least adjustment. Up to the present we have come across no better suggestion than the one we made last summer, which was in favour of fitting a road brake. This was to be a large shoe applied by an extra pedal, the whole arrangement being of the strongest and simplest construction, and if the other brakes failed the driver could apply the road brake. The brake would be noisy, and objectionable in many ways. Such a brake is quite unnecessary, provided the ordinary means of retardation are kept in decent order, and we suppose it would never be fitted except by careful people who would like to make assurance doubly sure. It would seem that nothing can be done to protect foolish or careless persons against themselves; warnings are wasted on them, but the worst of it is they do not always suffer alone. In almost all cases other people confide in them, and suffer with them when the car meets with an accident through their gross neglect of necessary and simple precautions.

Motor Jobmasters.

From enquiries which we receive, there is evidently room for the motor equivalent to the jobmaster. There is a large number of people who make a practice of hiring their horse carriages. For various reasons they object to purchasing, and they are now disposed to start a motor car in place of a horse carriage, and to hire such a vehicle regularly. There is a still larger class in which it would appear the period of hesitation is not yet passed. If they could hire a car for periods varying from a month to six months they would give motoring a good trial, and if they liked it, would then purchase a car. These two classes which may, from the motor jobmaster's point of view, be regarded as one, in nearly all cases require a man with the car. There are already firms who undertake this class of business in London; but, with very few exceptions, it is merely a branch, and the number and choice of cars are very small, while in the provinces, with one or two exceptions, the experiment has not been tried at all, though here and there an agent may have a car which he hires out for short periods from half a day to a week. As we are always anxious to do all we possibly can to help to spread the practice of automobilism, we shall be glad if all the firms who are undertaking the hiring business would send us their names and addresses so that we can refer any enquirers to the agent or firm who is nearest to them. As time goes on, the hiring of motors will no doubt become quite an important phase of the movement; it is now only in its infancy. It requires a great deal of pluck, enterprise, and no small amount of capital to enter into it with any chance of success, for it not only means a heavy outlay, so far as the cars themselves are concerned, but arrangements have to be made for their upkeep and repair, as, of course, the hirer is not responsible in these directions, the fee he pays for the car being inclusive of every expense connected with it, except that for fuel and lubricating oil.

The Sport of Motor Launch Racing.

Young as is the new sport of motor launch racing, it will be seen from the report of the Monaco races which is given in Continental Notes and News this week that some most exciting sport was provided. We do not refer to the trouble with Parisienne II., which was certainly exciting enough in its way, but to the magnificent finish made in the hundred kilometres handicap. This is, roughly speaking, sixty-two and a half miles, and five boats were entered. They were accorded starts based upon their performances in the scratch races, and the quintet finished so nearly together that there was only thirteen minutes between the first and the fifth boat, while the second boat was only a third of a minute behind the first. This is a remarkable finish for an open sea race of such a distance, and the mere record of it is sufficient without argument to show anyone with any sporting knowledge at all that motor boat racing is a sport worth enjoying. There is exhilaration as well as excitement, too, as will be shown by the fact that the sixty odd miles were covered in a little under three hours—not fast for land travel, but distinctly so for launches on the open sea.



In order to include a race against the clock over a mile course with a flying start the Promenade des Anglais at Nice was lengthened sufficiently to permit of this being done. The photograph above depicts Mr. Andrew Fletcher driving his 90 h.p. Mercedes over the course.

USEFUL HINTS AND TIPS.

Truing Contact Points.

Realising that it is practically impossible for any man to file up the faces of the offending points correctly without some aid from a subsidiary device, we have devised two "jigs," which can be made for a few shillings, and by the aid of which the merest tyro at the use of a file will be able to make an exactly flat, true face on the point.

How to true up the Contact Screw.

In devising a jig for trembler screw points, the simplest possible form has been purposely ignored, for the reason that, as many of the coils used are of foreign make, foreign sizes and screw thread pitches are used, and great difficulty would be found in getting either a "tap" which would fit the trembler screw, or in cutting a tap to do so, since almost all the lathes in England have English pitch leading screws. Of course, if a tap can be obtained, all that is necessary for the trembler screw device is to drill and tap a hole through a piece of ⅜in. steel plate, ground perfectly true on one face, and then harden the plate. The hard flat face acts as a guide for the file, ensuring that it travels truly in the same plane, and the fact that the trembler screw is held by its own thread is a guarantee that the face of the point is at right angles to the line of the screw. This way of doing the point is certainly the simplest, but we are taking it that the trembler screw cannot have its thread matched without trouble and expense, and the jig illustrated in fig. 1 obviates any difficulty in this direction. It consists simply of a piece of cast steel bar, bent round as shown, and having the face marked D ground quite flat. Through the centre of this portion of the bent steel a hole is drilled, which is exactly the size of the outside of the trembler screw, so that it will just push in from the under side easily. In the illustration a slice has been cut out in front of the trembler screw A so that it can be seen. Exactly opposite this hole in the other arm of the bend a second hole is drilled and tapped with any convenient thread. Through this hole the round-ended set screw B is inserted, its rounded end bearing beneath the milled head of the trembler screw. The steel bend and the screw B should both be hardened. To use this jig the trembler screw is inserted, and the lower set screw B run up until the contact point C can just be seen, on glancing along the face D, to be

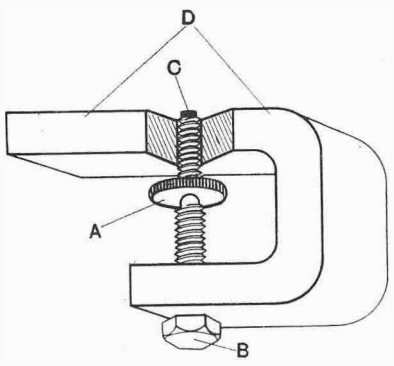


Fig. 1.—Jig for filing trembler screw points correctly.
A, trembler screw
B, adjusting screw acting as a stop.
C, platinum point
D, (hardened flat) face

sufficiently above that face to clean up quite flat. A fine flat file then steadied along the true face D will complete the operation, and a perfectly level surface will be obtained for the point C.

Truing up the Blade Contact.

The jig for the trembler blades illustrated in fig. 2 consists of a cruciform base, the central portion of which is bored and screwed to receive the circular table A. This table, which is shown separately in the left-hand corner with its shank in section, is made with a buttress thread as shown, and preferably its edges should be knurled or milled. Along one diameter of the base, and equidistant from the centre of the table A, are the screwed studs D D, which pass through holes in the two clips C C. These clips are as shown,

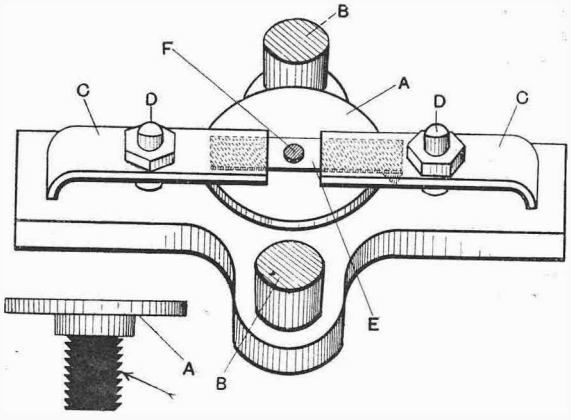


Fig. 2 Perspective plan view of jig for filing the points of trembler blades flat.
A, adjustable table with buttress threaded shank
BB, hard steel studs for grinding the file
CC, clips holding blade to table.
DD, studs and nuts for tightening clips.
E, trembler blade.
F, platinum point

and consist simply of two metal strips about ¾in. wide and $\frac{3}{16}$in. thick, bent over at the one end, and ground flat on the down-turned face opposed to the top of the table A at the other. Along the other diameter the studs or stops B B are fixed, these being screwed into the base and made from hard steel. The upper faces of these studs B B must be perfectly level, and exactly the same height from the base plate.

The method of procedure is as follows: The trembler blade E is laid down on the table A with the platinum point F upwards. The clips C C are slipped over, so that the trembler blade is between the lower faces of the clips and the table top, but the nuts on the studs D D are left quite slack. A straight-edge is then held across the faces B B, and the table screwed up until the point F comes into contact with it. The straight-edge is removed and the table taken up just a shade more, according to how much has to be removed from the platinum point F. The nuts on the studs D D are then tightened down gently, when the blade is gripped firmly against the surface of the table, and, moreover, since the table has a buttress-threaded shank, the pressure locks the table very securely in position. A fine file is then run across the studs B B, with the result that the point F is made quite flat and true with the blade in both directions.

Two steel plates, identical in shape, which can be clamped together by a pair of thumbscrews, and having a ⅜in. hole drilled completely through the two, make an excellent jig for holding the end of the trembler blade when filing the hole to secure coincident setting of the points, this obviating straining or bending

THE WHITE STEAM CAR.

(Concluded from page 477.)

LAST WEEK THE GENERAL ARRANGEMENT OF THE CAR WAS DESCRIBED AND THE GENERATOR ILLUSTRATED TO SHOW ITS CONSTRUCTION. THE BURNER WAS DEALT WITH, AS ALSO WAS THE METHOD OF AUTOMATICALLY MAINTAINING THE SUPPLY OF FUEL TO THE BURNER AND WATER TO THE GENERATOR.

HAVING dealt with the burner and the boiler, both of which are automatic in their action, we will turn to the compound engine carried on the frame beneath the motor bonnet.

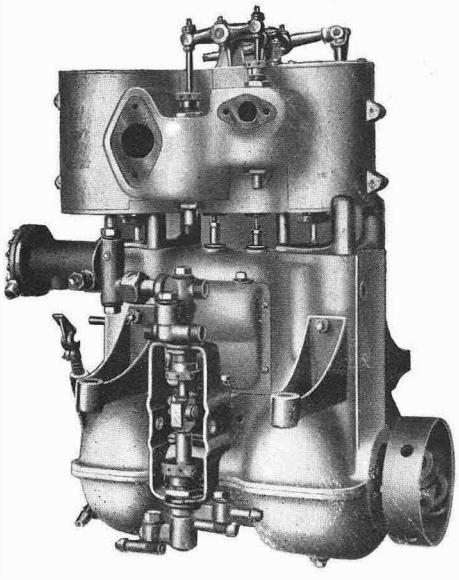


Fig. 3.

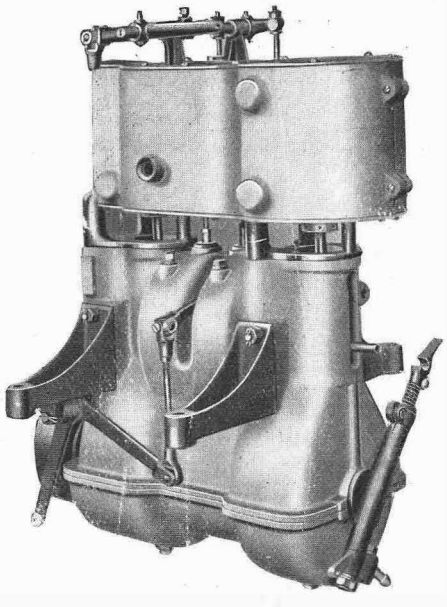


Fig. 4.

In fig 3 the diaphragm water regulator is seen on the left, while in front are seen the water pumps, the casing being removed for this purpose. Fig. 4 depicts the opposite side of the engine, and also shows the power air pump in front of the crank chamber out of engagement; the bell crank seen operates the valve for admitting high pressure steam to the low pressure cylinder when required.

Fig. 3 shows the engine as it is set under the bonnet, with the low-pressure cylinder forward. These cylinders have a 3½in. stroke, and are 5in. and 3in. in bore as to the high and low-pressure cylinders respectively. The guides are formed in the upper half casting of the aluminium crank chamber. The cylinders are asbestos-lagged, the lagging being enclosed within an aluminium jacket. The crankshaft runs on ball bearings, and ball bearings are fitted to the crank pins and eccentric strap bearings. The valve motion is of the ordinary link pattern, set between the crossheads, the valve eccentrics being separated by a fifth eccentric, which actuates a rocking arm, the outer end of which is connected to the crosshead, to which are attached the plunger rods of the water feed pump and the condenser pump, seen on the left side of the engine in fig. 3. The delivery pipe from the water feed pump passes directly to the diaphragm regulator, which operates the bypass valve, to the action of which we have already referred in dealing with the boiler. The rocking shaft seen running across the top of the low-pressure cylinder in figs. 3, 4, and 5 operates the device which permits an equal pressure of steam to be admitted to both cylinders. This rocking shaft is operated by means of a heel pedal projecting above the footboard, and is only used when starting the car. The exhaust steam passes from the valve chest to the condenser before-mentioned; the resultant water is pumped thence through the oil separator (a cylindrically-shaped vessel attached to the dashboard beneath the bonnet), where the cylinder oil is separated from the water, both by gravity and filtration, before it passes back to the tank.

The liquid fuel is supplied to the burner under pressure in the oil tank, and this pressure is set up and maintained whenever necessary by the power air pump seen attached to the rear end of the crank chamber in figs. 4 and 5. In fig. 5 this pump is seen swung into contact with a pin projecting through a slot in the guides, and in position for work, whilst fig. 4 shows the same pump swung back out of action. Whenever the pressure gauge on the dashboard shows that the pressure in the fuel tank has fallen below what it should be, the pump can be swung back into contact with the crosshead pin from the footboard, and retained there until the desired pressure in the fuel tank is regained.

The drive from the engine is transmitted through a universally-jointed propeller-shaft (as shown in fig. 6) to a bevel pinion meshing with a bevel-toothed ring surrounding the differential gear on the live axle in the now generally accepted manner. The rear end of the propeller-shaft is made

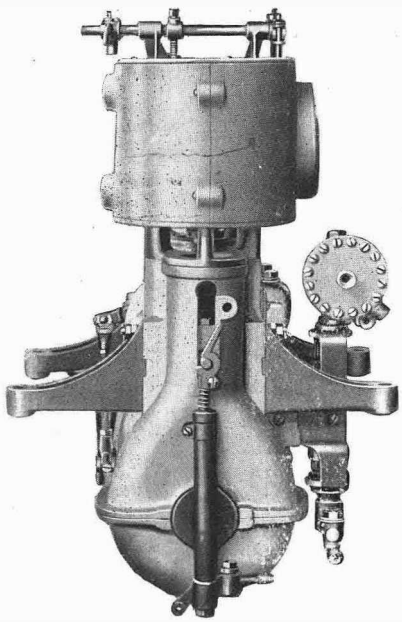


Fig. 5.

In this illustration an end view of the diaphragm water regulator is seen. The air pump is here shown in engagement with a pin attached to the crosshead which gives the necessary motion to the air pump. When not required this pump may be immediately swung out of action by the driver pressing a small pedal.

with a telescopic joint, as usual. The bearing of the bevel pinion spindle, as may be seen, is lubricated by a screw-down greaser. Dash lubrication is depended upon for the big ends, eccentrics, etc., a force feed pump driven by belt from the crankshaft, and set on the rear face of the dashboard, with visible feed, supplying oil to the crank chamber for this purpose. A similar pump, similarly placed and similarly driven, supplies lubricant to the cylinders. All other bearings are fed by screw-down grease cups conveniently situated, and the universal joints of the propeller-shaft are lubricated by the pins being hollow and filled with grease.

The driving and control of the White steam car are of the simplest. A small wheel placed in the centre of the steering wheel (see fig. 1) controls the throttle upon which practically all the driving is done, while handily placed at the side of the driver are the two side lever brakes, the outer of which applies the highly efficient double-acting internal expansion band brakes, taking effect upon drums attached to the rear wheels, and the inner lever by which the engine is linked up and the steam used expansively to any desired degree. A pedal on the footboard operates also a powerful band brake on the engineshaft.

From actual experience, we are able to testify to the extreme sweetness and quietude of the running of the White car and its great controllability. Most comfortable, well upholstered bodies are fitted, and well sprung. Anyone who has driven a White car has grasped the simplicity of its control, and its all-round excellence, will no longer wonder at the favour and position it has gained with a very large section of the motoring public.

With regard to fuel consumption (which is always a matter of interest, particularly as in the earlier steam car it was excessive), we may say that the cost, as certified in the thousand miles trials by the judges, is a little less than $\frac{3}{5}$d. per mile. This was with the two cars which took part in the trials, but one consumed slightly more than the other. At the same time, it is only fair to note that throughout the trials A petrol was used, which cost just double as much as the fuel which is at present being used on the cars. They run quite as well on benzoline or C petrol as on the more expensive grades of fuel.

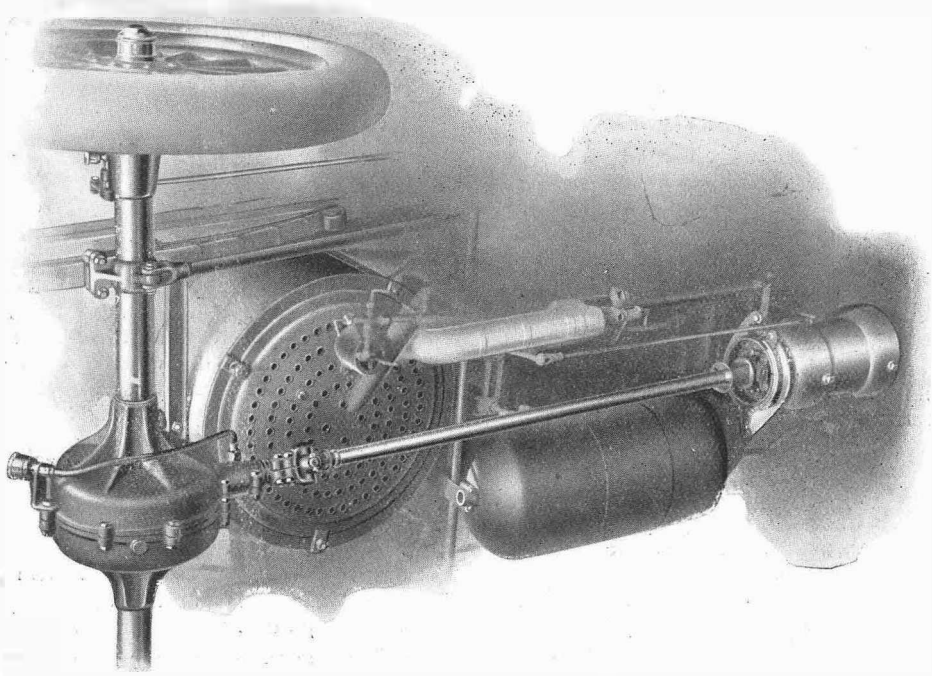


Fig. 6.—An underneath view of the car, which clearly shows the propeller-shaft and universal joints transmitting power to the rear live axle. A view of the bottom of the burner is also included.

THE VIRGINIA BEACH. It was suggested that the American Eliminating Gordon-Bennett Trials should be held here, but upon examination the surface was found to be unsuitable owing to its soft and treacherous character and to the presence of wreckage washed up from the ocean. There are also difficulties in the way of gaining access to the beach for cars and spectators. The trials will, therefore, probably be held on the Florida Beach as originally proposed.

THREE MEN ON A MOTOR CAR.

By R. H. Carlisle.

THE FOLLOWING DETAILED DESCRIPTION OF THE END TO END RUN ON THE 10 H.P. ARGYLL MARCH 23-26), BRIEFLY REFERRED TO IN TWO PREVIOUS ISSUES, WILL BE READ WITH INTEREST.

After a wet forenoon, the clouds were breaking with every promise of fine weather for the start at least of our journey northward as we sallied forth on our staunch car from the home of the Argylls. There were three of us on board—the skipper, who had once made an adventurous voyage across Europe into the heart of Russia, and was a most accomplished steersman; the supercargo, whose object it was to record the incidents of the journey; and the pilot, who, having traversed the road on a push bicycle a decade back, was supposed to have a knowledge of the route.

Glasgow to John-o'-Groat's.

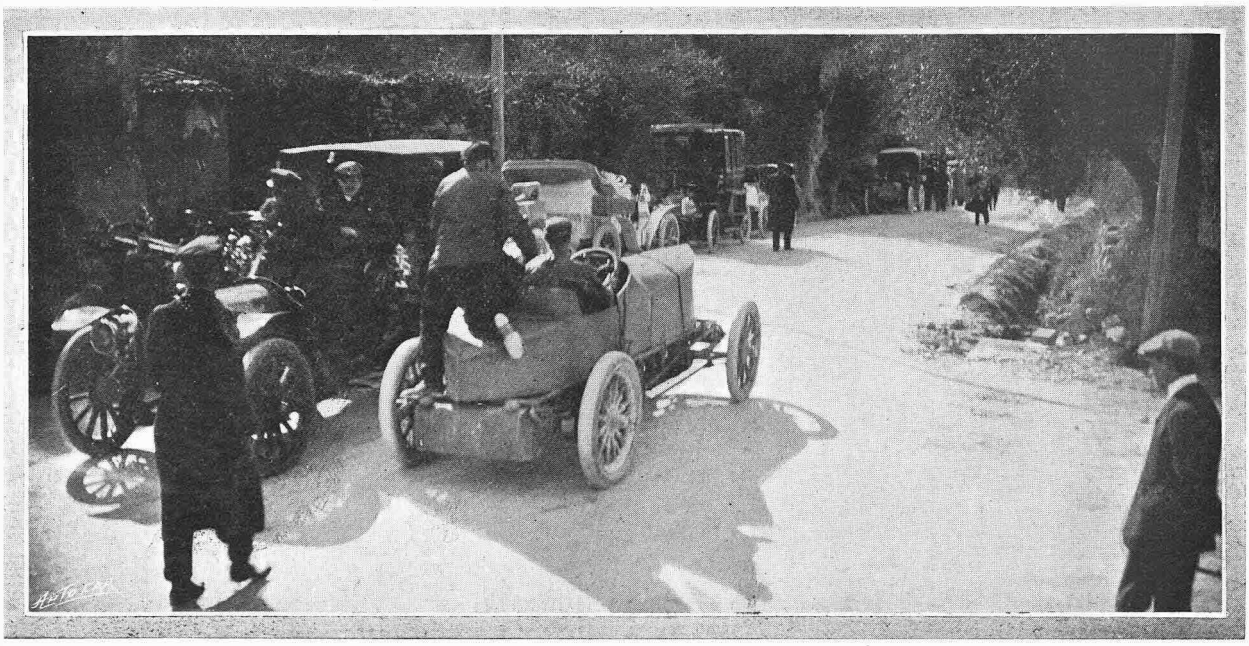
After a good meal at Perth (our first stop), we called at Blair Atholl to arrange for sending off wires on our journey south, and then we commenced to climb the wild and bleak Garry Pass. As we neared the top we overhauled a couple of old-fashioned 6 h.p. Daimlers, acting as convoys to "Dr." Deighton, the Bovril-sustained hero of the John-o'-Groat's to Land's End walk. Shortly afterwards we passed the plodding veteran himself, in company with his trainer. It was now dark, and soon after we had commenced the descent into Kingussie we struck a snowdrift sloping across the road. We charged right into the middle of it, and then stuck fast in fully four feet of snow. It took considerable time and exertion to extricate the car, but we finally got through, only to encounter another drift a few hundred yards further on, where we underwent the same experience. However, we eventually reached Kingussie about 9 p.m., where we were ready to enjoy a good square meal and a warm fire. Having made up our minds to reach Inverness the first night, we started off again, after spending an hour in a vain endeavour to persuade a recalcitrant headlight to burn. Without further adventure we reached our first day's destination soon after midnight, having journeyed nearly 180 miles.

The Second Day.

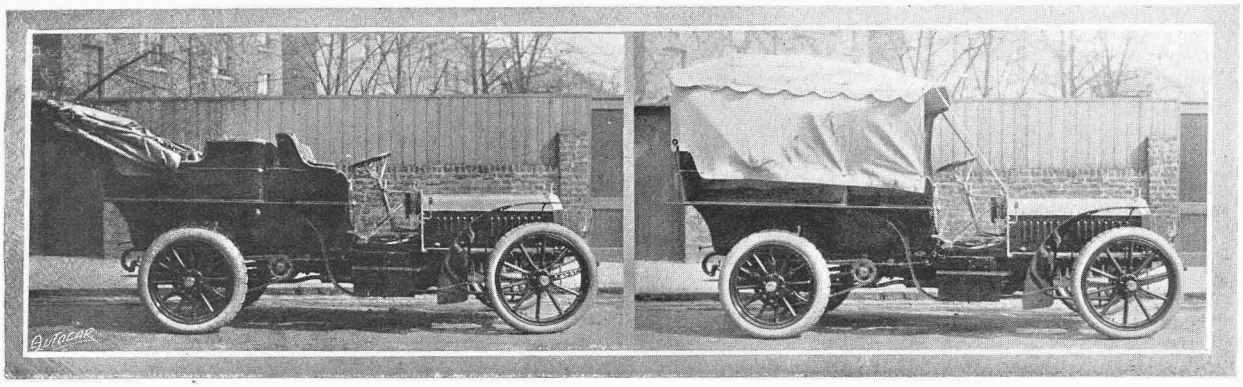
Next morning we were up betimes, and were on the road by nine o'clock. It was a glorious day, and proved to be the most enjoyable of our whole journey. Everything tended to put us in a cheerful frame of mind, and we made rapid progress to Helmsdale (100 miles from Inverness), where we had our first stop. After lunch we climbed the Ord, descended the dangerous declivity of Berriedale, and made the difficult ascent on the other side, finally reaching the fishing town of Wick about 5 p.m. After filling up with petrol here and taking in supplies of food for our return journey on the morrow, we made our way to John-o'-Groat's. I do not think any of us truly realised that we had undertaken to live for two days and nights in a state of perpetual motion, having our board and lodging on a motor car, exposed all the time to the elements. At any rate, if we did, we would not let it depress our spirits, and we retired to bed with cheerful minds, after thoroughly lubricating the car and charging the lamps.

The Start from John-o'-Groat's.

Next morning (Thursday) everything seemed propitious, the weather being brilliantly fine, with every prospect of its continuing to be so, and the roads dry. All being aboard, with the supercargo stowed snugly behind and wedged securely in with the case of provisions, tins of lubricating oil and petrol, the tools, special funnels, etc., we at last made a start at 8.11 a.m. We soon reached Wick, but shortly afterwards had to make our first stop for two or three minutes at the closed gates of a level crossing. Everything went well, and we made rapid progress, in spite of the fact that we encountered innumerable stretches of newly-laid



Scene at the foot of the hill on the Nice-Corniche road where the hill climbing contest during the Nice automobile week took place.



The Rt. Hon. A. J. Balfour's six-cylinder Napier. This is the car which the Prime Minister has been using during the Easter recess. The one view shows it with the Cape cart hood down and the other with it raised. In the latter form the appearance is not prepossessing, but it is exceedingly practical, as it affords good protection to the occupants of the rear part of the car from the worst of the weather.

metal, which we dashed through without slackening speed. The ascent of Berriedale—the stiffest climb on the whole route—was surmounted in fine style, and we had soon left Helmsdale behind.

A Dog damaged the Radiator.

Between the latter place and Inverness we met with an unfortunate accident, which gave us more trouble than we anticipated at the time. We were travelling down a slight incline at a pretty considerable speed, when a large sheep dog, without even a warning bark, dashed out of a gate and charged headlong at us. When it met the car the relative speed of the two moving bodies must have been a good sixty an hour. The dog appeared to be thrown up in the air for a moment, striking against the radiators, and then dropped underneath the car. Looking backwards we saw the poor beast make one last effort to rise on its forelegs, and then sink lifeless on the road. Our skilful skipper stuck to the wheel like grim death, and we never swerved or slowed up for a moment, though he complained afterwards that the steering appeared to have become a trifle stiff. Keeping the pace up, we reached Inverness—154 miles—at 2.45 p.m., or six and a half hours from the start.

A Stoppage.

Going slowly through the town, we picked up four tins of petrol, and were soon climbing the long rough ascent to Freeburn Inn. We maintained a steady pace through Kingussie, and were soon at the scene of our adventure with the snowdrifts. Fortunately, we had wired the stationmaster at Dalwhinnie Station on the previous day to have these cleared, which he had considerately done, so that we found them no obstacle to our progress. All went well, and we were congratulating ourselves in having surmounted the desolate Garry Pass, where the atmosphere was bitterly cold and thick with heavy clouds, which threatened a fall of snow. We were fast approaching Perth, when the engine began to falter ominously, finally stopping on a slight rise. Hastily examining the carburetter, we found, as we had suspected, that it was empty, though there was plenty of petrol in the tank. Twice we had to take down the carburetter and its feed pipe before we finally got rid of the obstruction, and we thus lost one and a quarter hours. There is no doubt that the admission of dirt into the carburetter was due to the fact that in filling the tank *en route* the petrol tin had jolted on to the gauze of the specially large funnel we had for the purpose, and so broken it. However, with the record well within compass, we were soon through Perth and Stirling, it being dark by this time. On the road to Glasgow we got out of our road somewhat, and on this stretch we had an incident which nearly ended our career altogether. The skipper was palpably sleepy, and, mistaking a slope up to a public-house for the road, was dashing along it straight for a wall. I managed to warn him in time, and he pulled up a yard or two off.

Driving in the Dark.

At length we reached Glasgow, where we stopped a few minutes to refill our petrol tank and lubricator, and to have a new headlight fixed on. Thence we made steady progress through the night over Beattock summit towards Carlisle. Of course, we could not maintain the same average in the dark as in the daylight, but still we lost no time. The monotony was varied somewhat by innumerable rabbits that, dazzled by the glare of the acetylene light, careered madly in front of the car from time to time. Many of them, in finally dashing to the side of the road, were caught by the wheels, and must have been knocked on the head and stunned. About ten miles north of Carlisle the skipper was at last induced to let me relieve him at the wheel, and we crossed the Border into England about daybreak. Carlisle—427 miles—was reached at 5.30, and at Penrith (eighteen miles further on) we had accomplished practically half our journey—and the worst half—in a little over twenty-two hours. This encouraged us considerably, but we were soon to receive a further check to our progress. In climbing Shap the engine showed signs of overheating, and on stopping to discover the cause we found that the radiators were leaking badly, the damage caused by the dog's impact evidently having increased as we had gone on. We had to break the ice on a mountain stream, and fill up again with water before we could proceed, and this was no pleasant task, as snow was falling slightly and the frosty air was bitterly cold. The skipper thought he would take this opportunity of straightening the rod connecting the steering arms of the front wheels, which had also been bent by the collision, but on resuming the steering I found he had only made matters worse, so that after he had made a somewhat erratic and alarming attempt to steer the car at a high speed, we had again to dismount and bring the wheels into alignment by bending the connecting rod.

Changing the damaged Radiator.

With the radiator still leaking badly, we proceeded through Kendal and Lancaster, but had to make another stop before reaching Preston for a further supply of water. Finally we reached Warrington soon after

Three Men on a Motor Car.

11 a.m. (Friday)—544 miles. Here we were met by Mr. J. A. Bennett (of Bennett and Carlisle, Ltd., Manchester agents for Argylls) with a sister car, and we decided that the best plan was to change our damaged radiator for his sound one. By twelve o'clock we were again under weigh. We now had a capital stretch of road, and made good use of it. Passing through Tarporley, Whitchurch, Wellington, Bridgnorth, Kidderminster, Worcester, and Gloucester, we reached Bristol at 6.45 p.m., covering the 160 miles from Warrington in six and threequarter hours, including a loss of a quarter of an hour in Gloucester, where the main road was up for the inevitable tramway electrification, and where we had in consequence to dodge round narrow bystreets, and finally through the docks, in order to reach the Bristol road. Here we arrived unexpectedly early, and, instead of being met outside the town, had to discover the garage of the Bristol Motor Co., who were providing the fresh supplies for the final stage. When we eventually found the garage, nothing was ready, so we fed while the car was replenished and the lamps prepared for our last night's journey.

The Last Night's Ride.

Finally, after one and a half hours' delay, we made a start at 8.15 p.m., with every prospect of accomplishing the journey under the forty-eight hours. We kept steadily on to Exeter, leaving 122 miles to be accomplished, our journey from Bristol having been enlivened by crowds of spectators at Bridgwater and Taunton, who cheered us as we passed through. Leaving Exeter about one o'clock Saturday morning, we took a wrong turn, and toiled uphill for two or three miles, finally having to retrace our wheelmarks to get on the Okehampton road again. We were now both in a semi-comatose condition, and took frequent turns at steering. At length we reached Okehampton between two and three o'clock in the morning, and here we got utterly fogged, owing to road complications, and found ourselves in a graveyard. Finally, after many useless wanderings, with snatches of sleep in between, we managed to rouse one of the inhabitants, who put us on the right track. It was now 5 a.m., and getting daylight. We reached Launceston about 6.30 and Bodmin about 7.45 a.m. Coming over Bodmin, I had half an hour's sound sleep on the car, in spite of the jolting of the terribly rough road—so rough, in fact, that one of the front springs gave way. At Bodmin we decided to stop and examine the broken spring, and, having breakfasted as well, we started on our last stage of sixty miles at 8.15 a.m.

The skipper was too sleepy to steer, so I took the helm till in passing through Redruth one of the inhabitants thrust a mysterious package into the former's hands as we passed by. This proved to be a book of views of the neighbourhood, and this mark of public interest instilled such fresh life into the skipper that he resumed his duties. Finally, after going out of our way by the Logan rock, we arrived at Land's End, much to our relief, at 12.50 p.m., Saturday, having accomplished the 902 miles in 52h. 39m.

General Conditions.

Considering the ride as a whole, I must say we had exceptionally fine weather and good roads for the time of the year. The long cold dark nights, however, caused a very considerable loss of time, especially on the second night, when we were both feeling the strain of the prolonged journey.

The car was simply a standard pattern Argyll (10 h.p., nominal), with an extra large petrol tank fitted. It was driven mercilessly during the daytime, the speed never being slackened for loose metal or rough roads, and it stood the strain without flinching. The collision with the dog and consequent damage to radiator, etc., were most unfortunate, otherwise we could doubtless have run through with no, or at any rate very little, addition to the water. Petrol consumption was very moderate. We filled our tank at Wick on the northward journey, took on eight gallons at Inverness, six at Glasgow, and on reaching Warrington—a distance of 560 miles (counting the mileage from Wick to John-o'-Groat's)—it took barely six gallons to fill up the tank again. This means a consumption of twenty gallons for 560 miles, or twenty-eight miles to the gallon. Pognon plugs were used, and gave no trouble. The rear wheels were fitted with Grose non-skidding and non-puncturing band, and the tyres were not touched from the time we left Glasgow till we reached Land's End—a distance of nearly 1,250 miles. The bands were in perfect condition at the finish, the only damage shown being the cutting of a small piece out of the edge of the leather strap that carried the steel studs. These latter, of course, were somewhat worn, but looked good for some thousands of miles further travelling before being discarded.

Visitors who attended the speed trials at ce ran their cars on to the Plain du Var, over which the prolonged course was constructed.

DESIGN OF SILENCERS.

By A. C. Davidson, A.M.I.M.E.

It behoves us to enquire a little more deeply into the matter of silencers before we can feel that we are doing the best with the available space and other limiting conditions existing upon autocars and motor cycles in particular.

Before we can proceed to any length with our subject, we must enquire what are the conditions we wish to fulfil; and we may say that an ideal silencer should (1) reduce the noise of exhaust to the least possible, and (2) put no back pressure upon the piston of the engine. It should obviously also be large enough to meet these requirements and no more, space being valuable. It may even be desirable in practice to sacrifice a little of each of these points to the desirability of keeping the silencer as small as possible in the case of the motor cycle and some small cars; but they still remain the ideal.

Referring to the first item, the noise we wish to deaden is caused by the sudden liberation of the exhaust gases under pressure. These expand violently, striking the surrounding air and setting it into vibration, causing the sensation which we know as a noise or explosion. If we could expand the gases in the cylinder until they came down to atmospheric pressure, the only sound we should hear would be the hiss of the gas as it passed the exhaust valve, and such a result would be quite possible, and conducive to economy in the engine, but at present we are concerned with the engine as it usually is.

The same result is achieved by making the silencer of such capacity and form that the gas expands in it gradually to atmospheric pressure before being released, and this is the method usually adopted.

There is another method which has lately been tried with fair success, and that is to make the silencer of practically no capacity, but to dismiss the gas through very numerous small openings, the idea being to subdivide the large explosion into numerous small ones, which, not synchronising, do not produce the same noise; but such silencers must always be inferior to one which allows room for the expansion of the gas to a lower pressure before dismissal.

To avoid (2) back pressure, the holes of either type must be of sufficient combined area to pass all the gas at the pressure at which it reaches them without reducing its velocity, and as the pressure must obviously fall

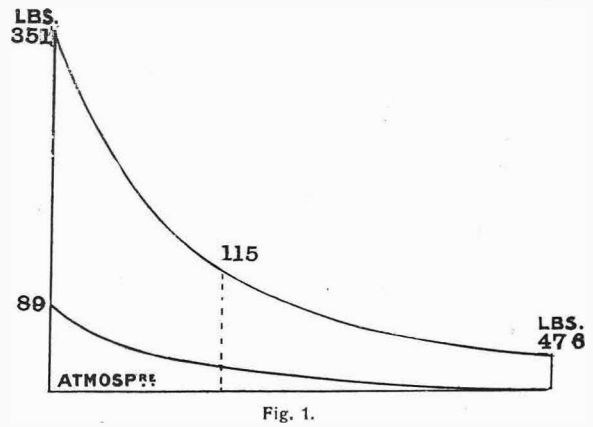


Fig. 1.

off after passing the exhaust valve, and the amount of gas passing through any given opening depends directly upon its pressure, the combined area of the holes in the baffles must never be less than that of the exhaust valve.

Before we can proceed to actual dimensions, we must know the volume of gas we have to dispose of and its pressure at the moment of release. As no reliable experiments of the pressure in the exhaust pipe are at hand, we can best arrive at this by making an indicator diagram of the engine to be considered; and we will assume a piston of five square inches area and a stroke of 3in., such an engine, we know, giving about 2 b.h.p. at 2,000 revolutions per minute.

Fig. 1 gives the diagram, assuming a compression of one-fourth of the cylinder volume, and a temperature at admission of 150° Fahr., the gas being heated to 3,260° Fahr., and expanded to its original volume.

From this it will be seen that we have at the end of the power stroke a volume of 15 cubic inches at a pressure of 47.5 lbs. per square inch absolute.

To expand gas at this pressure down to atmospheric pressure, it must increase 2.3 times its volume, and the capacity of cylinder and silencer combined must be 2.3 times the capacity of the cylinder alone, always supposing that the exhaust valve is large enough, as is generally the case, to liberate the gas practically instantaneously before the piston returns.

As gas at 47.5 lbs. pressure passes through an opening of threequarters of a square inch (about the usual size of valve for such an engine) at the rate of 434 cubic feet per minute (see formula given later), and we have only 15 cubic inches to pass, the time occupied will be $\frac{15}{434 \times 1728} = \frac{1}{49800}$ minute, and the piston performs a stroke of 3in. in 1-4000 minute.

Therefore, it will only have moved about ¼in. In point of fact, less, as the velocity taken above is its average velocity, and at the ends of the stroke it moves more slowly, so that we may take it that the emission is unaffected by it, and count the cylinder in our available expansion space. We need, then, only provide for 1.3 times its capacity in the silencer.

If, therefore, we add to our engine cylinder a silencer of 19½ cubic inches, and allow the gas to expand in it, there will be no tendency to expand farther and escape, but it will merely be displaced by the piston during its return stroke, and will put no back pressure at all on the engine except the small amount caused by the friction of the air against the sides of the pipes.

So far our requirements are fully met, but the noise, although muffled, will still remain, as the expanding gas, suffering no check after passing the exhaust valve, will still strike violently against the imprisoned air in the silencer, and we shall experience exactly the same report as if it were allowed to pass directly into the open air, except that this report will be inside a box, the walls of which will to some extent diminish the communication of the vibration to the surrounding air.

To check this still further, we must break up the large explosion into a number of smaller ones, by passing the gas through a series of holes or baffle plates, and we must now consider how to proportion these to avoid back pressure. The theoretical discharge of air through an orifice is given by the following formula:

Cub. ft. passed per min.
= area × 37·8 × external press. in lbs per □" absolute × diff. of press. on each side of orifice in lbs per □

Design of Silencers.

For pressures up to 50 lbs., experiment shows that only .7 of this amount can be counted on, and we may write the formula:

1.) Cub. ft. passed per min.
$$= \text{area} \times 26{\cdot}4 \sqrt{\text{external press.} \times \text{diff. of press}}$$

Let us assume that we insert three plates across our silencer, dividing it into four equal parts. We can then find the pressure of the gas at each baffle, and from that the area necessary to pass it.

With three baffles, the volumes of the expanding gas will be

At entrance	1
At 1st baffle	$1\frac{1}{3}$
At 2nd baffle	$1\frac{2}{3}$
At 3rd baffle	2
At exit	$2\frac{1}{3}$

The pressures corresponding to these volumes may be calculated on the formula:

$$P_2 = \frac{P_1}{r^{1{\cdot}408}}$$

P_1 being the initial pressure in pounds per square inch absolute, P_2 the required pressure, and r the ratio of the volume after expansion to the initial volume.

From this we find the pressures to be respectively:

At entrance	47·5 lbs.
At 1st baffle	31·3 lbs.
At 2nd baffle	23·1 lbs.
At 3rd baffle	17·5 lbs.
At exit	14·7 lbs.

the following diagram (fig. 2) showing the results:

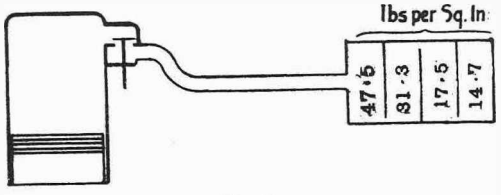


Fig. 2.

We must now proportion the area of the holes in the baffles so that the velocity of the escaping gas may not be diminished. Taking the area of exhaust valve at ¾ square inch, the quantity of gas passed at 47·5 lbs. pressure to a pressure of 31·3 lbs. by formula 1 = 550 cubic feet per minute.

The first opening into silencer should be obviously at least as great as the exhaust valve, which with a properly-proportioned exhaust pipe it will be.

Calculating by formula 1, the amount of gas passed per minute through a ¾ square inch opening is

At entrance	550 cub. ft.
At 1st baffle	316 cub. ft.
At 2nd baffle	225 cub. ft.
At 3rd baffle	138 cub. ft.

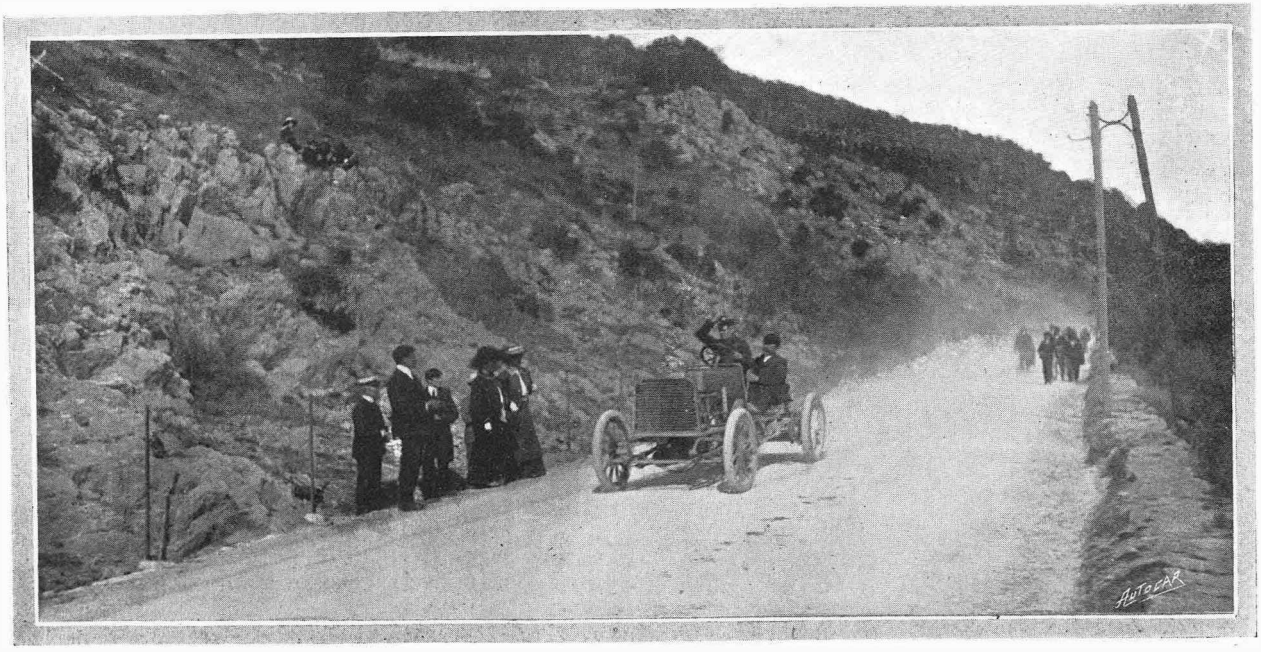
If the velocity of the gas is to remain constant, the areas of the holes should vary inversely as these amounts, or be

At 1st baffle	$\frac{3}{4} \times \frac{550}{316} = 1{\cdot}3$ sq. in.
At 2nd baffle... ...	$\frac{3}{4} \times \frac{550}{225} = 1{\cdot}8$ sq. in.
At 3rd baffle... ...	$\frac{3}{4} \times \frac{550}{138} = 3{\cdot}0$ sq. in.

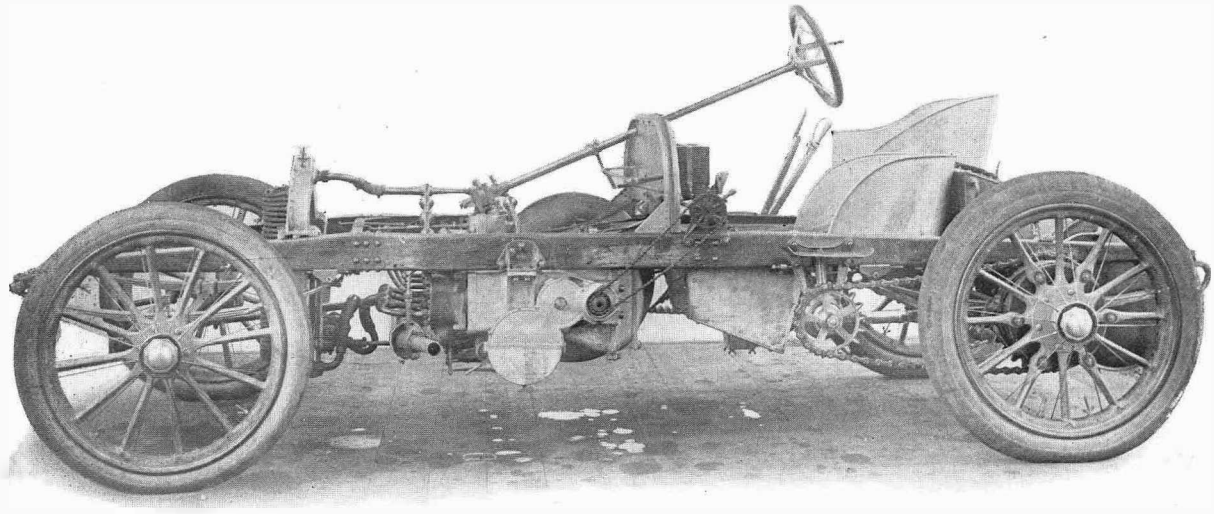
If the total quantity of the expanding gas had to pass through each baffle, these areas would be the right sizes, but when the silencer is completely filled the last compartment has passed only one-third of the cylinder volume, the next two-thirds, the third three-thirds = one, and the entrance four-thirds = one and one-third the cylinder volume. We may, therefore, reduce the areas in proportion to the volumes they have to pass, and the final result is

At entrance	$\frac{3}{4}$ sq. in.
At 1st baffle	$1{\cdot}3 \times \frac{3}{4} = 1{\cdot}3$ sq. in.
At 2nd baffle	$1{\cdot}8 \times \frac{3}{4} = 1{\cdot}2$ sq. in.
At 3rd baffle	$3{\cdot}0 \times \frac{1}{3} = 1{\cdot}0$ sq. in.

These are the total amounts to which the combined area of the holes must amount, and the more numerous and smaller they are the better for silencing effect, the practical limit to their smallness being set by the liability of exceedingly fine holes to get choked up. In conclusion, the above figures must not be taken as representing any particular silencer, but from the formulæ given, and following the same principles, it is easy to proportion any type, whether tubular, cross baffled, or other, so that it shall allow the gases to expand to atmospheric pressure without back pressure on the piston, and with the maximum of silencing effect.



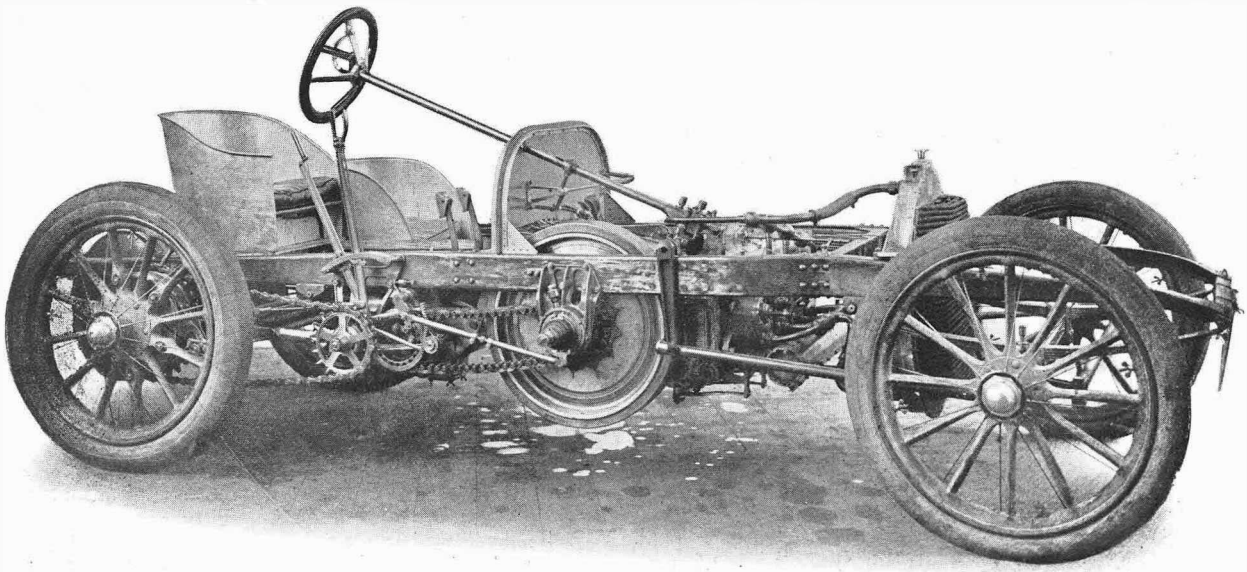
On the Nice-Corniche Road. Rigolly bringing his Gobron-Brillie car down the hill.



A left-hand view of the 96 h.p. Gordon-Bennett Wolseley car in sprinting trim.

THE BRITISH GORDON-BENNETT CARS.

To-day (Saturday), at the Automobile Club, the British cars which are to take part in the Gordon-Bennett eliminating trials in the Isle of Man on the 10th of next month, are to be presented for inspection. This proceeding is merely a formal one, and partakes of little more than a cursory inspection by the club officials. After it is over the makers will have nearly a month to further tune up those vehicles which need it. The Napiers are the most advanced cars, and one or two of them at least are practically last year's machines, with certain modifications and improvements. They are probably none the worse for this; in fact, there is a very general opinion that some of the older cars, both English and foreign, may acquit themselves better than the entirely new machines. There is so much to do in getting each car thoroughly run in and in the best of working trim—every racing car being more or less of an experiment—that after it is once tuned up to its best it is usually a faster and more reliable machine than a new one of greater power which has not passed through a similar ordeal of trial and adjustment. The cars to be presented at the club are five Napiers, three Wolseleys, three Huttons, and three Darracqs. The Napiers and the Wolseleys we have already dealt with. The Hutton is practically an enlargement of the 20 h.p. now being described in our pages, and the Darracq we hope to refer to next week rather more fully, as it was not finished in time for us to deal with it in the present issue, but the illustration on page 532 gives a good idea of its smart appearance.



A right-hand view of the 96 h.p. Wolseley Gordon-Bennett racer without bonnet. The bonnet is extended forward in the form of a wind cutter, and the back shaped to shield the driver and mechanician from wind against the knees. Both sit very low. The vehicle is much the same as the 72 h.p. illustrated in our supplement of April 2nd. Its chief features embody a pressed nickel steel frame, 9ft. wheelbase, 4ft. 7in. gauge, 36in. × 5in. back wheels, 34in. × 3½in. front, reinforced by wire spokes, four-cylinder engine, all cylinders in a line with the crankshaft across the car, transmission from clutchshaft to gearshaft by Renold's chain, and from second shaft to road wheels by outside chains, the same as with ordinary roadster Wolseley cars. Three point suspension for both engine and gear-box. The weight is all kept very low, and the car is a very promising one, though it suffers from being finished comparatively late, yet its construction is no small feat, as the drawings were not commenced till January 1st.

THE COMING OF THE MOTOR CAR VET.

By Robert E. Phillips, M.I.Mech.E., Assoc.M.Inst.C.E.

The Motor Car Expert.

Seven years' experience in automobilism has convinced me that the want that is most felt amongst the votaries of the new form of locomotion is that of competent experts—*i.e.*, experts doing consultative and advisory work only, and totally disconnected with the trade. The class of man who now poses as a "motor expert" leaves much to be desired. He is more often than not a man with little or no technical training, very limited practical experience—in most cases picked up at someone else's expense—and almost without exception connected with the trade, either as a vendor or repairer. The harm that these so-called experts have done and are doing is incalculable, though some idea of it may be gathered from the complaints that from time to time appear in the columns of the automobile press.

The correspondence that has recently taken place in *The Autocar* on "Incompetent Experts" shows the trend of public feeling at the present moment, and in that correspondence I have ventured to suggest that what is now required is a class of motor car engineers doing consultative and advisory work only, and independent of all trade influence. Such men, in my opinion, would be a boon not only to users of motor cars, but also to manufacturers and agents, as it must be, or at all events should be, to their interest that cars in the hands of the owners should give the least possible trouble and the best possible results.

His Mission.

To my mind, the most important work these consulting motor car engineers would perform would not be so much advising on the selection and purchase of cars, but the supervision of the cars, making periodical examinations, and reporting as to their state and the adjustments or repairs (if any) that require to be done. The fact that such men would occupy pretty much the same position with regard to the motor car as the veterinary surgeon does to the horse has led me to term them "motor car vets."

It is not necessary to enlarge upon the fact that any advice on the selection or purchase of a motor car, to be unbiassed and perfectly *bona-fide*, should be given by one having no connection with the trade either directly or indirectly, and whose position is such as to preclude the possibility of his accepting commissions.

The Classes to whom he appeals.

Automobilists may be divided into two classes—those who are trained engineers, and therefore well qualified to look after their cars, and those who have no knowledge of mechanics, and are therefore dependent on others. It may safely be said that at least nine-tenths of the private owners of motor vehicles belong to the latter category, and it is to this class that the coming of the motor car vet. should most strongly appeal. By placing their cars under the supervision of such men, owners will ensure not only that their vehicles are being kept in the highest possible state of efficiency, whereby depreciation from wear and tear and the cost of repairs will be reduced to a minimum, but that their outlay for fuel, lubricating oil, and "spares" is commensurate with the mileage run.

Let me take some typical cases. First, the owner who has neither the time nor the inclination to make himself acquainted with the mechanism of a car. This man is entirely in the hands of his so-called "chauffeur." If he is told that the car cannot be used on any particular day, because it wants so-and-so doing to it, he can only grin and bear it. If he is told that such-and-such a part wants repairing or renewing he can only give the order and pay the bill on which more often than not the chauffeur receives a commission. If he finds—assuming that he takes the trouble to look into figures—that it has cost him, say, 2d. per mile run for petrol, he will probably be told that the car always had a reputation as a "petrol eater," and so on *ad nauseam*.

The Mechanic-chauffeur and the Driver-chauffeur.

It is difficult to conceive anything better calculated to keep a chauffeur up to a keen responsibility of his duties than the knowledge that the car in his care is under the supervision of a competent motor car engineer, and in the coming of the motor car vet. lies, I believe, the true solution of the vexed question of motor car servants. The crux of this matter lies in the fact that, if an owner has but one car and employs a mechanic-chauffeur, he is employing a class of man whose wages are not compatible with the work he is called upon to perform. At a rough estimate it may be taken that out of each day of nine working hours the chauffeur is not doing mechanic's work for more than three hours, while for the remaining six hours he is doing a driver's or servant's work. As an experienced mechanic's time is worth at least twenty-five per cent. more than that of a driver or servant, it follows that for two-thirds of his time the mechanic-chauffeur is being paid excessive wages for the class of work he is doing. By placing the car under the supervision of a motor car vet. the mechanic-chauffeur may be dispensed with and a driver-chauffeur employed, whose only duty, besides driving, would be to clean the car and make such small adjustments as require little, if any, technical knowledge. The saving effected by reason of the lower wages of the driver-chauffeur would probably more than pay the vet.'s fees, and the car would be kept in a higher state of efficiency.

The Owner who Drives.

Take next the owner who drives himself, and has sufficient knowledge of the mechanism of his car to be able to make small adjustments. As a rule cars in the hands of this class of owner run well for a time, and then all of a sudden something happens—generally when least expected, and in the most awkward places. Diagnose these cases, and it will generally be found that these cars have been run without sufficient inspection and examination, and have given out from derangement of some part that has been allowed to get into a bad state through sheer neglect, due in most cases to ignorance of mechanical cause and effect. The fact is that modern motor cars are, in the majority of cases, so well designed and constructed that they will run for a considerable time when new with little or no attention, with the result that owners are too often lulled into the false belief that cars require none of that careful attention which all engineers know must be given to any kind of machinery if it is to be maintained in a high state of

efficiency, and depreciation is to be reduced to a minimum. Would not the services of a motor car vet. be invaluable to this type of owner? I believe that all private owners of motor cars who have no technical knowledge of mechanics will, by placing their cars under the supervision of such men as I have foreshadowed, ensure not only that their cars are always in running order, but that they are being run with the minimum amount of wear and tear, and, further, that the vet.'s fees will be more than met by the reduction in the cost of the upkeep and repairs, beyond which owners will be relieved of all responsibility as to the maintenance of their cars in an efficient running condition.

The Motor Vet.'s Qualifications.

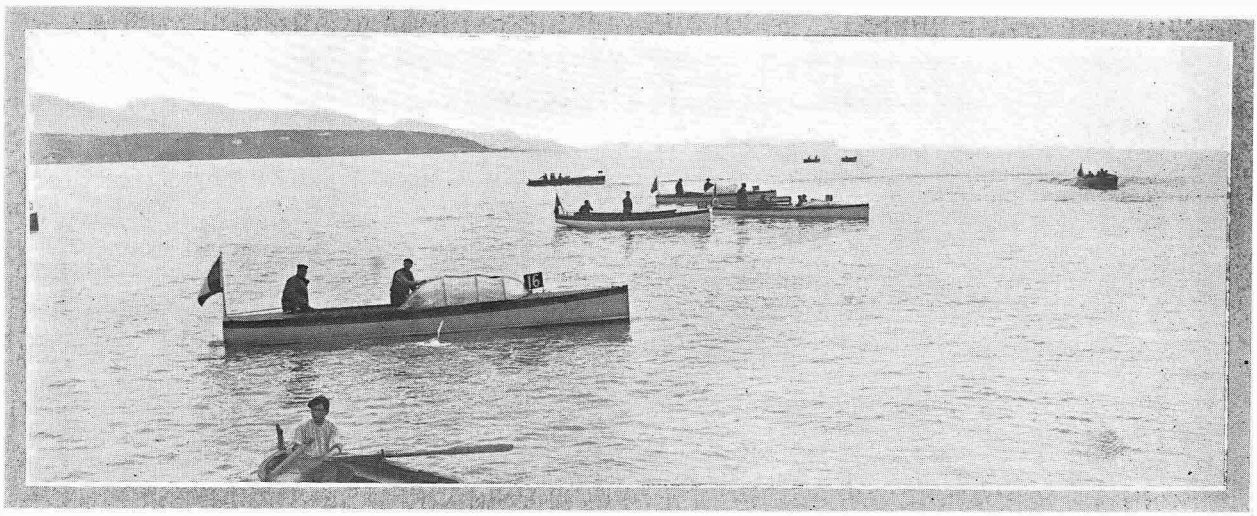
Now what kind of man should the motor car vet. be? I take it that he should be, first of all, an experienced mechanical engineer—not merely one who has picked up a little experience with motor cars, but one who has had a mechanical training and been actively engaged in mechanical engineering, more especially in that branch dealing with prime movers. He should also be one who has had considerable experience with modern self-propelled vehicles. He should be one who has made a close study of the various types of cars that have been produced, and have an up-to-date knowledge of the latest practice in automobile construction. He should be a close observer of details, and able to see at a glance if anything is wrong with the mechanism of the car, and ably to quickly diagnose the cause of any failure. He should have at his command such particulars of every make of car on the market that a would-be purchaser may desire to know, and last, but not least, he should be in every sense of the word a professional man, completely independent of trade influence. He should, therefore, be neither connected directly or indirectly with the trade, nor accept commissions either from manufacturers, agents, or repairers.

The difficulty, of course, is to find the men competent and willing to lay themselves out for this class of work, as their fees would, under the most favourable scale, be insignificant compared with the commissions that could be made on sales and introductions; but I have little doubt that when properly qualified men devoted themselves to this class of work their services will soon be in such request as to make the work remunerative.

AN AUSTRALIAN MOTOR CAR MEET. As reported in *The Autocar* of April 2nd (page 471), the inaugural run of the newly-formed Automobile Club of Victoria took place on Feb 20th. The above illustration depicts the procession of cars on the road near Melbourne, led off by Mr. H. Sutton's Winton car fitted with an apparatus of his own invention by which paraffin or other heavy oil may be used as fuel with results which are claimed to be equal to, if not better than, petrol. As a Colonial Mr. Sutton has fully realised the difficulties which prevent the use of petrol in certain climates. We commence to describe his devices for the use of paraffin in this issue.

REGISTRATION ON CHANGE OF CAR OWNERSHIP.

The Local Government Board, on being approached by the Hon. E. Forester, of St. Helens, for information as to the proper course to adopt in the matter of registration on parting with an old car and buying a new one, has replied to the following effect: "The separate number assigned by a registration authority under Section 2 (1) of the Act of 1903 attaches to the motor car and not to the owner. Upon the cancellation of the registration of a car under Article IV. of the regulations the separate number which had been assigned to the car is liberated, and may be assigned by the Registration Authority to another car (whatever the ownership of such other car); but this can only be done upon the fresh registration of such other car, in accordance with the provisions of the Act and regulations. There is no provision for an exchange of numbers between cars apart from fresh registration. No fee is payable for cancellation itself. If, however, registration of the car is continued with the same local authority, but the ownership is altered, a fee of 5s. is chargeable in respect of the necessary alteration of the register. (See Article IV. of the Regulations.)"



Motor launches lying in the bay at Monaco awaiting their heats.

CONTINENTAL NOTES AND NEWS.

AUTOMOBILE BOATS AT MONACO.

For more than a week the attention of the automobile world has been directed to Monaco, where the different important trials of automobile boats have been carried out so successfully. His Royal Highness Prince Albert I. of Monaco assisted at all the different trials, which interested him more particularly from the fact that in his youth he was an officer in the French fleet. Later, we intend to examine the practical lessons which these trials furnish. To-day, we will content ourselves with glancing over the different races which were competed. But, notwithstanding this, we may say at once that both the racers and cruisers behaved admirably on the sea, and, further, some of them beat the world's records. This is at least a good commencement. After having been submitted to very hard trials, the frail craft showed that they were quite capable of regular running at high speed.

The First Day's Racing.

The first day's racing was reserved to a trial for cruisers and one for racers. The cruisers had to complete a course of about thirty-seven and a half miles from Monte Carlo to Antibes and back. This class was made up of cruisers of less than 21ft. in length, and the following were the results:

1. La Marguerite (Jacques Depret), 3h. 22m. 23s.
2. Loodit (Despujols et Pinaud), 3h. 22m. 23⅘s.
3. Allo I. (Birnbaum and Moulet), 4h. 59m. 39s.
4. Le Dauphin (Blanc), 5h. 59m. 47⅖s.
5. New York (Rheaume), 6h.

The starters included Allo VI. (Pitre), but this boat abandoned the race.

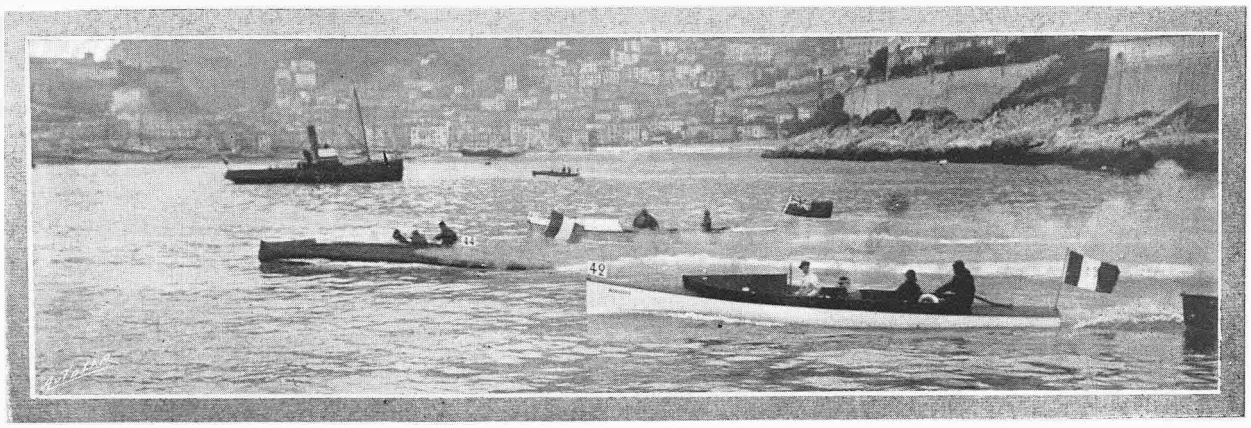
The race between La Marguerite and Loodit was quite remarkable from the fact that there was only ⅖s. difference between the winner and the second boat.

The racing class contained boats of less than 26ft. 3in. in length, furnished with explosion engines with a total cylinder capacity of less than seven and a half litres. The distance to be covered was 150 kilometres round a hexagonal course of about eight miles in length. The following are the results:

1. La Rapée III. (Tellier), 4h. 33m. 22⅕s
2. Princesse Elisabeth (Primez Frères), 5h. 18m. 40s.
3. La Rapée II. (Avollee), 6h. 3m. 8⅘s.

Peugeot I., Titan II., and Allo VII. abandoned the race.

The winner, La Rapée III. (which keeps the water in a marvellous manner, and which affords a fine sight as it is cutting through the waves), was furnished with a



The start of a heat in the racer class. The Napier boat is seen on the right of the trio.

Panhard and Levassor motor. The Princesse Elisabeth had a Delahaye motor.

The Second Day's Racing.

On the second day there were again competitions for racers and cruisers. To speak at once of the hero of the day, we must say here that Trefle à Quatre—that is to say, the Four-leaved Shamrock—which was already the favourite for this race, carried off the laurels. The Four-leaved Shamrock (which is the property of the Etablissements Georges-Richard) is driven by a Georges-Richard-Brasier motor, Gordon-Bennett type, beat all the records of the world, and covered the sixty-two and a half miles in 2h. 37m., and the 125 miles—the total extent of the course—in 5h. 16m. Both of these times constitute world's records. The Four-leaved Shamrock accomplished an average speed of twenty-four miles an hour in the sea—a speed which had never been before achieved by an automobile boat. The

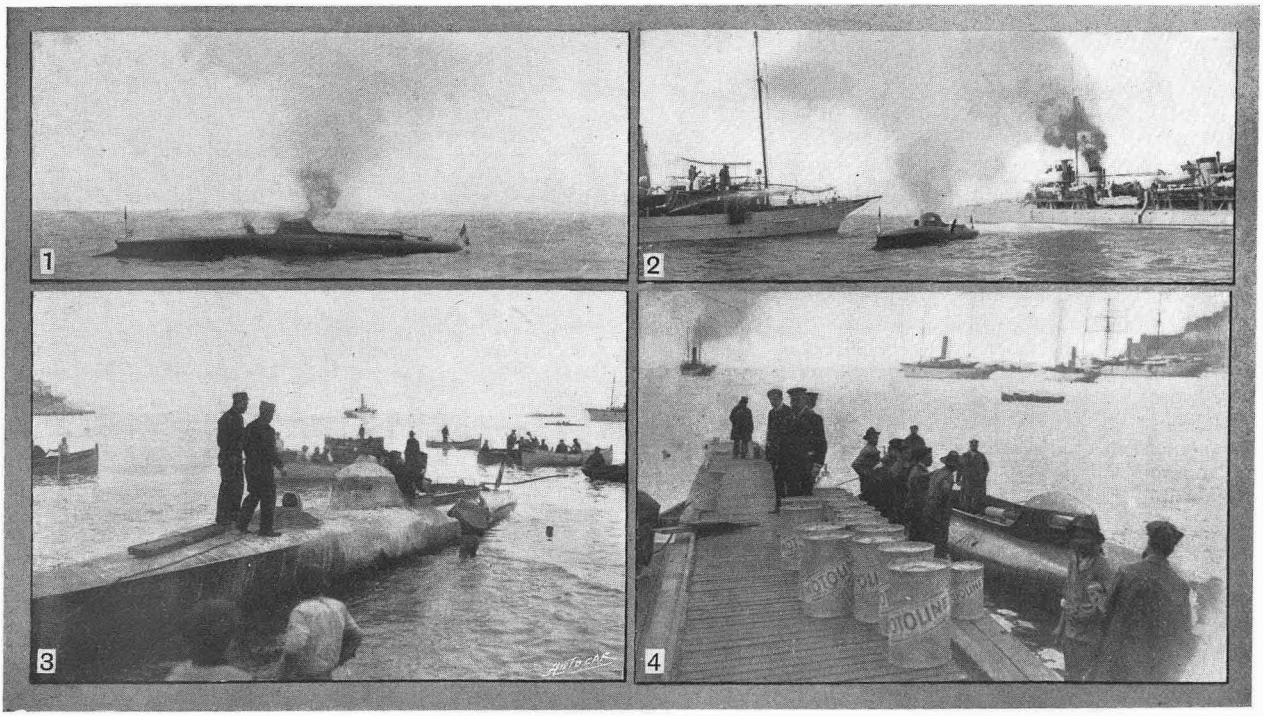
CRUISERS.—Open to cruisers of less than 26.24ft. in length and of a cylinder capacity of less than 3¾ litres, over a course of 53½ miles.

1. Peugeot III., 3h. 55m. 16s.
2. Titan III. (Delahaye motor), 4h. 4m. 41⅗s.
3. Arion II. (Filtz motor), 4h. 11m. 54⅘s.
4. Consul (Bayard-Clement motor), 4h. 14m. 14s.
5. Peugeot II., 4h. 14m. 20s.
6. Heraud (Radium motor), 4h. 49m. 18⅕s.
7. Allo III. (Ader motor), 5h. 23m. 43⅕s.
8. Le Nogentais (Darracq motor), 6h. 5m. 15⅘s.
9. Moustique (Beaudoin motor), 6h. 10m. 24⅘s.
10. Girondin (Renault motor), 7h. 14m. 30⅗s.

It will be seen, therefore, that in this race there were ten starters, and the whole of the ten arrived, showing a hundred per cent. regularity in the cruisers, which is an excellent result.

The Third Day's Racing.

On the third day there was a race for cruisers from 39.36ft. to 59ft. in length, and for fishing boats, but in



1. The accident to Parisienne II. The petrol burning itself out after the crew had jumped overboard.
2. A French torpedo boat passing a hawser to the damaged launch.
3. The launch after the fire had been extinguished.
4. The cause of the trouble. 175 gallons of petrol about to be emptied into the fuel tanks of Parisienne II.

motor, as we have mentioned above, was made by Brasier, and is similar to the three that will engine the makers' cars in the eliminating trials for the Gordon-Bennett race. This is the first boat in which the manœuvring is all placed in the hands of the man who steers the boat, and it is arranged just like a motor car in this respect. The following are the results of the day's races:

RACERS.—Open to boats of more than 26.24ft. and less than 39.36ft. Course: About 125 miles, round a hexagonal course of 8 miles in length.

1. Trefle à Quatre (Georges-Richard-Brasier); length, 32.8ft.; cylinder capacity, 9 litres 885; time, 5h. 16m. 51⅗s.
2. Mercedes I.; length, 32.7ft.; cylinder capacity, 6 litres 786; time, 6h. 39m. 27⅕s.

Mercedes II. abandoned the race, having shipped a big sea, which was caused by the propeller of the yacht Lysistrata belonging to Mr. Gordon-Bennett, the water inundating the motor and the carburetter, and they were unable to proceed. Napier Minor gave up the race on account of an accident to its exhaust pipe.

each of these competitions only one competitor came up to scratch—the Rotceh in the first class and the Dalifol in the second. It was a walk-over for both boats, therefore, the Rotceh covering the course in 6h. 33m. 26s.; the Dalifol also motored over the required course successfully. The Dalifol, however, is not, truly speaking, a fishing boat—that is to say, it is not a boat that could be put into the hands of fishermen with which to earn their living.

The Fourth Day's Racing.

On the fourth day the races were for the big boats, and there were two races, namely, one for racers between 39ft. and 59ft. in length, and the other for cruisers between 26.24ft. and 39.36ft. in length. In the first category, the victory fell easily to the Lutece, which for part of the race averaged more than twenty-two and a half miles an hour. The Lutece, with only one four-cylinder motor of a total cylinder capacity of thirteen litres, beat the Dubonnet, which had three

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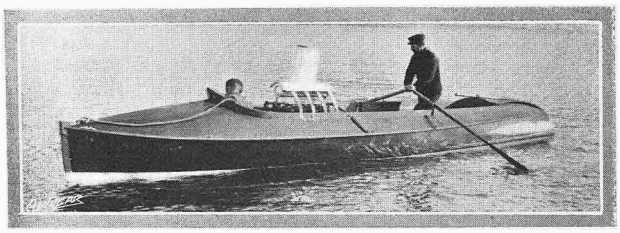
motors and a total cylinder capacity of twenty-seven litres. In the cruiser class, the Vas-y easily triumphed over its competitors, doing an average speed of fifteen miles an hour.

Before giving the final classification of the day, we must speak about an accident which occurred to the Parisienne II. This boat had on board a supply of

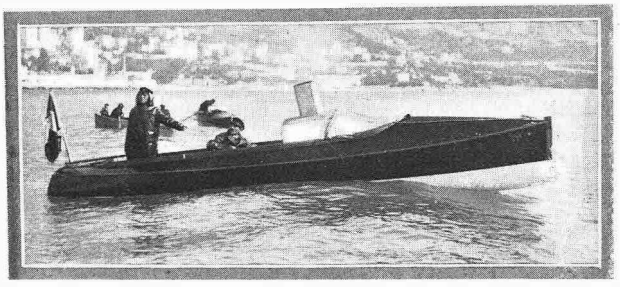


La Rapée III. One of the winning motor launches at Monaco.

175 gallons of petrol, contained in reservoirs, and supplied to the carburetter by means of pressure produced by the exhaust. One of the taps on one of the reservoirs shook itself open, and allowed a quantity of petrol to escape, and this became ignited. Thanks to the excellent arrangements for safety with which the course had been furnished, the occupants of the Parisienne II. were brought ashore after having jumped into the sea to save themselves from being burnt. Two of the occupants were burnt slightly on the face and hands. The boat was being steered by Mr. Currie, nephew of Sir Donald Currie. This accident, according to the rules of the meeting, put an end to the race, because one of the competitors went to assist the Parisienne II. When, however, it was found that there were no serious consequences further than the partial destruction of the boat, it was decided to start the race again over a shortened course. Two boats only completed the race, the Napier giving up with a broken pump. The following were the results:

CRUISERS.—Over a course of 62½ miles.
1. Vas-y (Delahaye motor), 4h. 25m. 18⅘s.
2. France (Beaudoin motor), 5h. 23m. 29⅗s.
3. Usona II. (Lozier motor), 5h. 23m. 54⅕s.
4. Suzy (De Dietrich motor), 5h. 48m. 58⅗s.

RACERS—
1. Mercedes, 1h. 32m. 20⅗s.
2. La Rapée III., 1h. 29m. 25⅗s.
3. Princesse Elisabeth, 1h. 30m. 42⅗s.
4. Lutèce, 1h. 20m. 27s.
5. La Rapée II., 1h. 49m. 40s.
6. Dubonnet, 1h. 33m. 40⅗s.
7. Trèfle-à-Quatre, 1h. 19m. 28s.



La Rapee III. going at half speed. This launch was the winner in the class reserved for boats of less than 26ft. 3in

In the cruiser class the following were the results:

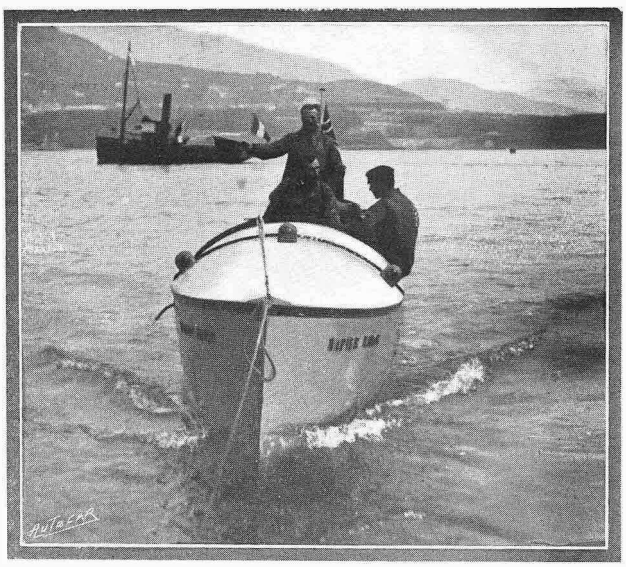
1. Le Nogentais (Caillois—Darracq motor), 2h. 57m. 38⅗s
2. Arion II. (Fayaud—Filtz motor), 2h. 57m. 56⅘s.
3. Vas-y (Jean—Delahaye motor), 2h. 35m. 7⅗s.
4. Usona II. (Fournier and Knopf—Lozier motor), 3h. 25m. 5⅗s.
5. France (Compagnie Arm. d'Antibes—Beaudoin motor), 3h. 21m.
6. Suzy (Paul Meyan—Dietrich motor), 3h. 43m. 32⅗s.
7. Allo VI. (Société Ader), 4h. 31m. 5s.
8. Peugeot II., 3h. 16m. 49s.
9. Herand (Radium motor), 3h. 58m. 20s.
10. Girondin (M. Chauchard—Renault motor), 5h. 4m. 58s.
11. Titan III. (M. Desmarais—Delahaye motor), 3h. 23m. 6⅕s.
12. Allo III. (Société Ader), 4h. 1m. 28s.
13. Peugeot II., 3h. 57m. ⅘s.
14. Rotceh (M. Darmaros—Henriod motor), 3h. 54m. 16⅕s.

In the racing class—109½ miles—Lutèce, with a Panhard and Levassor motor, did the distance in 5h. 6m. 9s., and the Dubonnet, with a Panhard and Levassor motor, in 5h. 36m. 43⅘s.

It will thus be seen that the Four-leaved Shamrock of Georges-Richard-Brasier beat the best time accomplished by the larger and more powerful boats.

The Fifth Day's Racing.

On the fifth day's meeting there were still further handicaps, but on this day only for racers, and over a distance of sixty-two and a half miles. The morning



Napier Minor leaving the water after her accident. Mr. S. F. Edge is at the engine.

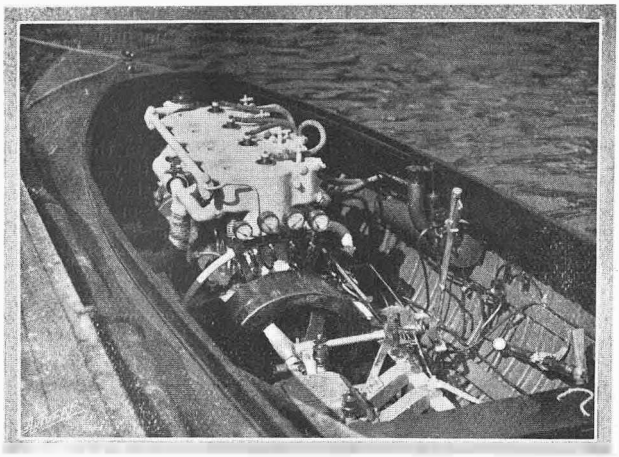
was occupied in a cat-head boat race—that is to say, a race for yachts and launches, over a course of fifteen and threequarter miles. In this trial the victory fell to Bayard II., which ran a very pretty race, and brought well into view the qualities necessary for a boat of this kind. The big handicap for the racers was won by Princesse Elisabeth, which did a very regular speed and a good average. The Trèfle-à-Quatre made a splendid struggle for the first place. It started from the scratch, and came in only a few seconds after the Princesse Elisabeth. This performance proved once again that the Trèfle-à-Quatre is the fastest racer at the present time on the sea. The following are the results of the two trials:

RACERS AND LAUNCHES—
1. Bayard II., 1h. 41m. 14⅕s.
2. Peugeot II., 1h. 58m. 50s.
3. Allo I., 2h. 0m. 52s.
4. Dalifol II., 2h. 22m. 2⅗s.
5. Sans-Atout, 2h. 54m. 59⅗s.

RACERS—

1. Princesse Elisabeth, 3h. 14m. 52s.
2. Trefle-a-Quatre, 2h. 51m. 14⅘s.
3. La Rapee III., 3h. 15m. 38⅘s.
4. Mercedes I., 3h. 23m. 57⅘s.
5. Dubonnet, 3h. 33m. 9⅘s.

La Rapee II. did not start, and Lutece had to return to Monaco on account of an accident.



A four-cylinder Delannay-Bellerelie engine fitted in the motor launch Riri II. This depicts the general arrangement of the motor, change-speed gear, and control.

Sixth Day's Racing.

The Georges-Richard-Brasier, with the rapid Trefle-a-Quatre, carried off the events of the sixth day's racing. The day was reserved to the speed trials over the kilometre and the nautical mile, and Perignon, the clever steersman of the Trefle-a-Quatre, won both events, and the boat proclaimed itself again the fastest petrol launch on the sea. The second place fell to Lutece, and the third to La Rapee III.

The whole of the week's racing proved of very great interest, and the competitions were very keenly followed by a large concourse of spectators. Excitement ran high during some of the close finishes which took place in the handicap races. Altogether the meeting proved a success.

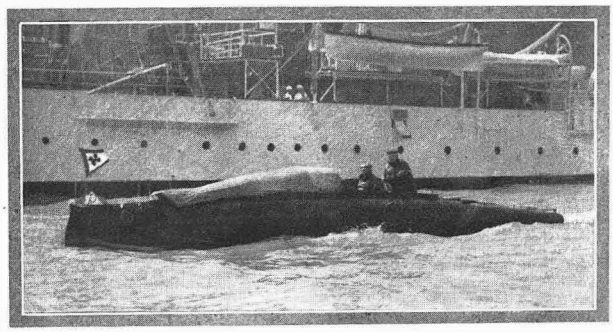
A Carburetter Competition.

The A.C.F. has organised for the 16th of May next and following days a competition for carburetters for explosive mixtures. The trials will take place on a single cylinder motor of eight kilowatts, which has the following dimensions: Bore 140 millimetres, stroke 160 millimetres, speed 850 revolutions per minute. The trials will be made in the following conditions:

1. Power developed at different speeds.
2. Consumption in litres per kilowatt hour.

There will be three classes of carburetters:

1. Carburetters made for one special motor.
2. Carburetters made for one special fuel.
3. Carburetters made for any motor and any fuel.

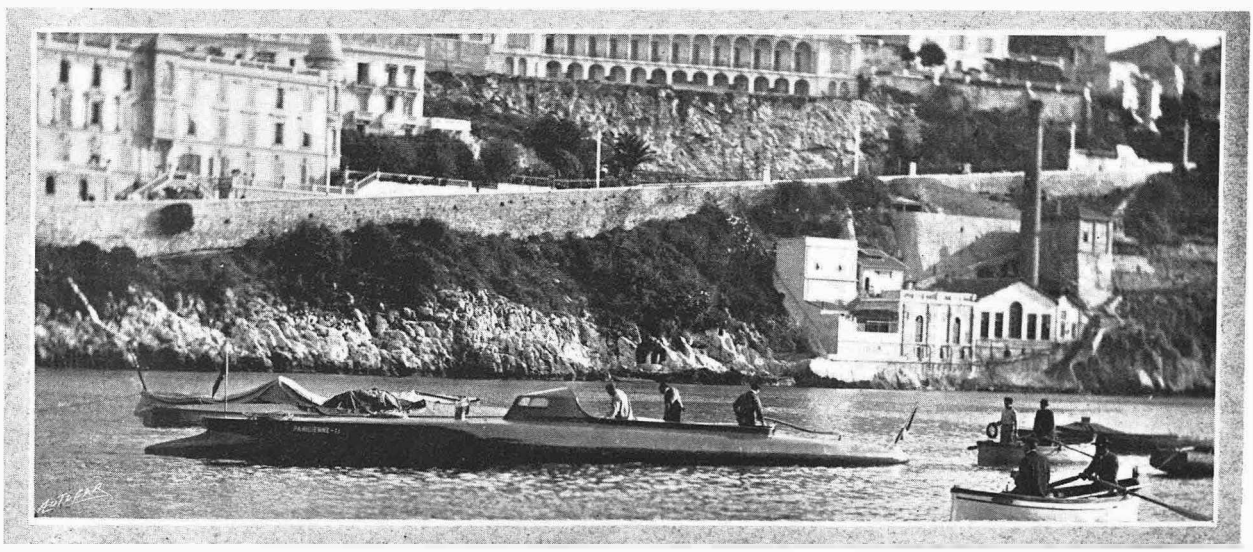


The Georges-Richards-Brasier motor launch, Trefle-a-Quatre, which created a record for motor launches propelled by internal combustion motors.

The Gordon-Bennett Cup.

The organisation of the French eliminating trials on the Circuit des Ardennes is being carried on actively, and the road is being prepared for the race, which will be held in May next. The most defective parts of the route are being repaired, and there is no doubt it will be in perfect condition for the race.

The Racing Committee of the A.C.F. has fixed the starting place at the cross roads of Mazagran, where there is an intersection between the road from Rethel to Vouziers, and that from Chalons to Attigny. In all probability the race will last about nine hours.



Parisenne II. lying in shore in Monaco bay. This is the boat which unfortunately took fire through the petrol leaking and becoming ignited from the exhaust.

CORRESPONDENCE.

EDITORIAL NOTICES.

We 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.

DISCREPANCIES IN H.P.

[8675.]—A friend has sent me a cutting of "D.M.W.'s" letter to *The Autocar* on the 2nd inst. on the subject of the nomenclature of the Mercedes cars, and I have taken advantage of my being with Mr. Jellinek at Nice to obtain from him accurate information on this very confused question of the correct horse-power of these well-known cars.

Parenthically, I may express my regret that "D.M.W." in setting out to correct others has not taken the pains to be himself accurate, nor would it appear that his Paris informant, through whom, I understand, "D.M.W." obtains Mercedes cars, is any better informed than "D.M.W."

"D.M.W." asserts that the cars being put on the market this year by the Cannstatt Works are as follows: 24-28 h.p., 24-32 h.p., 40-45 h.p., and 60 h.p.

This is not accurate, whilst his informant in Paris declares that the production of 1904 Mercedes at Cannstatt will be of the following types: 24-28 h.p., 40 h.p., and 60 h.p., and the other types will not be made at Cannstatt. Neither of these declarations is accurate, for the Cannstatt Works' description of the cars being turned out this year is as follows: 18-24 h.p., 24-28 h.p., 28-32 h.p., 40 and 60 h.p., and all these cars are manufactured at what are known as the Cannstatt Works.

It may surprise "D.M.W." to be told that, strictly speaking, no Mercedes cars are being actually manufactured at Cannstatt, the original works having been destroyed by fire last June and not having since been rebuilt. The essential parts of all the pleasure cars are, and will be, manufactured at the new works at Unter-Turkeim, four miles from Cannstatt, the old works, or what remains of them, being only used for body making, for stalling finished cars, and for offices. The Daimler Company have other works near Berlin, but there only heavy launch and lorry motors are manufactured, and no pleasure cars are made by the company there or elsewhere than at Unter-Turkeim.

To make matters perfectly clear I cannot do better than give your readers in tabular form the details of the present output of the Daimler Company, which Mr. Jellinek has supplied me with, the same being a copy of a statement made by the Daimler Company themselves at Cannstatt:

Works' description of cars.	Effective brake power.	Bore.	Stroke.
18 h.p.	1903	90	120
18 h.p.	1904	100	130
24-28 h.p.	1903	105	130
35-40 h.p.	1903	116	145
60 h.p.	1904	140	150
28-32 h.p.	1904	110	140
40-45 h.p.	1904	120	150

Now, as to "D.M.W.'s" complaint that dealers are not entitled to call the 18-24 h.p. 1904 an 18-28 h.p. car, I would like to explain how it is that this car, in the contract under which I bought thirty of them, came to be described in that contract as an 18-24 h.p. car. It was called an 18 h.p. car because it is the same frame and body as was supplied with the 18-22 h.p. car of 1903. It was called 18-24 h.p. because at that time Cannstatt intended to supply a 20 h.p. motor, that is, a motor of 100 mm. bore and 130 stroke, which they estimated would yield a 24 h.p. effective, whereas on testing the engine it was found that the motor developed fully 28 h.p. and even more. In these circumstances I felt justified in describing the car as an 18-24 h.p., in the same way as "D.M.W." in his letter describes the 40 h.p. car which gives 45 h.p. on the brake as 45 h.p. car.

To me and to any ordinary person it appears reasonable that if a car develops on the brake a certain h.p. one is entitled to call it by the h.p. developed, and surely the most important thing for the buyer is not to know what is the nominal h.p., but to know the actual brake h.p. which can be given, and to see that he gets it.

I have on order thirty of these cars, which I shall still continue, with all respect to "D.M.W.," to call 18-28 h.p. cars, and I am interested in fifty others of the same description, so that I hope "D.M.W." if he sees the reasonableness of my explanation, will do me the justice to acknowledge it with the same publicity as his letter has obtained, as otherwise his letter is calculated to do me and others considerable injury.

C. H. M.

RECKLESS DRIVING

[8676.]—As a lover of horses and at the same time a believer in the usefulness of a motor car, may I impress on those who drive motor cars the necessity of showing courtesy and consideration towards those who use horses on the roads. I have recently in testing various cars had opportunities of observing the driving of professional drivers, and I have been simply disgusted with the reckless and thoughtless way in which they deal with the traffic on the highway. It never seems to occur to them to slow down in passing farm teams (often composed of young horses) or to respect the nerves of ladies or others driving dogcarts, etc. I believe the reason is because in many cases these men have never driven a horse in their lives and know nothing whatever about them, and they do not realise that although no accident may occur at the moment through their reckless driving, still a valuable young horse may be so frightened that it may be rendered unsafe to use on the road afterwards, and to nervous people the whole pleasure of a country drive may be spoilt by the constant fear of meeting one of these "horrid motors." A man may be a first class mechanic and able to build a motor car, and yet he may be quite unfit to drive one with safety to the community. May I draw the attention of the proper authorities to this point. As time goes on I trust that many men "trained in the stables" may become motor drivers, and thus increase the number of those who know how to have sympathy with "the horse" as well as with "the motor." May I add that I have now two such men in my service, and I am fully satisfied and have my cars turned out in first rate style. A neighbour has three highly paid mechanics, whose cars are badly turned out, and I have yet to learn that the "local repairer's" bills are less than mine. Of course, there are many good mechanics, but from my experience I prefer a well trained "shuvver" who takes an interest in his work, who is clean and smart in his person, and also civil and respectful. Your correspondent "W.S." may scoff at such "poor devils," but when more of them are available "competent men" of his type may find it difficult to get either a "chance or a salary."

X Z 42.

[8677.]—I am an experienced motorist, and have a car of my own. I am afraid, however, unless motorists in general have more consideration for the feelings of the general public, that before very long such new restrictions will be placed upon us all that many will give up their cars. In Esher, the other day, two cars went at a great pace through a narrow, crowded street. I was on the side walk, and the remarks of the people near me were not nice hearing for a motorist. The next day a nurse and child were as nearly as possible run over by a car. My own children and nurse have for some time been debarred from all but a few roads near my home, the others are unsafe. I went to Eastbourne, and there the same general complaints and threats of action were heard.

The cars generally may be well in hand, but that is not enough; the public will not stand cars going through narrow, fairly crowded streets at anything but four or five miles an hour.

I think this is a subject on which the Motor Union and Automobile Club should take a strong stand; they would be supported by all sensible motorists. The selfishness at present shown by the other sort is making a good many car owners disgusted.

A CAR LOVER.

BORON CHARGING CELLS.

[8678.]—In reply to "Cantab's" enquiries, my own experience of the Boron cells does not confirm Dr. Eustace Morgan's letter, No. 8645. I notice, however, from the photograph accompanying that letter that Dr. Morgan's accumulators, shown therein, are small ones. It may, therefore, be that the manufacturers have not supplied me with

sufficiently powerful cells for charging accumulators for my 16 h.p. Napier car. I find, as "Cantab" states, great difficulty in fully charging my accumulators.

Although carefully carrying out the directions sent by the manufacturers, I find that after leaving the accumulators on the cells (which apparently give off about six volts when coupled up) for eight hours, and though the accumulators register over four volts when taken off, they give out after a run of twenty or thirty miles. It is fair to say that these cells seem to charge the accumulators on my little Gladiator car fairly satisfactorily.

As I unfortunately know nothing about the science of electricity, I asked Messrs. S. F. Edge, Ltd., to kindly procure me the necessary charging cells, which, with the courtesy they invariably show their clients, they were good enough to do after communicating with the manufacturers.

Perhaps Dr. Morgan could kindly state the amperage of his accumulators? And might possibly be able to explain the reason why up to now I have obtained such singularly unfortunate results from these primary batteries?

The advantage of such batteries to anyone situated beyond the reach of an electrical generating station is obvious; but they have their disadvantages when their use results in leaving one stranded on the high road. This occurred to me not long ago. I left home with all three accumulators registering over four volts, all of them having apparently been fully charged off Boron cells, but all three accumulators gave out after a run of about fifty miles. Luckily this occurred only two miles out of Newmarket, where, by the kindness of Messrs. Cresswell, I was fortunately able to borrow a fourth battery to take me home. OXON.

[8679.]—Having used Boron cells since last Christmas, both for charging and lighting purposes, I must confess I have been more than satisfied with the results obtained. I have six cells in all which I use, when not in use for charging, to light my motor house, and also for reading purposes. For charging purposes they are unrivalled. Although more expensive at the start than any other cells, they very soon repay for that, both as regards results obtainable and the absence of poisonous mercurial salts such as are employed in some of the cheap sets on the market. If the cells are used in accordance with the printed instructions accompanying them, and the accumulators are in sound condition, to my mind the difficulty would be to undercharge one's accumulator.

G. BUSSHOTT.

[8680.]—In reply to Cantab, I have been using for the past six months a set of Boron cells, which I purchased through an advertisement in *The Autocar*. I have two sixty ampere hour accumulators, and also four (twenty amperes); for the former I use a set of six cells, two sets of three in parallel; and for the latter four cells, or if only partially run down three cells are sufficient. Quite recently I purchased from the same company a couple of their electric lamps to use with the cells. I have had a very good result from the same, and sufficient to light my motor house for hours at a stretch. I have used other cells, and have them by me at the present time, but in my opinion the Boron cells for charging purposes are the only practical cells in the market. You would obtain full particulars by writing to the company, and a written guarantee should you purchase a set. H. C. HOLMES

THE NAPIER IGNITION.

[8681.]—May I be permitted to point out an error in your description of the new Napier ignition. You say, "As a matter of fact a commutator is unnecessary, as the trembler of the coil may be constantly kept at work, the high tension current being distributed to the sparking plugs in the engines as each cylinder is fired in its turn." If this were so the primary circuit, being always closed, and the second broken intermittently at the sparking plugs, there would be no path open for the secondary between such times, and it would very soon find one for itself—by breaking down the insulation of the secondary coil. I invented just such a system as the Napier over two years ago, but with additions. I generated the current by a magneto having thirty-six magnets, giving an alternating current at eighty volts, this energising the primary of a mica-insulated transformer (not a coil) giving about 8,000 volts at the secondary terminals, and, of course, a beautiful spark. A double make and break as in the Napier is then required, breaking both primary and secondary circuits, the primary slightly in advance. By this system you at once dispense with accumulators, coils, and tremblers, but still retain our old friends the sparking plugs. Only the original set has been made, as want of interest by the trade and my own business prevented me from putting it on the market.

FRED. H. HADFIELD, M.I.E.E.

[We agree that a commutator is desirable, though Messrs. S. F. Edge, Ltd., suggest that the apparatus may be used without one.—ED.]

A BRAKE QUERY.

[8682.]—Probably it is a well worn subject, but may I ask your readers' experience of, say, 7-16ths wire rope as against ordinary rope for hand brakes—the latter varies too much with the atmospheric conditions to be reliable.

ARTHUR ATKINSON.

THE MENDING OF COVER CUTS.

[8683.]—Can any of your readers tell me the best rubber solution to use for repairing cuts in motor wheels? I have been using Hills's with most satisfactory results so long as the dry weather lasted, but after running on the wet roads this week all the cuts have broken open, and the work must be done over again. G. H. MAITLAND KING.

TRACTION ENGINES AND ROADS.

[8684.]—If I may be permitted to refer to a road question which has previously been discussed in *The Autocar*, I would direct attention to the increasing damage caused by traction engines to our main roads and by-roads. Having occasion to travel over some of the finest main roads in England, my attention has been drawn to the crushing action of the immense wheels of these engines on the road surface. Places which would stand ordinary traffic for months are cut up and the surface pulverised by the passage of a single engine and its train of waggons. Is it not possible for something to be done to lessen or prevent this damage? We may shortly expect a considerable diminution in the use of iron tyres, but if the huge traction engine is allowed to tear and crush our highways to pieces we shall be no better as far as road surface goes. It seems, also, that increasing use is being made of these engines. The point I wish to urge is the necessity for some action to be taken by the Roads Improvement Association, the A.C.G.B. and I., or other body. C. E. ABBOTT.

A WHEEL TAX.

[8685.]—A Devon member (A.C.) has supplied one solution for the problem of road damage from traction engines. I beg to quote the extract from his letter in the *Western Morning News*: "The fairest form of road tax ever proposed was the 'Wheel tax,' in which every wheel used on the road was to be taxed, roughly, in proportion to the damage it did to the surface." Regretting I could not send this with my last.

C. E. ABBOTT.

ALCOHOL AS A MOTIVE POWER.

[8686.]—In your editorial dealing with the paper read by one of our chemists—Dr. Ormandy—on "Alcohol as a Motive Power," we notice that you make him refer to Dr. Meyer as his authority for quoting a possible shortage of supply in petrol. We think that we ought, because of the added weight which it gives to the warning, to point out that the authority quoted was the chairman of the meeting at which the paper was read, Dr. Boverton Redwood, F.R.S.

Further, we would point out that the average percentage of petrol in the crude oil yield of the various fields is about two per cent., which is not quite what your paragraph might convey.

We are very pleased indeed to find your widely read paper is pressing home the importance of the subject, and trust that the united efforts of all who are working for the same end may result in producing fruitful activity on the part of the Government. J. CROSFIELD AND SONS, LTD.

SMARTNESS IN EFFECTING REPAIRS.

[8687.]—I have followed with much interest the discussion re the respective merits of English and foreign cars, and in this connection my Easter experiences may be of interest to your readers.

In February, 1903, I commenced motoring with a 14 h.p. Brooke car, without any previous experience, since which time I have done several thousands of miles, with no engine troubles of any kind, until Thursday, March 31st, when the engine developed what I took to be a merely temporary trouble, which, as it turned out, was owing to my neglect

Correspondence.

in not lubricating sufficiently; and on the afternoon of Good Friday, after a severe knocking, one of the connecting rods broke, smashing the bottom out of the crank chamber, this being doubtless due to my not having had the trouble of the previous day properly rectified.

The above smash happened sixteen miles from Messrs. Brooke's works at Lowestoft. At six p.m. I wired them, with the view of their sending for the car on the following day, if possible, I naturally thinking that any further motoring was for some time out of the question as far as I was concerned, but to my great surprise and satisfaction, Messrs. Brooke replied they would fetch the car that night (Good Friday), and deliver same to me on the following morning in perfect order. And this they actually did, getting my car to their works at 11 p.m. on Good Friday. The engine was then removed, and a new engine fitted during the night, with the result that the car was delivered at my house ten miles from the works—at 10.30 a.m. on Saturday, in time for me to attend the meet of the Norfolk Automobile Club at Cromer—thirty-five miles away—at 1.30 p.m., and the car has since been running perfectly.

As an illustration of smartness the above would, I think, be hard to beat, and constitutes a good object lesson of one of the advantages of an English-made car. Had mine been a foreign car I should probably have been motorless for five or six weeks, whereas, as a matter of fact, I lost only about one hour on the road. H. CHAMBERLIN.

PETROL CONSUMPTION.

[8688.]—In reply to "R" (8650), my consumption was as stated. But he may not call the conditions ordinary. They were:

Switch off down every hill that allowed free-wheeling.
Top speed whenever possible.
Minimum of acceleration.
Petrol tap not quite full on.

In fine, driving for economy of petrol. As a matter of curiosity, in a tour to Devonshire that I have just made, *vid* Bridport, with its fearful hills, I ran without economies of any sort. My consumption was a good deal more—about twenty-six miles to the gallon. This is an excellent result, I understand, though it looks poor beside the previous record. I may add that my petrol consumption is nowadays rather erratic, at one time almost heavy, at another I have run thirty miles without any appreciable difference in the petrol tank. This might be taken to imply a choked supply, only that as I easily ran up Charmouth Hill, between Bridport and Axminster, with four up and about two hundredweight of luggage, the necessary loss of power is very much absent. The lowest speed eats the petrol.

I attribute my low consumption to two things. Firstly, that I take a good deal of pains to see that my pump is all right, and to keep the engine cool and well oiled; secondly, that the 10 h.p. M.M.C. is a very powerful car for its weight and nominal horse power, consequently swifter than the average expectation, and less likely to be unduly taxed.

About the throttled vibration when standing I can give no explanation. The fact remains as stated—the engine shakes a good deal when standing throttled down, and slides quite smoothly when running on the top speed.

FRED T. JANE.

THE RATIONAL CAR.

[8689.]—There are many people who, like your correspondent "F.W.B." [8657], wonder when car makers will seriously consider the requirements of the parish clergyman, the country doctor, the small tradesman having shops in adjacent towns, and generally the hard working man who has to get over ground at a moderate speed, carrying one, two, or three passengers, or it may be samples or light merchandise, and who has neither £250 free at his disposal with which to buy a motor car, nor an annual income sufficient to pay the average repair and upkeep charges for such a car.

A single-cylinder, slow running, 8 *full* h.p. horizontal engine (at front), few gear wheels, two speeds forwards and reverse, really good springs, chain drive, strong frame, artillery wheels, no ball bearings, solid tyres (large), tonneau body, detachable seats, everything plain, simple, and of the very best quality and workmanship, and easily accessible. A car in which duplicates of the very few vulnerable parts could be always carried, and that is practically certain, day or night and in any weather, to take one to one's destination and bring one back without delay due to accident. I feel sure that if the makers of certain well-known cars would bring out a workman's car of this kind in the late autumn when the demand for the pleasure car is slacking off, they would get a good deal of extra business, and reckoned as such the workman's car should not need to bear any share of the usual heavy charges on pleasure cars for cost of selling. The demand for a workman's car undoubtedly exists, and has been often expressed, but so far as I know no car embodying all these essentials at present exists. The elaborate mechanism usually mounted to obtain silence is not really wanted, but first rate carriage springs, freedom from overheating in any parts, and thoroughly good stuff and workmanship throughout are essential. W. R.

NON-SKIDS ON SOLID TYRES.

[8690.]—May I ask if any of your readers have experience of non-skid apparatus on solid tyres? If so, was the apparatus satisfactory? G. B.

TYRE TROUBLES.

[8691.]—As we so often hear of marvellous runs without damage to tyres, it is well sometimes to hear of failures. I have been running an Oldsmobile for less than two months. A better car or a more reliable one no man could need. My longest non-stop run was seventy-five miles, but when it comes to tyres, "Oh dear!" (1.) Front tyre cut clean through in three places, one cut large enough to get three fingers in. (2.) Tyre burst, though fitted with Smith's band. (3.) Tyre fitted with thickened tread and Smith's band, cut clean through the lot. It is enough to dishearten one. I have heard of puncture proof jelly, but in none of these cases would it have been of any use.

I am told that solids on a light car would take out of the engine through vibration quite as much as the saving on tyres. Any advice on this matter would be welcomed. Would it be worth while to alter from single to double tube tyres, and would the cost of converting Oldsmobile wheels be very great? TYRE-TIRED.

REPAIR CHARGES.

[8692.]—Noticing in your correspondence columns the bad treatment two fellow motorists have received by a West End repair shop, I think it will prove useful to other motorists to mention a recent experience of mine.

I sent my car to the Relyante Motor Works at Walthamstow to be overhauled, and I received from them the most courteous treatment. They fetched my car away and delivered it back on the date promised without any trouble to me, the work was done to my satisfaction, and their charges were so reasonable that I think it right to let other motorists know where they can rely on being so fairly treated. They have splendid works and a large number of motor mechanics, and facilities for doing anything.

I have no interest in the firm, but think my experience may be useful to other motorists. S. R. WARD.

THE EVOLUTION OF SPEED.

[8693.]—This year we shall probably see on the road more cars and motor cyclists than in any previous season. Many at this moment will be hesitating as to what their particular mount of 1904 shall be. May I, as a motorist of longer standing, perhaps, than most drivers and riders, venture to point out what in my humble opinion so many people lose sight of, viz., the necessity of increased horse-power for those who are no longer featherweights.

When I commenced hunting in Leicestershire, more than thirty years ago, a ten stone horse suited my requirements perfectly. Now, alas! owing to *Anno Domini*, and a certain amount of *embonpoint*, I have to purchase fourteen stone hunters instead. With a bicycle and a car the case is identical. If the rider does not want his mount to halt beneath him, when ascending rising ground, he must always have a bit in hand on the flat.

I began motoring with a Benz car of 3½ h.p. My second car, an 8 h.p. Napier, the first ever built by that firm, distanced all other English competitors in the celebrated 1,000 miles club run to Edinburgh and back, over which we took three weeks. My third was a 15 h.p. of the same make, and I am now anxiously waiting the delivery of a new 30 h.p. six cylinder Napier.

As a motor cyclist, evolution has carried me forward in precisely the same progressive fashion. My 1½ h.p. became a 2¾ h.p., and I am now the proud possessor of a Clyde high tension magneto bicycle, that develops an easy 4 h.p. on the brake. What is the result? Instead of having to propel with perspiring brow an under-powered machine up wearisome

inclines, I now glide gracefully to their summits, without pedalling and without anxiety, no matter how steep the ascent. As to danger, with proper exhaust control on the handle-bar, there is absolutely nothing to fear In any serious emergency speed by means of this lever can be immediately reduced. In traffic one can crawl behind the slowest growler. No anti-vibration springs are required for the seat-pillar. One of the first articles from my pen you did me the honour to publish sang the praise of the Simms-Bosch magneto ignition. Since then I have found no occasion to change my mind, or to transfer deep-rooted affections from an old love to a new. With high tension electricity, doing away with troublesome tremblers and faulty accumulators, the arguments in its favour are overwhelming. How long, indeed, will an obsolete mode of ignition remain in use? E. KENNARD.

NON-SKIDDERS.

[8694.]—I have read with interest Mr. Jane's letter in your issue of the 9th inst., but I fancy that in his eagerness to do battle for the Parsons chains he has missed the salient point of the trials and what the Automobile Club wishes to bring clearly before the public, viz., the evolution of the most perfect non-skidding tread.

A few years ago the public bought their motors and awoke to the fact that skidding was a very dangerous and expensive amusement, and they greedily seized on any appliance that would keep them out of the ditch and clear of the lamppost.

Now this has all changed, and they have become much more fastidious, and demand a non-skidder that they can take on and off at pleasure, or perhaps I may go further and say that will take itself on and off as required.

The non-skidder, like its parent, the motor car, is in a state of transition, and happy is the man who can for the next few years journey about the country without developing too strong an affection for any particular type of car or non-skidder. Granted that all non-skidding properties are equal in the various anti-skidding devices, I should say that there is no doubt that the Wilkinson or Samson is a vast improvement on the Gallus or the Chamerov. The Parsons chain can in its turn give some points to these two last named, while in my humble opinion none that I have mentioned are in it with the Eyre or the Sainsbury, for the simple reason that they are more or less automatic, can be stowed away with the minimum of trouble, and do very little harm to the tyres.

The fault in all permanently fixed non-skidders is that they ruin the outer cover. As a rule, when the non-skidder is worn out the outer cover is done for too, and will not bear the strain of a second anti-skidder. Whether the makers will be able to overcome this drawback remains to be seen. At present they certainly have not.

What is a perfect non-skidder? I am not good at definitions, but I can tell you nearly what I want, and I dare say your readers can supply the correct formula.

(1.) It must be always on the wheel and close to the tyre.
(2.) It must come into and go off from work automatically.
(3.) It must not injure the tyre.
(4.) It must stop and prevent instantly all kinds of side-slip and skidding.
(5.) It must not cost more than 1d. per 100 miles run.
(6.) It must be noiseless and easily put on.
(7.) It must not reduce speed.

When we have got an anti-skidder that comes up to the above qualifications we shall have made great strides in the comfort and safety of motoring, and when it arrives I expect nearly all change gears, too, will be things of the past.

ARTHUR COTES.

DISGRACEFUL CONDUCT.—A WARNING.

[8695.]—The publication of the two letters under the above headings in the last issue of *The Autocar* is opportune at the commencement of the driving season, and, seeing how the many must suffer for the sins of the few if this sort of thing continues, might we not all do something to mitigate the nuisance? In the instance quoted by Mr. W. Fairman we apparently have a car driven by a *mécanicien* as the delinquent, and I conclude its number was recognised. I suggest that if we motorists—instead of leaving it to the police—take the numbers of cars under such circumstances, and *as automobilists* draw the attention of the owners to the occurrence, it will be appreciated by the majority of owners, although some inconsiderate ones—I hope they are few—might possibly resent the intrusion. In the case instanced by Mr. G. F. Heath he says the car bore the registration plate, so I imagine, as the car was going slowly, it was readily and clearly readable, and I fancy a note of remonstrance from another motorist, couched in strictly correct language, would be quite as much taken to heart as a police summons. If motorists do not care to do this, might they not bring the facts and the numbers before the notice of the club or of the Motor Union, and these bodies could write an official remonstrance? I am sure the club would willingly do so if the offender were a member, and in that case might even go further if the case were a very flagrant one.

HENRY STURMEY, F.R.P.S., Hon.M.C.E.I.

MOTOR POSITION.

[8696.]—I was much struck by the nice illustration in your last of the 8 h.p. Panhard, as shown by the Lancaster Motor Garage at "the Hall." It was the neatest brougham at the show, and well bears out my previous letter suggesting a wider adoption of placing the motor under the seat. Besides being much more economical in space, it should add to the appearance of the car, and does so to no small extent in the one under notice.

In "public service" and similar types where the maximum of carrying capacity with the minimum of space occupied is of such importance a bonnet does indeed seem a waste, and often an ugly one at that. In comparing the Stirling and Milnes-Daimler War Office waggons—also illustrated in *The Autocar*—this is very plain. Not that the latter is unsightly; rather it is a most business-like looking vehicle, and only compares unfavourably (in illustration) with its brother Stirling in the shorter length of carrying space compared to the total lengths of the respective cars.

I look forward to the enlightened time when a bonnet (why not a hat?) will no longer be considered the *sine qua non* of a good car, the car being judged by the size of its bonnet as if it were a lady, though, of course, there are many cases where the bonnet is desirable. R. G. WELLS.

THE SUPPLY OF PETROL.

[8697.]—In your issue of the 2nd inst. I notice that, in discussing the supply of petrol, you state that the supply of this article is practically in the hands of one huge corporation, which I take to mean the Standard Oil Co., of New York. Nothing could be more diametrically opposed to the actual facts than this statement. I should think that ninety per cent. of the petroleum spirit brought into this country during the past eighteen months or two years has come from sources not controlled in any way by the Standard Oil Co., and the same remark refers to the supplies of petroleum spirit imported into Germany, Belgium, and Holland.

Fortunately for the automobile trade, there is a very large production of the best quality of petroleum spirit in Sumatra, which I have every confidence in stating will be sufficient to meet all the possible requirements in this country.

PHILIP TENNANT,
THE GAS LIGHTING IMPROVEMENT CO., LTD.

SUMMARY OF CORRESPONDENCE.

THE RATIONAL CAR. In response to "F. W. B.'s" query last week, the Albion Motor Car Co., of Glasgow, suggest that their cars most nearly meet the requirements laid down by our correspondent, who, it will be remembered, asked for a strong and simple car with solid tyres and maximum speed of fifteen miles an hour on the level, and the ability to make half that speed up a hill of one in six, high body, and no ball bearings.

DISCREPANCIES OF HORSE-POWER. In reply to "D.M.W.'s" letter under this heading, which appeared on April 2nd, the Cannstatt Automobile Supply Association write: "The Mercedes cars he refers to are received by us direct from the Cannstatt works, and the following extract from a letter of the Daimler Motoren Gesellschaft, Cannstatt, may make the matter clear both to him and to anyone else who is in doubt on the subject: 'The 1904 motor reaches 28 h.p. compared with 22 h.p. of the 1903 motor.' We may mention that we guarantee all our cars to give 28 h.p. on the brake.

THE SIX-CYLINDER ENGINE. In reference to M. Yzelen's letter, in which he suggested a four-cylinder engine should be as perfect in running as a six-cylinder, Mr. S. F. Edge points out that he has not grasped the advantages of the six-cylinder Napier engine, in which one explosion commences to rotate the crankshaft before the previous one has ceased exerting its effort on the shaft, so that the propulsive force on the crankshaft is continuous, and not intermittent. The six-cylinder engine, Mr. Edge is convinced, is the engine of the future for all motors *de luxe*. Of course, it is out of the question for cheap cars.

Flashes.

Mr. J. A. Moffat, of Oakham, informs us that he recently had occasion to invoke the aid of Messrs. T. M. Mackay and Co., who have just opened a new garage in Dalblair Road, Ayr, and found them very capable repairers and moderate in their charges. He can recommend them with confidence.

* * *

The new forked tyre lever that Messrs. Gamage have lately put upon the market is an exceedingly useful tool. Not only does it obviate the use of two levers, but it renders removal much easier, since the ends of the fork are made exactly the right distance apart for the purpose. Beyond this, when the cover is lifted by this lever the space between the two arms just provides easy clearance for withdrawing the valve—an advantage that will be fully appreciated by those motorists who have had trouble in this direction with a stiff cover and a single lever.

* * *

Sir Charles Rivers Wilson has just ordered a 23 b.h.p. Brush car. The special feature about the carriage is the body, which is capable of transformation into three types. In one form it is a diligence with a glass front, in another a victoria with a hood, and in the third a double phaeton, with extra seat for a man at the back. There is also considerable luggage capacity.

* * *

The remarkably highly finished Hotchkiss 24 h.p. chassis, which excited so much admiration at both the Paris and the Agricultural Hall Shows, can now be seen at the British Automobile Commercial Syndicate's Depot, at 98, Long Acre, W.

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The Cardiff Cabs' Committee last week reaffirmed their decision to refuse a licence to the South Wales Transport Co. to run motor omnibuses in the borough, in direct opposition to the expressed wish of the public.

* * *

A report reaches us of a good run made in Australia during the Christmas holidays upon a two-cylinder 10 h.p. Argyll car by Mr. W. S. Ross, of the Tarrant Motor and Engineering Co., Melbourne, Victoria. The car left Melbourne at 4.30 on December 23rd, covering 175 miles in 9h. 20m., or an average of nineteen miles per hour. Mr. Ross was surprised and astonished to find that only five gallons of petrol had been used for the whole distance, the consumption working out at thirty-five miles per gallon. The atmospheric temperature was 92° in the shade, and unfavourable for a long run. Returning to Melbourne on December 31st, the speed averaged 21.8 miles per hour. The only inconvenience experienced was the exhaust pipe becoming loose, allowing the exhaust to discharge itself directly into the atmosphere, and so making a great noise. On the homeward journey, a non-stop run was made from Colac to Melbourne, except for a few seconds, on account of a restive horse.

We are informed that Baron Pierre de Crawhez has been selected to drive a Pipe car in the forthcoming Gordon-Bennett Cup eliminating French trial.

* * *

The Du Bois Co., Ltd., 4, Princes Street, Hanover Square, W., write that they have taken up the London agency for the Dennis cars, and that a selection of these vehicles may be seen and tried at their showrooms.

* * *

The United Motor Industries, Ltd., are placing a series of voltmeters and amperemeters, known as F.A., on the market. These instruments are remarkably cheap, considering the quality and deserve attention. A wall plug charging apparatus with a pole indicator is also in the F.A. line, and seems to be both neat and handy. Beyond these, there is a charging board, two different dashboard voltmeters, one with a two-way switch, and the other without, and a case carrying a voltmeter and pole indicator.

* * *

A carriage accident at Plymouth the other day, caused by the restiveness of a young horse, resulted in the death of Mr. J. Pethick, J.P., an alderman of that town. Although the details of this accident were of a harrowing description, they were not given anything like the publicity in the press that the motor car accidents which occurred about the same time were accorded.

* * *

In view of the discussion at present being carried on with reference to the scarcity of qualified and reliable "motor vets.," we are pleased to hear that Mr. H. W. Bamber (who will be remembered by our readers as a former works manager of the Daimler Motor Co., Coventry) may now be consulted at 25, Ryder Street, St. James's, London, S.W., where he has a drawing-office and consulting-room, and is making the designing and examination of petrol cars his speciality.

* * *

One day last week we were afforded the pleasure of a short but none the less interesting run in the 1904 20 h.p. Dennis, built with Dennis patent rear axle, with worm drive. In addition to the last-named feature, this car possesses other special points, such as a stationary secondary gearshaft on top speed, the secondary gearshaft being itself a steel bushed sleeve revolving on a stationary shaft, and the patent spring drive, which we hope to illustrate and describe in an early issue. By the result of our experience already referred to, we can testify to the extreme sweetness and noiselessness of the Dennis worm drive, whether at speed or climbing a grade of one in eight. Both in driving forward and backward, the worm conveys the drive perfectly, and we were much pleased with our little trip. It is gratifying that the second firm of automobile constructors to perfect a worm drive should be a British house.

The Gordon-Bennett Race, June 17th.

Although too early to discuss our programme for the Gordon-Bennett Race in detail, we may say we have organised arrangements for reporting it fully in "The Autocar" of June 18th. The race takes place on June 17th, and on the following morning (Saturday) a full report of it will be on the subscribers' breakfast tables, and on sale at the bookstalls. That is to say, the usual Saturday edition of "The Autocar" will contain special accounts of the race of the preceding day, with many illustrations.

The Merthyr District Council has decided to erect signboards on all hilly and dangerous points, and to limit the speed of motor cars at those points to ten miles an hour.

* * *

The Pytchley Autocar Co., of Bradshaw Street, Northampton, inform us that they have just enlarged their premises, and now have extensive showrooms, garage, repair shops, etc., in the very centre of the town. They have also taken up the agency in the Midlands and North of England for the F.I.A.T. cars.

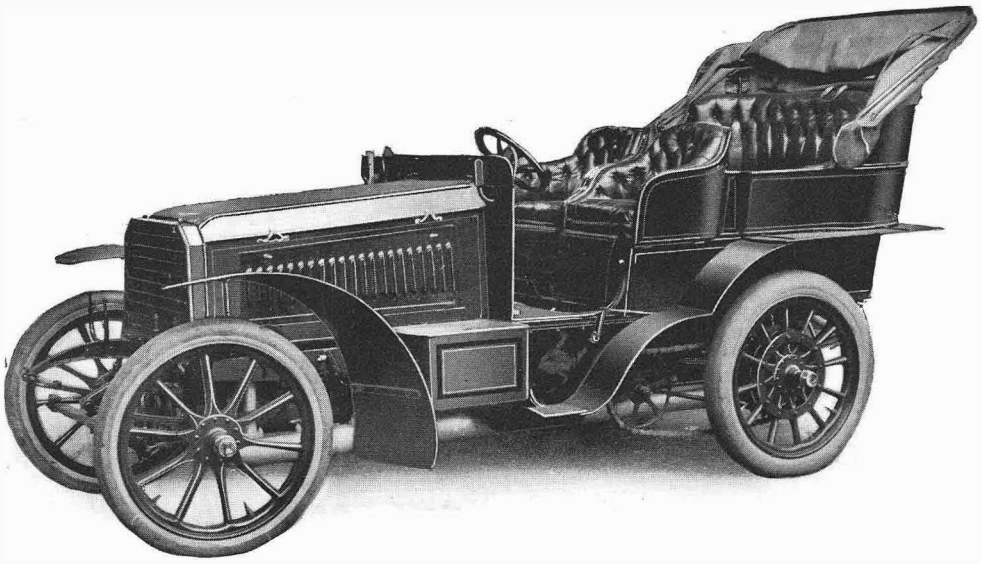
* * *

Captain Ottley (Royal Navy), who is wooing the Pembroke boroughs as a parliamentary candidate, uses a magnificent motor car for travelling about the scattered district. The other evening he had a series of amusing adventures. Besides his driver he was accompanied by a footman, whose duty it was to assist in quieting or holding restive horses that might be encountered. On the way the car was stopped twenty-seven times by people with timid horses holding up their hands. The footman had to leap out of the car twelve times to hold horses' bridles, and spent a quarter of an hour assisting a friendly farmer to get an unbroken colt past the car. A clergyman, however, who was met, designated the captain as a "motor fiend," notwithstanding the fact that the speed at which the car is regularly driven does not reach by one-half that allowed by law.

* * *

On Saturday last, April 9th, an important walking match between two well-known athletic clubs—the Ranelagh Harriers and Blackheath Harriers—took place from Westminster clock tower to Brighton Aquarium, over the classic course of fifty-two miles—a route dear to motorists as the scene of the first official and legal run ever held in this country, on the never-to-be-forgotten November 14th, 1896. As both clubs include several Stock Exchange men, very great interest was taken in the event. T. E. Hammond (third in last year's S.E. walk) won, beating the time then made by over an hour, and record by over sixteen minutes, his time being 8h. 26m. 57⅖s. P. B. Thompson, second, 8h. 37m. 13⅗s., also beat record. No less than three motor cars promised failed to turn up for the start at 5.37 a.m., but F. E. Eastmead kindly placed his 12 h.p. Sunbeam at the disposal of the officials. It went well throughout without the slightest hitch. It is interesting to note that the winner wore a special form of walking boot designed by Mr. G. Lacy Hillier, whose name is not unknown as a contributor in our pages.

There are many special features of interest about the Gordon-Bennett Wolseleys. Among them it may be mentioned that the sparking plugs have been specially made and are extra large. The coil is provided with two tremblers, only one of which works at a time, a crossover switch being provided so that either trembler may be used. A separate switch is fitted to each low tension wire to act as a detector to the various plugs if any cylinder is missing, and there is a jump spark on each high tension circuit. The pump is carried on the radiator and driven from the motor by a telescopic shaft with spring drive. The gear box has ball bearings throughout, while both hand and foot brakes work on the back wheels.



Last week we announced that Mr. D. M. Weigel's 90 h.p. Panhard on which he broke the flying kilometre record in June, had been bought by the Hon. Maurice Egerton, and transformed into a touring vehicle. Our illustration shows it in its new guise with its Rothschild body. Of course, a car of this kind is one which should only be handled by the most experienced and careful automobilist. So long as its great powers are only used when hill-climbing and on the rare occasions when a deserted stretch is found there is no objection to the vehicle, but unless it is driven with restraint it will do a great deal of harm. In the general sense we are entirely opposed to the use of such needlessly high powered vehicles for every day pleasure work. We may add that a very large silencer has been fitted which has a much greater quietening effect than the one provided for the car in its racing form.

Some of the papers published exaggerated accounts of the accident which took place at Rye on Easter Monday, when Mr. C. Earp, driving a Napier racing car, ran into the back of a waggonette, which a small boy was driving, on the wrong side of the road. Some of the reports stated that both waggonette and car were wrecked, and several people injured, whereas in reality nobody was hurt at all. All the occupants of the trap were at their usual work next day, and the damage to the waggonette was covered by a couple of sovereigns! The accident was caused by the horse-drawn vehicle being on its wrong side, and was contributed to by the wet and slippery state of the road, which prevented Mr. Earp's car from coming to a stop when he applied his brakes as quickly as it would otherwise have done. The result was that the front of the car just touched the back of the waggonette, bending the step and breaking a spoke in the wheel. The suggestion which has been made in one quarter that the steering gear of the car was at fault is quite unfounded, as the car was driven back to London immediately after the occurrence. The fault would appear to be not in the car, but in the fact that it was taken round the corner at too high a speed. The harm which such accidents do can scarcely be exaggerated.

THE 20 H.P. HUTTON CAR.

(Continued from page 505.)

The Metallic Clutch.

Figs. 8 and 9, together with the following description and the numbered reference to the diagrams, will enable our readers to grasp clearly the design of the Hutton clutch, which is at once both novel and ingenious, and should be sweet and efficient. Within the overhanging rim of the flywheel, and attached to the web thereof, and the flange formed on the end of the crankshaft, is a cast-iron ring 1 made with an internally-grooved periphery 2. This cast-iron ring answers to the female portion of the ordinary clutch. These grooves coincide with the grooves in the split rings 3, which form the expanding portion of the clutch. Mounted on the forward squared end of the clutchshaft 9 is a form of carrier with bosses, in which are set the spherical nuts 7 7, having sharply pitched square threads tapped therein. In these nuts are placed the armed screw studs 5, which carry at their outer ends the wedge-ended members 4. These wedges are moved out and in by the partial rotation of the screwed studs 5 turning in the spherical nuts 7 by means of the slotted levers 6 attached to them. The levers 6 are actuated by the movement of the clutch sleeve 8 on the clutchshaft 9, which movement forwards and backwards is brought about by the clutch spring 10 and the clutch pedal respectively in the usual way. It will therefore be seen that the forward pressure of the clutch spring 10 presses the slotted levers 6 outwards, thereby partially rotating the screw studs 5 in the spherical nuts 7, causing these studs to thrust the wedges 4 between the splayed ends of the expanding split rings 3, and thus jamming the ring wedges on their outer surfaces into the grooves on the inner periphery of the cast-iron ring 1 bolted to the flywheel.

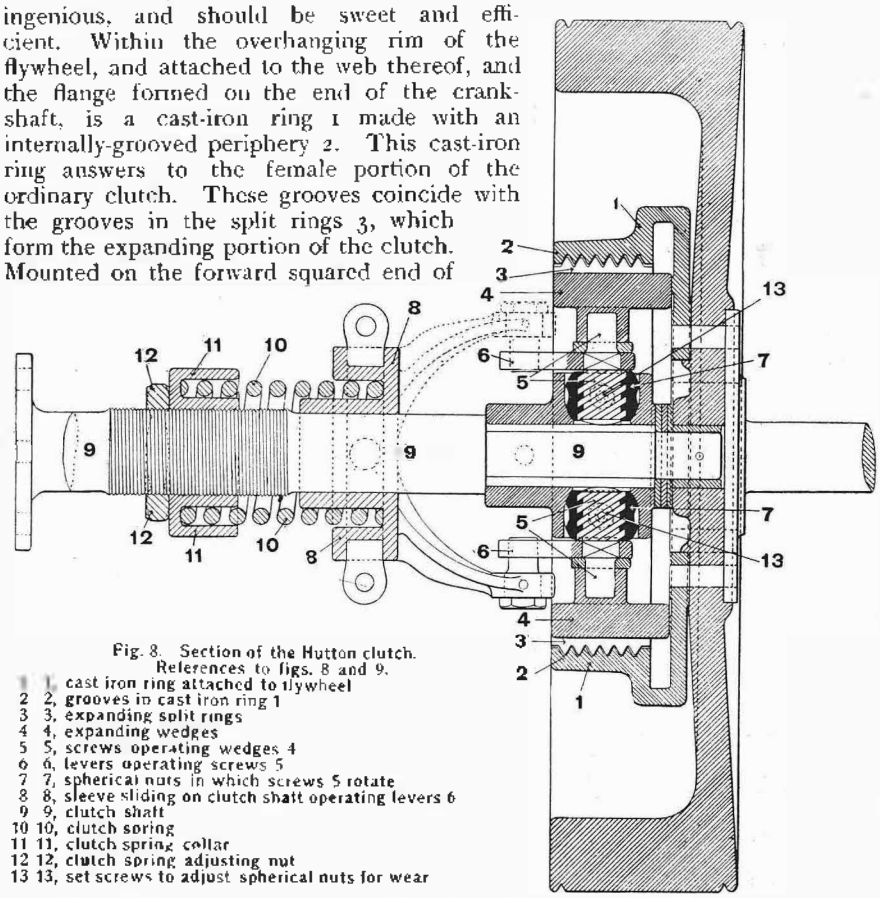


Fig. 8. Section of the Hutton clutch.
References to figs. 8 and 9.
1 1, cast iron ring attached to flywheel
2 2, grooves in cast iron ring 1
3 3, expanding split rings
4 4, expanding wedges
5 5, screws operating wedges 4
6 6, levers operating screws 5
7 7, spherical nuts in which screws 5 rotate
8 8, sleeve sliding on clutch shaft operating levers 6
9 9, clutch shaft
10 10, clutch spring
11 11, clutch spring collar
12 12, clutch spring adjusting nut
13 13, set screws to adjust spherical nuts for wear

The adjustment for wear is very simply obtained by means of the set-screws 13. These set-screws project into cavities formed in the sides of the spherical nuts 7, and all that is necessary to take up the wear of the clutch is to slacken back these set-screws and rotate the nuts until the next cavities register with the set-screws, when these are again secured. There are sixteen of these cavities on each nut, and two on each nut can be seen in the section and elevation. It will be seen that with this clutch there is no end thurst.

The Variable Speed Gear.

Figs. 10 and 11 show various views of the Barber variable speed gear, which was so fully described in a late issue of *The Autocar* that we shall now only indicate briefly its essential parts and action. Fig. 10 is a section through the driving-shaft 21, the eccentric sheave 16 and strap 13, and fig. 11 shows these parts, the gear rings, etc., in cross section. The eccentricity of the sheave and the eccentric to the shaft is brought about by oil under pressure from a tank set on the dashboard, admitted to the hollow portion of the shaft 21 through the oil passage seen in fig. 10 to the cylinder formed on the body of the shaft in which the piston 17 works. This cylinder is, in fact, bored out of the cross head which rotates the sheave, and upon which the sheave slides. In fig. 11 the eccentric strap is shown with links 1 attached to the four lugs thereon. The outer ends of

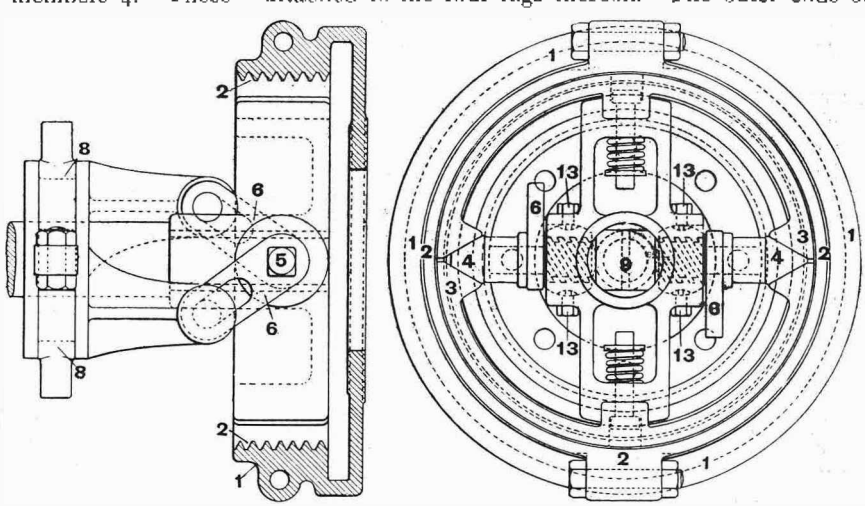


Fig. 9. Side and end elevation of the Hutton clutch

these links are attached to toggles 2, which form a connection between shoes 3 and 4, gripping either side of the rings formed on the rotating portion of the gear.

The effect of this toggle movement is such that a species of free-wheel construction is obtained, so that when the links move in one direction the shoes are caused to grip the ring on the periphery of the gear and the whole rotates, while when they move in the other direction the shoes are disengaged and slide back freely on the rings.

When the eccentric 16 is quite central no movement is conveyed to the strap 13, but as soon as the smallest amount of eccentricity is given to the eccentric 16 by means of the oil ram 17, which carries and drives it, the strap gyrates, and each of the lugs on the strap describes a circular movement equal to that of the eccentricity of the sheave or eccentric. The greater the eccentricity of the sheave the greater the movement of the lugs, and consequently the more reciprocating movement is communicated to the links 1 and therefore to the periphery of the gear.

The provision of the large ball bearings shown in fig. 10, set between the eccentric sheave 16 and the strap 13, reduces the friction to a minimum, and the provision of a large bearing surface on the shoes 3 and 4, and large diameter pins upon which the links 1 (fig. 15) rock, reduces the wear and tear very largely. The gear is controlled through a small lever set upon the steering wheel, which lever operates the oil inlet and outlet valves. The inlet valve permits the access of the oil under pressure to the ram 17 (fig. 10), which increases the throw of the eccentric 13, the movement of the gear, and consequently the speed of the car.

When the oil outlet valve is operated by the same lever the fluid under pressure escapes from the cavity beneath the ram, and the throw of the eccentric being reduced, the gear is likewise reduced in proportion. The operation of this gear further obviates the necessity of a differential gear and a clutch.

(To be continued.)

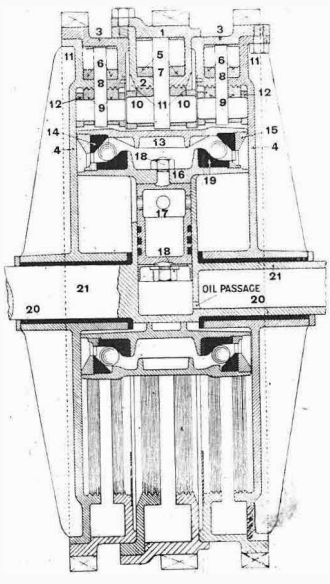


Fig. 10.—Section of the Hutton gear.
1 2, case for middle toggles
3 4, case for side toggles
5, middle toggles
6 6, outside toggles
7, middle toggle link
8 8, side toggle links
9 9, inside toggles
10 10, middle inside toggles
11 11, middle inside toggle links
12 12, outside toggle links
13, eccentric outer case
14, outer ring for ball race
15, locking ring for outer ball race
16, eccentric
17, piston
18, nuts for piston
19, inner ball race
20 20, shaft bearing
21, shaft

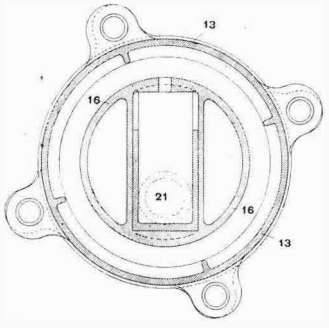


Fig. 12.—This drawing shows the detail of the ram 17 and the eccentric 16 in cross section. It is a transverse section through the ram and eccentric

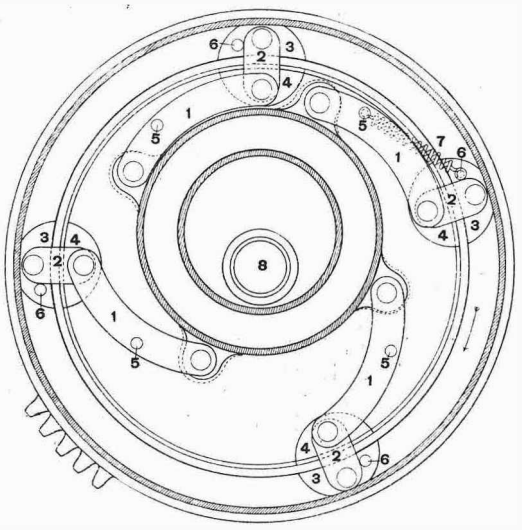


Fig. 11.—Elevation of the Hutton gear.
1 1 1 1, side links for toggles
2 2 2 2, toggle links
3 3 3 3, outer toggles
4 4 4 4, inner toggles
5 and 6 repeated, pins for springs as shown by 7
7, spiral spring to toggles
8, shaft

MOTOR VOLUNTEER CORPS.

The corps had an exceptionally busy time during March, and it is gratifying to know that it has not been found wanting, and that all the duties undertaken were successfully carried out. These duties included a staff drive under Lieut.-General Sir John French, commanding the 1st Army Corps, when some sixty officers were conveyed round the Chichester district from the 14th to 17th of March. At the conclusion of the tour, General Sir John French expressed to the commanding officer his entire satisfaction with the arrangements which had been made.

A most interesting staff tour was carried out under Lieut.-General Lord Grenfell, commanding the 4th Army Corps, on the 24th and 25th ultimo, when about eighty officers of the Scottish Volunteer Brigade were conducted around the London defences. Both days' work were very interesting to all members of the corps as giving them an insight into the manner in which London is protected from attack by land on its southern side, and showing how perectly the great principle of reciprocal defence is carried out. Lord Grenfell has expressed his appreciation of the manner in which the duty was carried out by the corps.

From the 17th to 22nd of March, Members Whittaker and McKelvie were employed under General Sir Leslie Rundle on a staff ride at York. This was the first occasion on which the corps has been called upon for duty in the North of England, and it is gratifying to know that General Rundle expressed his appreciation of the services rendered. From the 27th to 31st of March, Captain J. E. Hammond and Member Lanchester were also employed under General Rundle at York.

A most interesting staff ride under Colonel Sir H Rawlinson, C.B., was held in the neighbourhood of Newhaven and Brighton from the 28th to 30th of March, when the following were on duty: Major J. M. Benett-Stanford, Lieut. J. A. Holder, Members W. A. Ellington, E. Blount, C. Knight, and G. H. Herron.

From the above reports it will be seen that the corps is not merely of an ornamental character, but is recognised as a definite part of the organisation for national defence.

OCCASIONAL GOSSIP. By the Autocrat.

By the way, two of the heaviest men I have come across lately were indirectly referred to in the club *Journal* last week, in which the weight of the 25 h.p. Humber was given as 28 cwts. 3 qrs. 18 lbs. without passengers, and as 36 cwts. odd with two passengers!

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Speaking of the *Journal* reminds me that a correspondent, in referring to alcohol fuel, asks a most pertinent question. He wants to know whether the advocates of alcohol fuel manufactured from British-grown potatoes know whether it is possible for British farmers to grow potatoes remuneratively? He says that when the Department of Agriculture enquired into the subject of the growing of potatoes in Ireland, they found that the price of imported potatoes was so low that it did not pay to grow them in Ireland, and he estimates it would be the same in England. Potato-growing is not my forte, so, while pleading utter inability to answer the question, I must say that if it is indeed true that potatoes cannot be grown at a profit in this country, it is only another argument in favour of alcohol as a motor fuel. I mean we should find out where the leakage is, and stop it, so that we could grow potatoes profitably, for, as Dr. Ormandy pointed out in his valuable paper before the club the other day, it is not merely a question of a home-made fuel; the reserve of potatoes might be of the greatest importance from a food point of view in time of war. The matter, as has been repeatedly urged in *The Autocar*, is a national one.

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Owing to the accident off Monaco, when the immensely powerful boat with the three Mors engines, each driving its own propeller-shaft, caught fire, an outcry has been raised against the danger of petrol for motor launches. It appears to me the danger has been greatly overrated. It was shown very plainly by Mr. J. E. Thornycroft, in his paper before the Institution of Naval Architects, that so long as the petrol was safely and properly isolated, there was no danger. So far as tank leakage was concerned, it could do no harm, as if a leak occurred the spirit ran straight into the sea, and I look upon the accident to Parisienne II. as being due to bad design, and not, as is more often assumed, to the danger of the fuel used. With a tank properly arranged in a boat, there is no danger of leakage from that, and the only thing to be feared is leakage from the petrol pipe itself to the carburetter, but if this is properly protected and of sufficient strength there is no danger to be apprehended from this source. As pressure feed is used, and necessarily used, owing to the rolling and motion of the boat, it is most essential that the tank itself and all the pipe connections should be protected and not likely to be damaged in any way. Therefore everyone will admit it would be better still if paraffin could be used with equally satisfactory results—at any rate, for launch work.

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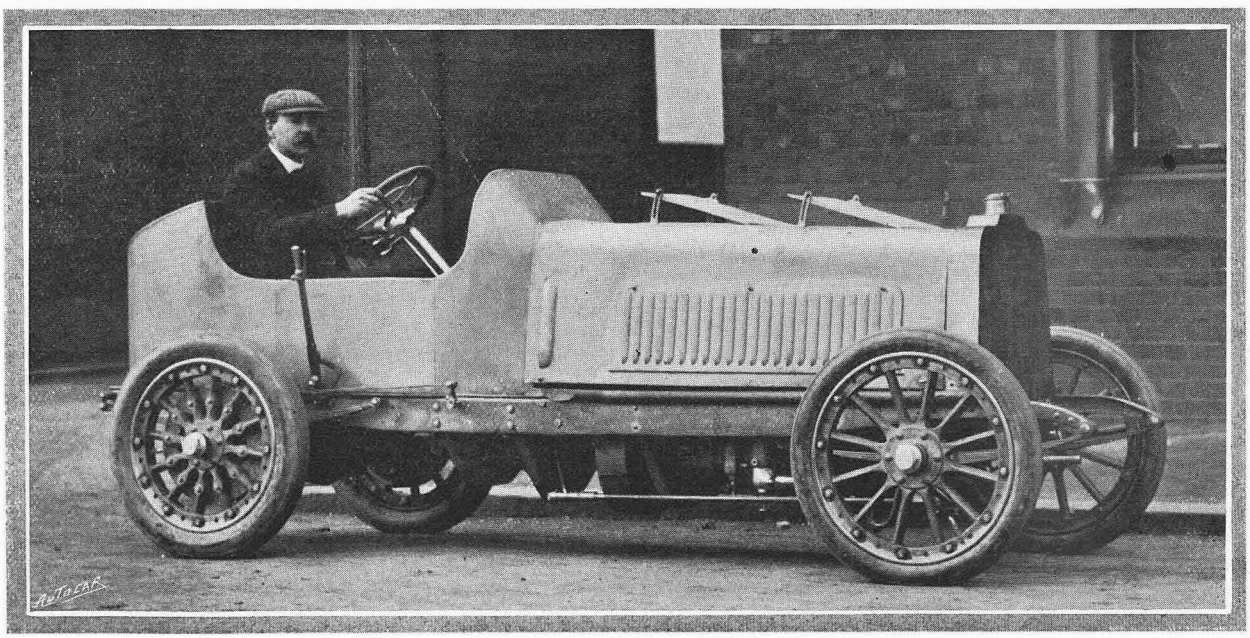
I see the suggestion made some months since in *The Autocar*, to the effect that no members of the industry should be asked to adjudicate upon questions of alleged breaking of the racing rules by drivers who might be directly or indirectly their competitors in business, has been adopted. The members of the new Races Committee are none of them concerned in the sale of cars. There is also a new committee which is called the Industrial Committee. This will deal with such questions as the desirability of trials and exhibitions, the effect of legislation upon the industry, and so forth, and it will report to the Club Committee. It is composed mainly of members of the industry. It will have no actual power, but its work should be useful, as it will consider questions from a strictly industrial standpoint, and will then present its view to the Club Committee, which will endorse or amend its suggestions according to expediency.



One of three Gordon-Bennett racers which will compete in the Isle of Man eliminating trials. These cars are constructed by Messrs. G. and J. Weir, of Cathcart, from designs by A. Darracq and Company, of 483, Oxford Street, and Suresnes, Paris. They are on well-known Darracq lines, and are similar to those constructed for the French eliminating trials. They have three speeds forward and reverse; direct drive on to the live axle; metal to metal clutch; magneto as well as high tension ignition; multi-seated inlet valves, all the valves being mechanically operated; pressed steel frame; brakes to hind wheels exterior and interior; weight, 19 cwts. 2 qrs. 20 lbs. The 90 h.p. motor is hung very low down in the frame. The wheels are fitted with bolted tyres manufactured by Michelin and Company, London. The above particulars have been sent to us by Mr. Rawlinson.

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.

GEAR CHANGING.

Could you give me a "wrinkle" on changing gear from middle to fast? It is a Panhard type of gear, and I constantly miss my top gear when trying to get it in. I fancy I declutch too much and too long, but then, again, I ripped two teeth out of my bevel pinion a month ago in trying to start the car on the second speed from a stationary position, and I am a little afraid of repeating this by quick use of clutch.—B.W.

In changing gear up, the clutch must be withdrawn entirely from contact with the flywheel, when the change speed lever should be moved forward to the next notch without undue haste and without force, should any obstruction be felt when the two wheels which are about to be engaged first meet each other. You should take care that your car is travelling fast enough on its middle speed before you attempt to change into your top speed. If the speed attained is not fast enough to warrant your change into top speed, that is probably the reason why you miss your gear. It is not altogether to be wondered at that you do rip the teeth out of your bevelled pinion when trying to start your car on the second speed. Gears object to this treatment, and are likely to resent it in the manner you indicate. Never use your clutch "quickly" if you have to change speed either up or down; the clutch should be let in gently and softly, and no impact should be felt whatever if this is done properly. When changing speed down it is only necessary to allow the clutch to slip and not to withdraw it altogether from the inner periphery of the flywheel. Indeed, in some cars speed can be changed down without withdrawing the clutch at all, but, so far as our experience has carried us, this is not the case with Panhards

EPICYCLIC GEARING.

I should be greatly obliged if you would furnish me with a description and explanation of epicyclic and helical gearing as fitted to the Oldsmobile and Lanchester cars.—A. H. P.

Epicyclic or Crypto gearing, as applied to the Oldsmobile and Lanchester cars, consists essentially of a central gear wheel with which two or more other gear wheels mesh, the spindles of such wheels being carried on a spider or plate which is mounted concentrically with the central gear wheel. These wheels are in mesh with an annular gear wheel having internally cut teeth, which is also capable of revolving concentrically with the others. Thus there is a central gear wheel of small diameter, a larger wheel but with internally cut teeth, and a pair of wheels which mesh with both, and whose angular motion is also concentric with the axis of the central wheel. By revolving one or other of the members of this train of gearing, varying motions are obtained from the remaining members; thus if the central pinion or gear wheel is driven and the plate or spider into which the studs on which the intermediate wheels revolve is held stationary, the outside ring having internally cut teeth will revolve at a reduced speed proportional to the number of teeth in it and in the central wheel, but in the opposite direction to which the central wheel is being revolved. If the outside ring is held stationary and the central wheel driven, the spider carrying the intermediate wheel studs will revolve at a reduced speed in the same direction as the central wheel for the following reasons: As the central wheel revolves it causes the wheels around it to rotate in the reverse direction, but the outside ring with which these wheels are meshing is stationary, and consequently their rotation causes them to roll round the annular wheel, carrying with them, of course, their studs and the spider in which they are mounted. These are the exact motions used for the Lanchester and Oldsmobile low speed and reverse gearing, but the Lanchester has what is known as a combined epicyclic train for its intermediate gear. This is merely an elaboration of the above, and the gear ratios are arranged so that a speed reduction suitable to the purpose is obtained without awkward dimensions or cumbersome design. Helical gearing is a totally different thing from epicyclic gearing, and the term "helical" refers to the shape of the gear teeth. With a helical gear every tooth follows the line of a screw thread of considerable pitch; that is to say, supposing the actual shape of the tooth to be neglected for the moment, a helical gear is nothing more or less than a worm of immensely long pitch. Helical gearing in its simple or single form sets up end thrust, owing to the wheels trying to force themselves apart, and to obviate this difficulty double helical wheels are made. With these two wheels are made, one with right hand and one with left hand pitch teeth, and are then bolted together with the pitches opposed, so that the thrust from the one wheel neutralises the thrust from the other.

FAILING MAGNETO IGNITION.

Having charge of a Type H 8 h.p. Mors car, I should be pleased to have a little advice respecting the ignition. The only system fitted is the Mors magneto, with make and break inside the (four) cylinders. This has been running exceedingly well for two years. What I wish to know is: What signs shall I get that the magneto machine is running out? Will it come gradually, causing the engines to misfire, or will it give out suddenly? When I am satisfied that no current is being generated, will it be possible to have the machine repaired? Could another system be fitted (English make preferred) without much alteration to the engines, or would you advise another machine of the same make? The magneto and pump are gear-driven off the timing-shaft, this likewise off a wheel on the forepart of the crankshaft. I have done the necessary repairs and adjustments to the various mechanical parts of the car, but have never tampered in any way with the magneto machine, and shall be very pleased if you can give me any advice respecting same, so that when the ignition fails I shall know what to do without losing unnecessary time.—MAGNETO.

When the magneto ignition is failing in its magnetic powers it will be found that the engine loses power, as the ignition is not complete as before. Consequently combustion is less rapid, and is followed by a loss of power. When this occurs it is only necessary to remove the horseshoe magnets from the machine, and to have them remagnetised by being placed against the fields of a dynamo which is working at its full power. By this the permanent magnets will be remagnetised, and the machine will then develop its full ignition power, and continue to work for a further lengthened period before further remagnetising is required

A QUESTION OF HORSE-POWER.

In your issue of April 2nd (page 465) a correspondent, "W.W.," asks a horse-power question, to which you give no reply, as to the relative horse-power of the Talbot and Gladiator cars, which are both sold as 14 h.p. I have made the following calculations, based on a formula given some time ago in *The Autocar*, which, I think, answer his question:

	Bore.	Stroke.	r.p.m.	H.P. as per formula
Gladiator	85	130	1,200	15.00
Talbot	80	120	1,200	11.72

These figures may not be absolutely accurate, but are near enough for the purpose. D. R. P. B.

In reply to your correspondent "W. W." on the question of horse-power, he will find, if he looks again at the advertisement of the Talbot cars, that the term used is "b.h.p.," and not "h.p." THE BRITISH AUTOMOBILE COM. SYND

THE SIDE-SLIP TRIALS.

In *The Autocar* of March 5th, on page 337, we gave some particulars of the devices which are entered for competition in the side-slip trials organised by the Automobile Club. We are now able to present to our readers some further details and illustrations of the lesser known devices. Although the Continental and Wilkinson non-slippers can hardly be included in this category, we include them, as the former has not been very much to the front since its introduction, the manufacturers having held it back in order to carry out constructional improvements, which have now been made; the construction of the latter device is not clear to a very large number of automobilists, and in order to make this clear we have had a special illustration prepared, which will be found to be self-explanatory. With regard to the mechanical devices, such as the Cross and Ross, Cavendish, and the Rourke and Horsburgh, the fact that such means are illegal seems to have been lost sight of by the inventors, for the use of any devices on wheels or vehicles which are harmful to the roadway are offences against the Highway Act. This is a matter which should receive the careful attention of inventors, makers, and buyers alike.

Such devices as the Parsons and the Sainsbury non-skids are not dealt with here, as the former is so well known and the latter has been very recently illustrated.

The thousand miles trials of the non-skidding devices will start on Monday next from the club garage at nine a.m. The routes followed will be one day from London to Slough, then across country to Beaconsfield, and back to the club, this route being covered twice on the same day. Another run will be from London to Margate, *viâ* New Cross, Dartford, Gravesend, Sittingbourne, and Canterbury, returning the same way. On another day the run will be to Marlborough and back, followed later by a trip to Birmingham, *viâ* Watford and Banbury, stopping the night at Birmingham, proceeding the next day to Nottingham, *viâ* Leicester and Grantham, and returning the day after from Nottingham to the club *viâ* Kettering. The run from London to Birmingham will take place on the 21st, proceeding to Nottingham on the 22nd, returning to the club on the 23rd inst. One of the Beaconsfield runs will take place on the 25th inst. The remaining runs will be fixed in accordance with the weather. The Beaconsfield run will comprise twenty-four miles of running over tram lines, out of a total of fifty-two miles. The cars and motor cycles which are fitted with the anti-skidding devices will be kept at the Locomobile Garage, in Sussex Place, South Kensington. These premises were selected because there were special facilities for separately storing the machines under lock and key each night; in fact, they will enter and leave the premises by a special entrance, and be entirely separated from other traffic of the Locomobile Garage.

The following is the list of competitors:

Official No.	Name.	Address.	Price for a tyre 810 × 90.	Weight of car.	Seats.	Nature of device.
				cwts		
1	Mr. Samuel Butler	Heobury Hill, Westbury-on-Trym, near Bristol	£4	25	4	Flat discs on tread held on by steel stems passing through the cover.
2	Mr. H. S. H. Cavendish..	Elvaston Lodge, Abbey Road, N.W.	£15 per car.	—	—	Single disc running on ground between back wheels.
3	Mr. W. Hunt	Northern Motor Works, Kettering	£15 15s. per car	17	4	Double roughed discs running on ground between back wheels.
4	Mr. W. Maitland Edwards	Queen Anne's Chambers, S.W.	£4 19s. per tyre	15	4	Detachable leather band fitted with steel segments riveted thereto.
5	Messrs. Rourke and Horsborough	9, Hawes Road, Bromley, Kent ..	£5	—	—	Double discs running on road between back wheels.
6	Mr. Alex. Nicholson	29, Mary Street, Dublin	£16	—	—	Steel blades on back wheels with springs; not touching tyres
7	Mr. Mark Vivian ..	70, Duke Street, Chiswick	£2 per tyre	—	—	Tread consisting of alternative strips of hard and soft rubber.
8	Wilkinson Tyre and Tread Co...	Chapel Hill Mill, East Parade, Huddersfield	£3 15s.	18	4	Fine steel wires embedded in tread.
9	W. Jenkinson and Co. ..	44, London Wall, E.C.	£6 per wheel	—	—	Detachable leather ribbed cover.
11	Sainsbury's Anti-skidders	Buchanan Buildings, 24, Holborn, E.C. ..	£6 6s. per car	—	—	Spring fork carrying blades each side of tyre, supported on rim.
12	Mr. L. Lempereur	81, Rue Jauffray, Paris	£4 per tyre	—	—	Steel plates connected by links fitted on tread.
13	Grose, Ltd.	Pike Lane, Murefair, Northampton	£3 10s. per tyre	19	4	Leather band with steel studs.
14	Parsons Non-skid Co.	175A, Manor Street, Clapham	£4	22	—	Detachable chains on tread.
16	Gare Patent Tyre Co.	5, Castle Street, Liverpool		—	—	Combined wood, rubber, and steel wheel.

Nos. 10 and 15 were withdrawn.

SOME OF THE COMPETING DEVICES.

THE CAVENDISH device comprises a stout frame hinged on the back axle, somewhat similar to that employed on the Cross and Ross. It carries on the axle a small steel roller, which has its faces hollowed out slightly, so as to obtain a pair of cutting edges. Normally, it is held from the ground by a spring, but on meeting adverse road conditions it is pulled down to the surface by means of a lever at the side of the car, between which and the roller frame a stiff spring is interposed, so that the driver may put on any required amount of pressure according to the road surface over which he is travelling. The data given are as follows: For macadam, 20 to 30 lbs.; for wood paving, about 50 lbs.; and for stone setts or asphalt, about 100 lbs. The photograph shows the device fitted to the axle of a car, with the roller in contact with the ground.

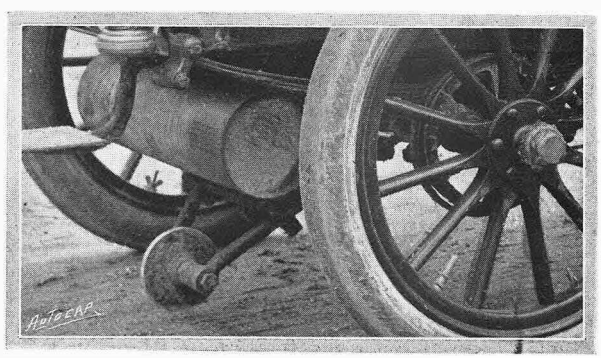


Fig. 1—The Cavendish.

THE CONTINENTAL CAOUTCHOUC AND GUTTAPERCHA Co.'s non-slipping tyre has a series of metal studs with serrated faced discs screwed into them. As a matter of fact, the tread—a portion of which is shown in fig. 2—has a series of saddles or short bushes vulcanised into it, these bushes being screwed internally to receive the serrated studs. The makers only recommend this tyre for town use, since (though the steadiness of the tyre is not impaired) the resiliency is not sufficient for high speed or touring work.

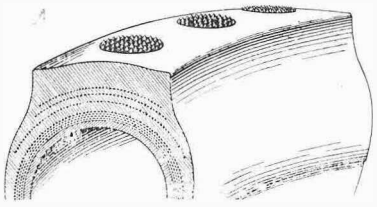


Fig. 2.—Continental Caoutchouc and Guttapercha Co.

THE CROSS AND ROSS.—This consists of a triangular frame A hinged to the rear axle, and trails like an ordinary sprag. At the apex near the ground there is a plate (likened by its inventor to a harrow) carrying three or more teeth, these teeth being spaced suitably to obviate the device catching in a tramline. This frame is normally kept clear of the road by the spiral spring B, but can be depressed till it comes into contact with the road by means of a pedal working in a notched quadrant. There is a tension rod C attached to the serrated plate, this rod having a strong spiral spring D incorporated with it, D absorbing and compensating for any heavy jar due to inequality of road surface. E is the continuation of the rod C. The inventors claim that only the lightest pressure of the sprag is required to entirely obviate all tendency to side-slip, that a more perfect form of ordinary sprag is obtained, and that the whole device is easy and cheap to fit and keep in order.

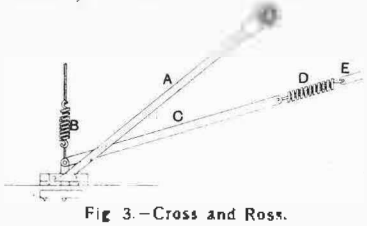


Fig. 3.—Cross and Ross.

THE ROURKE.—This is another device dependent for its action on the grip of a rolling wheel on the road surface, and to a great extent resembles the Cavendish. Several methods of applying the wheel are specified by the inventor. Fig. 5, however, shows a convenient arrangement. Here a bracket firmly attached to the car frame is slotted at its other end. In this slot the axle of the wedge-sectioned roller slides, being held out of contact with the road by a small spiral spring. Above the roller axle bracket the point of a wedge is entered, this wedge constituting the operating device, and being capable of actuation from the driver's seat. The inclined face of the wedge comes in contact with the face of a semi-elliptic single plate spring, which fulfils the twofold function of absorbing the shock from the road, and also for regulating the pressure with which the roller bears against the surface.

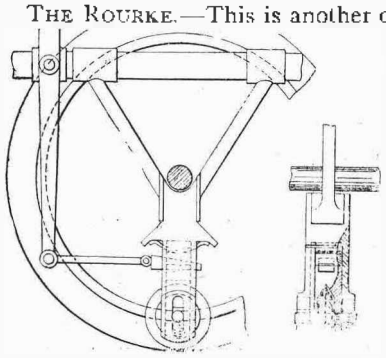


Fig. 5.—Rourke and Horsburgh.

THE EDWARDS.—This device consists of a number of metal plates riveted to a specially toughened chrome leather cover, which is moulded to fit all standard sizes and makes of tyre. The name of Edwards and the form of the device will no doubt remind old cyclists of the Edwards corrugated bicycle tyre of some years ago. The motor tyre is based on that practice, and has been thoroughly tested before being placed before the public.

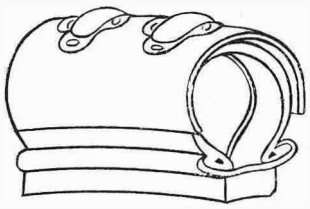


Fig. 4.—The Edwards.

TAYLOR-STEPHENS NON-SKID.—This consists of a series of thin metal plates stamped to the curvature of the tyre, which are riveted in lines around the tread. The arrangement is illustrated in fig. 6, where the plan shows their disposition on the tyre tread; a side view of a separate stamping is also shown. An alternative arrangement to riveting direct to the tyre tread is to rivet the shoes to a band, and then to fix the band to the tyre tread.

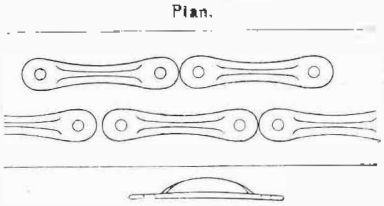


Fig. 6.—Taylor-Stephens.

THE VIVIAN NON-SLIP TREAD resists side-slip by reason of a difference in hardness of the rubber at various sections of the periphery of the tyre. The device is illustrated in fig. 7, the dark portions of the tread indicating the hard rubber sections and the light portions the softer sections. An inspection of fig. 7 will show that since the lines of demarcation between the different grades of rubber are diagonal, one soft and one hard portion of the tread are always in contact with the ground. One of the greatest claims that can be made for this device is that the tread is perfectly smooth, and that there is nothing to impair the resiliency of the tyre, whilst the objectionable clumsy appearance of so many non-skid devices is entirely obviated.

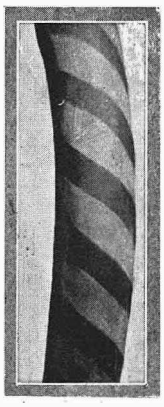


Fig. 7.—The Vivian

THE WILKINSON TREAD has already been dealt with in these pages, and consists, as the majority of our readers know, of a series of U-shaped pieces of hard steel wire inserted in the tread of the tyre, the points projecting about one-eighth of an inch from the surface of the tyre. The illustration (fig. 8) shows a section of the tyre, and in this the U wires can be plainly seen.

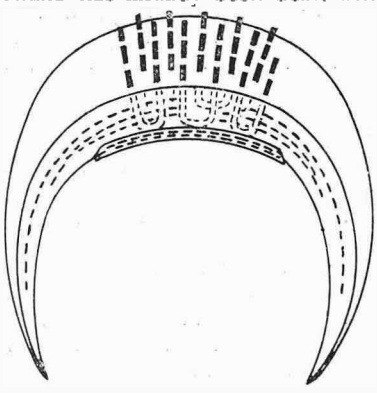


Fig. 8.—The Wilkinson.

A SUCCESSFUL PARAFFIN MOTOR.

AN ABBREVIATED DESCRIPTION AND PATENT SPECIFICATION OF AN INTERNAL COMBUSTION MOTOR USING PARAFFIN OIL AS FUEL AND RUNNING WITHOUT SMOKE OR SMELL. THE DESCRIPTION IS COMPILED FROM A LETTER ADDRESSED TO US BY THE INVENTOR AND PATENTEE.

We have received a most interesting communication from Mr. Henry Sutton, 290, Burke Street, Melbourne, Australia, enclosing full specification of a motor of his own invention, which burns ordinary paraffin as fuel. The specification is No. 634, and its acceptance is dated March 25th, 1899. We first referred to this engine in *The Autocar* of March 23rd, 1901 (page 272), and the description there given was accompanied by an illustration of an engine which had been working for some years, so there can be no doubt as to the date of Mr. Sutton's patent. The engine in question had a bore of 4½in. and a stroke of 6in., and was designed to give 5 h.p. at 750 revolutions per minute, but when it was finished and its final tests were completed it was found to give 6 h.p. on the brake at 640 revolutions per minute. The oil used is that which is known in this country as "Water White," or "White Rose," having a flash point of 100° close, or Abel test, the corresponding American test of which is 150° open. This is generally sold throughout the United Kingdom and the colonies as superior lamp oil. It is interesting to note that the specification includes many mechanical details which have been introduced into autocar practice during the last few years, such, for instance, as the exhaust valve lifter and the method of controlling the quantity of the charge admitted to the cylinder by varying the compression of the inlet valve spring. Both of these will be found mentioned in the abridged specification which follows, together with illustrations showing their arrangement and construction.

Mr. Sutton's experimental car

The patent is drawn up for heavy oil engines, and the principal claims are the self-regulating level of the oil to the supply nipple, the atomiser, and the valve regulator. In his letter, Mr. Sutton tells us that from his original theory and his subsequent experiments perfect combustion is attained by perfect atomising of the oil, a perfect mixing with the air, a regular proportionate supply, and a proper regulation, all of which are attained in a very simple manner in the Sutton oil engine. The engine is started up cold, no external vaporiser having to be heated. A few drops of spirit are admitted to the atomiser, and a turn or two at the starting handle invariably starts up the engine, immediately upon which the oil tap is turned on and the engine runs on cold paraffin. The charge enters the cylinder at a temperature below that of the flash point of the oil, the atomising chamber always being cold—in fact, fully 100° below the temperature at which vapour could be formed. The air is cold, and the oil is cold, and therefore the maximum expansion is obtained in the cylinders. No trouble is experienced from carbon or tarry deposits, and no trouble has been experienced with fouled sparking points. The whole secret of the engine running without either odour or visible exhaust is undoubtedly due to the fact that any surplus of oil over and above that which is used to produce work in the cylinder is taken away by means of the drain tap in the atomiser. Quoting from Mr. Sutton's letter:

"The old-fashioned, barbarous method of heating the air and vaporising the fuel by heat sets up fractional distillation in the cylinder. Immediately the engine gets hot, and the added temperatures of heated air, heated oil, heated cylinder walls, and heated compression cause decomposition of the hydrocarbons, the lighter ignite, and the heavier deposit, as tar, etc. The whole becomes a miniature gas-making retort, except that the gas is consumed in the engine, while the by-products deposit themselves.

The Oil Engine.

It is well known that there are many difficulties to be overcome in the production of a successful and efficient internal combustion engine.

One of the main difficulties is that oils having a specific gravity of from about .72 and upwards require extraneous heat for their vaporisation, and engines using the same could not be started whilst cold.

One of the chief objects of this invention is to provide an internal combustion engine in which this extraneous heat will not in all cases be required, the oil or spirit at its normal temperature being converted into an explosive mixture, with air and the heat arising from the combustion of such mixture being subsequently used to further assist in the rapid vaporisation of the subsequent charges. For this purpose I place my mixer as near to, and when possible in contact with, the explosion chamber in order that the heat abstracted therefrom may compensate the refrigerating effect of the vaporisation.

In my improved internal combustion engine I mechanically atomise or pulverise the oil or spirit when cold, and provide a cool exhaust with the loss of a minimum amount of heat energy.

The exhaust or expansion chamber of my engine is so constructed and arranged that it serves partly as a silencer, and by causing the exhaust to expand to nearly normal pressure within this chamber I effect a still further cooling of the engine, and at the same time make it self-contained, that is, it combines a piston chamber, an explosion chamber, an exhaust expansion chamber, and a vapour chamber, the vaporiser and mixer being arranged in a convenient position.

My invention also comprises an improved construction of vaporiser together with an improved method and apparatus for supplying oil or spirit thereto.

I have also devised means for regulating the power of the engine in a simple and efficient manner by varying the quantity of the charge without varying its quality. My invention also comprises improved electric firing apparatus constructed in such a way as to prevent leakage of the compressed or exploded mixture, whilst the ignition can be timed as required to suit the speed of the piston.

The silencer is, according to my invention, constructed in such a way as to utilise the principle known in acoustics as the interference of sound waves.

Fig. 1 is a plan partly in section of an oil engine constructed in accordance with my invention, whilst fig. 2 is a longitudinal central section on line A A (fig. 1).

In fig. 2 1 represents an oil or spirit supply pipe leading from a reservoir 14 attached either permanently or by a coupling to a metal cylinder 3 fitted with a nipple 4 and formed with air inlet openings 5 around its lower end about on a level with the upper end of the nipple. This nipple 4 is formed with a small hole, the inlet to which is regulated by a needle valve 6 passing through a stuffing box 7 in the upper end of the chamber 3, and projecting up into a protecting cap 8, which is screwed on to the gland of the stuffing box, and serves to prevent any injudicious alteration of the needle valve after it has been set.

If preferred this needle valve might be dispensed with, a hole of predetermined size being bored through the dependent nipple of only just sufficient size to allow the requisite amount of oil or spirit to be fed into the engine. The use of this needle valve is, however, preferable, because it provides a convenient means for regulating the charge, and having been adjusted can remain fixed for the particular kind of oil or spirit which may be used.

The Atomiser.

The nipple 4 projects into a cylindrical or other shaped tube 9 communicating through a vapour chamber 10 with the inlet valves 11. The lower end of the compartment 9 is provided with a small hole 12 communicating with a waste pipe 13 leading direct into the atmosphere or into any suitable vessel provided to receive any surplus oil or spirit which might not be vaporised. Across this latter are fixed the mixing contrivances 141. These may be constructed either of sheets of wire gauze of one uniform mesh or of sheets of gradually finer material towards the lower layer. If preferred the area of the air passage around the nipple 4 may be restricted, whilst the body or cylinder of the vaporiser is enlarged, so that the single sheet of wire gauze will not restrict the area of the air passage. If preferred the gauze may be dispensed with, as it is not essential, although useful, for assisting to start the engine.

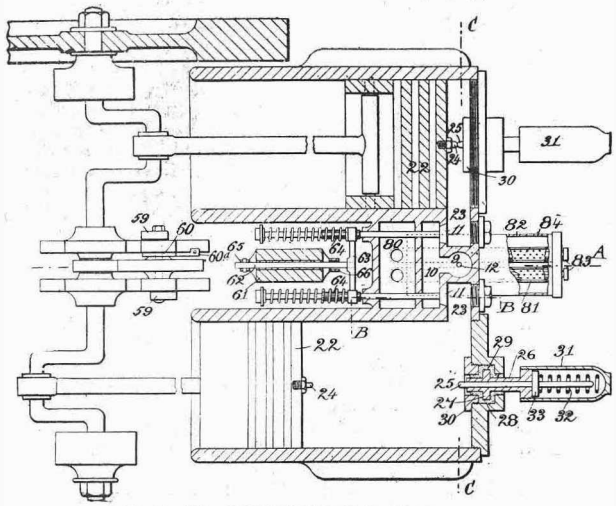


Fig. 1.—Plan of the Sutton oil engine.

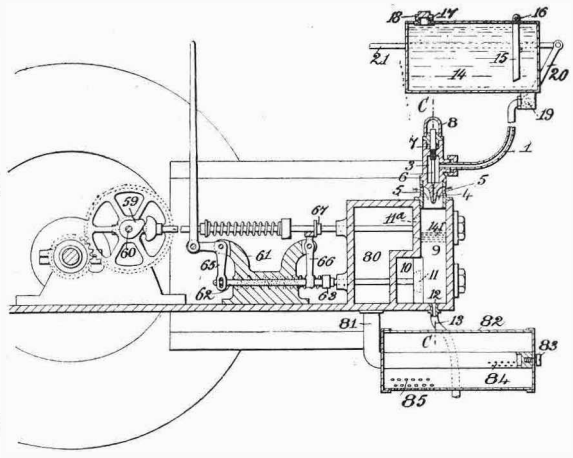


Fig. 2.- Elevation of the Sutton oil engine.

In order that the oil or spirit may be delivered evenly and regularly by the nipple 4 it is necessary that the supply shall be maintained at a fixed uniform pressure. I accomplish this result by means of a reservoir formed of a tank 14 of any shape, but entirely air-tight, except for a small air-supply pipe 15 extending down nearly to the bottom of the reservoir and having its upper end projecting outside it. The lower end of this pipe is open, but its upper end communicates with the atmosphere only through a hole 16. The inlet 17, whereby the reservoir can be charged, is closed by an air-tight cap 18, the result being that the only means whereby air can enter the reservoir is through the minute opening 16 and down the pipe 15. 19 represents an ordinary needle valve, which is fitted in the upper end of the oil supply pipe 1. When this needle valve 19 is opened a limited supply of oil or spirit passes from the reservoir into the chamber 3, and thence down the nipple 4, on the lower end of which it forms a small bead.

The effect of the suction stroke of either of the pistons 22 is to produce a partial vacuum in and around the nipple. A supply of air is then drawn in through the openings 5, and encircling the drop of oil or spirit on the lower end of the nipple carries it through the mixer 9 into the vapour chamber 10, and thence into one of the explosion chambers 25 through its inlet valve 11, any excess oil or spirit passing away down the waste pipe 13. The passage or chamber 10 serves to prevent any oil or spirit passing up into the explosion chamber, except such as has been properly mixed with the air.

(To be continued.)

CLUB DOINGS.

Manchester A.C.

The Manchester A.C. on Saturday had the first run of the season to Tarporley, Cheshire, which is between thirty and forty miles from Manchester. Unfortunately, the weather was very bad, but notwithstanding this fifteen cars turned up, including Mr. Maurice Egerton's 60 h.p. Panhard. After the members and their friends had partaken of tea the start for home was made shortly after six.

Derby and District A.C.

The second run of the season of the Derby and District A.C. took place on Saturday last to Ashby-de-la-Zouch. In view of the bad state of the London and Osmaston roads leading out of Derby, the members assembled on the Nottingham Road at the Chaddesden turning, and proceeded by way of Sawley to their destination. Unfortunately, the fine promise of the morning was not fulfilled by the afternoon, the wind being very boisterous, and at least one driving hailstorm was encountered on the way. The Derby club had arranged to meet the Nottingham motorists on this occasion, as they did last year, and were agreeably surprised and pleased to find that the Leicester club had also chosen Saturday and the Royal Hotel for their run to Ashby. Nearly fifty cars assembled, and considerably over a hundred motorists and friends sat down to tea. In spite of the rather adverse climatic conditions, the reunion was a most enjoyable one.

Scottish A.C.

The annual meeting of this club was held on Tuesday last at Glasgow. The report for the year ended 31st January, 1904, stated: Membership as at 1st February, 1903, Eastern Section, 56; Western Section, 113: additions during the year ended 31st January, 1904, 166; deaths, resignations, etc., 12; leaving a membership at 31st January last 323, namely: Eastern Section 118, Western Section 205. Since the close of the financial year the additions to the membership have been thirty. These numbers are in addition to the president and vice-presidents, and to the honorary secretaries of the Irish and of four English provincial automobile clubs, who are honorary members of the club. The reports of the sections show the club to be in a satisfactory financial position, the cash balances at 31st January last being: Eastern Section £85 18s., Western Section £214 12s. 6d. Matters affecting the question of affiliation with the Automobile Club of Great Britain and Ireland have been satisfactorily adjusted, and the agreement of affiliation signed by them and by this club. Matters arising out of the Motor Car Act, 1903, have received a large amount of consideration at the hands of the General Council during the past year. Up to the present no roads have been closed, and no ten miles per hour limit imposed in Scotland under the provisions of the recent Act. The General Council have every belief that the Act and the relative regulations will be administered in a fair and reasonable manner. They would urge on every member of the club the desirability of loyally observing its provisions, as well as showing the utmost consideration for other users of the highway, and the public generally. They will add thus considerably to the influence and prestige of the club, and to the weight of its representations when any necessity for such arises.

Lincolnshire A.C.

The Shades, Spilsby, was selected for the opening meet of the Lincolnshire A.C. on Saturday. There was a very fair attendance of members and friends, although the day was not favourable to many. On arrival the cars were parked in the football ground, and protected from the sharp shower which fell as the cars were arriving. Among those present were the chairman, Captain J. A. Cole, J.P., Mrs. Cole, and Mrs. Harrington (16 h.p. Durkopp); Mr. E. Cragg, M.D., hon. secretary (Enfield quad); Captain H. E. Newsum, Captain G. R. Sills, Mr. C. H. Newsum, Mr. J. R. Richardson, and Mr. L. R. Pennell (12 h.p. Richardson); Mr. and Mrs. W. B. Jevons, Market Rasen (9 h.p. De Dion); Mr. C. Holland and Miss Holland, Boston (Baby Peugeot); Dr. Beckitt, Boston (Baby Peugeot); Mr. C. W. Pennell, Mr. Godfrey Lowe, Mr. W. R. Pennell, and Mr. V. C. Pennell, Lincoln (12 h.p. Richardson); Mr. and Mrs. G. Linnell, Mrs. Matear, and Captain and Ms. Strangeways, Market Deeping (10 h.p. Wolseley); Major Goddard, Lincoln (12 h.p. Richardson); Mr. C. Nelson and Mr. W. Gilbert, Lincoln (De Dion); Mr. Tomlinson and Mr. and Mrs. Godson, Sleaford; Mr. Parsons Wright, and Mr. S. Tyson, Wold Newton (6 h.p. Rigal), etc.

Mr. Wilkinson, the founder and first secretary of the Lincolnshire Club, writes pointing out that our announcement that the club had become affiliated to the Motor Union is capable of misinterpretation. He states that the club, which is one of the oldest in the country, was affiliated almost from the first—indeed, the affiliation scheme practically arose from Lincolnshire.

CLUB FIXTURES.

April 15th.—Lincolnshire A.C. annual dinner.
,, 16th.—Yorkshire A.C. run to Ilkley.
,, 17th.—Gloucestershire A.C. run to Tewkesbury.
,, 18th.—Motor Union general committee meeting at five o'clock.
,, 18th.—A.C. side-slip trials at Ladbroke Grove.
,, 23rd.—Yorkshire A.C. run to Doncaster.
,, 28th.—South Lincolnshire M.C. meet at Boston.
,, 30th.—Leicestershire A.C. run to Rugby, Dunchurch, and Daventry.
,, 30th.—Sheffield and District A.C. run from Broomhill to Snake Inn.
,, 30th.—A.C. parade of motor delivery vans, Thames Embankment at three o'clock.

The opening meet of the Lincolnshire A.C.

THE ISLE OF MAN GORDON-BENNETT ELIMINATING TRIALS.

The Royal assent to the Permissive Bill passed by the House of Keys having been accorded, it has been possible finally to settle the actual itinerary of the route over which the eliminating trials of the English Gordon-Bennett races will be decided. Although the route now fixed upon varies but slightly from that we gave in a recent issue, nevertheless the subject has so much interest for all automobilists, and particularly for those who may cross to the island to witness the race, that we make no apology for reproducing it in its finally amended form. The cars will be started at intervals of four minutes or more (according to the number that come to the post) from Quarter Bridge—a point about a mile outside Douglas—and then will run south through

	Miles.	Control.
Ballasalla	8	1m.
Castletown	1.3	4m.
Foxdale	7.1	1m.
Kirkmichael	8.7	3m.
Ballaugh	2.1	1m.
Ramsey	9.1	4m.
Willaston Cross	13.0	1m.
Quarter Bridge	1.4	1m.
	50.7	16m.

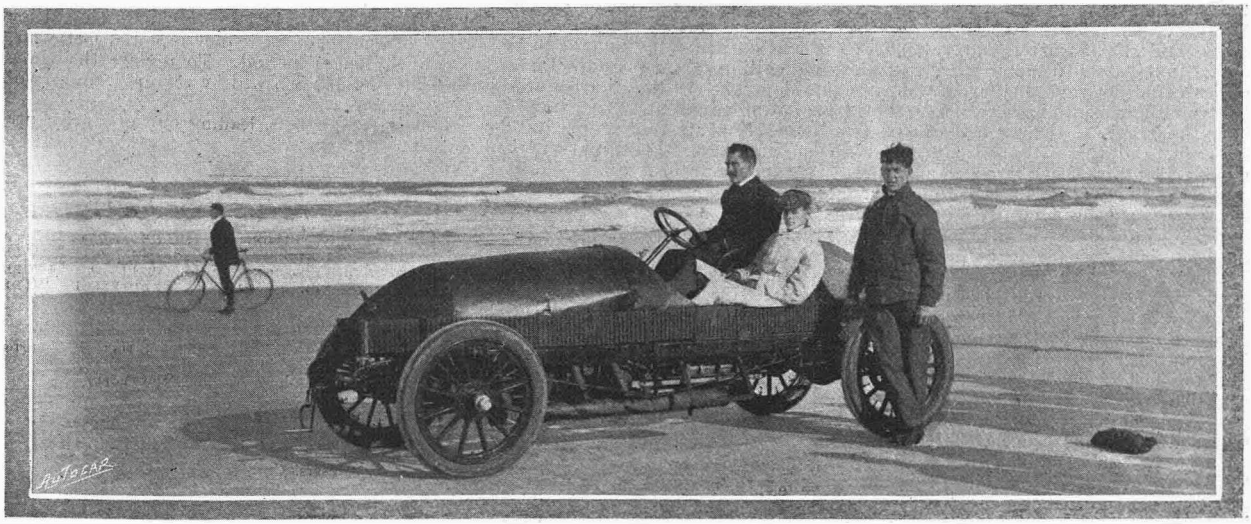
From Castletown the road turns due north through Foxdale and Lower Foxdale, where it crosses the main road from Douglas to Peel at Balacraine, and then proceeds in a north-westerly direction through Glen Helen by Creg Willey's Hill to Kirkmichael, where it turns east to Ballaugh Bridge, and north again to Ballaugh Old Church, then due east through Sandygate, past St. Jude's, to Ramsey. There is a sharp rise out of Ramsey to join the mountain road over Snaefell, rising 1,380 feet, whence the road descends to Douglas, *via* Willaston cross roads and Quarter Bridge. The number of circuits of the course to be made by the cars is not yet definitely settled, but it is certain to be four, and may be more. For absolute speed the cars will be timed over three or more fine straight stretches, the exact locality of which is yet to be settled. The competing vehicles will be clocked for hill speed over a part of the ascent of Snaefell, though for what distance and rise we are not yet informed.

It is hoped that automobilists driving racing or touring cars over the course before the race will exercise the greatest possible care, for if anyone is injured before the day of the competition the Governor of the island (Lord Raglan) will withdraw the permit for the trials.

Arrangements have been made with Messrs. Hampton and Co., of South Quay, Douglas, to stock 8,000 gallons of petrol, so that there should be an ample supply of spirit for all concerned.

RECKLESS DRIVING.

Complaints about reckless motor driving are reaching us from all parts of the country, and we are afraid that if greater restraint is not used prejudice will be excited even more bitterly than was the case last year. When we receive complaints from members of the public who are not automobilists, we believe that in many cases what is mistaken for too high a speed is perfectly safe, but, unfortunately, many complaints come to hand from motorists of experience. Already people are clamouring for further restrictions. There is, of course, no need for these, even with the most reckless drivers, as all the cars are numbered, and it will simply mean that if motorists will not restrain themselves when driving in towns particularly, their numbers will be taken and they will be summoned. No doubt in the majority of cases they will be fined; in some cases these fines will be deserved; in others careful drivers may be stopped and fined if once the order is given by the chief of police in a town or district that his men are to stop furious drivers. The really serious cases, in which actual damage is done, of course, carry their own remedy, as the driver is identified through his car number, and in one case at least it appears likely that a term of imprisonment will be suffered by the driver. We have no sympathy whatever with people who rush round corners on motors, to find themselves confronted



One of the American contesting cars for the honour of representing the Stars and Stripes in the forthcoming contest for the Gordon-Bennett cup. The Haynes-Apperson car depicted above was driven over the Virginia Beach track by Mr. J. T. Tracy when a committee examined that site with a view to holding the eliminating trials there and decided against it.

with another vehicle, and we can only hope that any automobilists who do this or in any other way cause hurt to their fellow creatures will be subjected to the imprisonment which the Act permits. We have spoken strongly, but we should speak still more strongly if we were not afraid that the innocent might suffer with the guilty, for, as we have said, when once the police are ordered to keep a strict look-out for any sort of misdemeanour, they are apt to discover it in some inoffensive person, simply because their zeal is awakened and they feel they must get cases at any cost, while everyone knows that the inoffensive, as a rule, are much easier to capture and deal with than those who do not consider the comfort or well-being of their fellows. These few thoughtless, callous drivers are doing incalculable harm, and we think it is high time that the club took the matter up. It is true it can do little, but that little should be done, for the credit of the movement. As the champion of the careful rational gentleman who drives a car, the position of the club would be greatly strengthened if it were also known it were the stern prosecutor of those who drove recklessly and without due regard to the comfort or safety of other road users. Up to now, the club has pounced on one non-member who drove furiously in the small hours of a summer morning on an absolutely deserted stretch of highway, but the member who rushes through a town or tears blindly down a much-frequented highway on the two days of the week when hundreds of vehicles are proceding up and down is not interfered with, nor is any attempt made to curb his behaviour, though it may be, and in some cases is, notorious.

THE DOVER APPLICATION FOR SPEED LIMIT.

Mr. E. P. Bard, a Local Government Board inspector, held an inquiry on Thursday last week at the Dover Town Hall on an application by the Dover Town Council to restrict the speed of motor cars to ten miles per hour within the limits of the borough. The application was opposed by the Automobile Club of Great Britain and Ireland and the Kent Automobile Club. No member of the Town Council attended the inquiry, and the public of Dover were represented by one person only. The Town Clerk in his statement said there were three roads running into Dover, but the road from Market Square to the Admiralty Pier was common to all three, and this was one of the most crowded of the main arteries of Dover. The regulation was asked for to protect foot passengers and the tram passengers. The Borough Surveyor gave evidence as to the widths of roads at various points and the character and volume of the traffic. He was not acquainted with motor cars, and knowing nothing about cycles could not say whether it was safe to ride a bicycle at twelve or fourteen miles per hour. Later on it was admitted that the trams in Dover had caused two fatal accidents to children, and there had been a dozen serious accidents. It did not transpire that there was any speed limit for the trams. The witnesses called for the opposition were first Mr. W. Rees Jeffreys, the administrative secretary of the A.C.G.B. and I., who stated that he had made a special study of the question and given evidence before the Royal Commission on London traffic. The effect of the ten miles limit to all the roads in Dover would be unnecessarily restrictive, very irritating, and impossible to observe, as motor cars would have to drive more slowly than bicycles and horse drawn vehicles. Ten miles per hour was too slow when the roads were clear, and too fast in Snargate Street or at Buckland Bridge when crowded with traffic. The ordinary law and Section 1 of the Act were ample protection for the public in narrow and crowded, as in more open, thoroughfares.

Lieut.-Colonel Holden, R.F.A., F.R.S., M.I.M.E., and Chairman of the Automobile Club, gave evidence as to the stopping capabilities of motor cars, which up to twelve miles per hour, he said, could be stopped in as many feet as miles, far less than either horse-drawn vehicle, bicycle, or tram. He did not consider the ten miles speed limit afforded safety, and a specific limit was not the right line to work upon.

Mr. Bernard Arnold, J.P., of Green Street, North Kent, said he had driven through Dover to the Admiralty Pier, and found no difficulty, though he had to go slowly at some points. There was no necessity for a ten miles limit. Dr. Burns, L.R.C.P., practising at Dover, said he used a car in his practice. He found no difficulty in driving through the streets of Dover, and saw no need for the restriction for which the Council asked. He drove up to and over ten miles per hour, which was not so fast as a cab. After Mr. Ricketts, the solicitor for the A.C.G.B. and I., and Mr. Mowll, who appeared for the Kent Automobile Club, had shown the adequacy of Section 1 of the Act for the protection of the public, and the ignorance of the Dover Corporation of the attributes of motor traffic, and had remarked upon the vexatious nature of such a regulation, the inquiry closed.

EXPORTS AND IMPORTS OF MOTOR CARS.

The Government returns of motor cars and parts thereof exported from and imported to the United Kingdom during the past three months show the following results, the figures for January of the corresponding past two years being also given for comparison:

	EXPORTED FROM THE UNITED KINGDOM.					
	1902.	1903.	1904.	1902.	1903.	1904.
	Number.			Value.		
January	27	62	55	£10,992	£16,876	£28,636
February			65			£28,195
March			55			£29,285
			175			£86,116
	IMPORTED INTO THE UNITED KINGDOM.					
	1902.	1903.	1904.	1902.	1903.	1904.
	Number.			Value.		
January	175	540	335	£43,885	£167,112	£120,772
February			538			£206,995
March			492			£189,907
			1,365			£517,674

It will be seen that during January—the only month for which comparison is possible—the exports during the first month of the present year have increased by £11,760 over those of January, 1903, and by £17,644 over those of January, 1902, while the imports during January of the present year show a decrease of £53,660 upon the imports of January, 1903, though they are still £76,887 higher than the imports for the corresponding month of 1902.

ROAD REPORTS.

We shall be glad to receive reports from correspondents under this heading as to the condition of the roads—both good and bad—in various parts of the country.

Carmarthenshire is likely to become famous—or infamous—for its bad roads. The surveyor recently reported that the road surfaces were three inches less in thickness than they ought to be. Some of the roads were not repaired last year, and others for a much longer period. To replace the three inches of metal a sum of £116,386 will be required. Many of the roads are worse than ploughed fields.

The London and Osmaston roads leading out of Derby are in a very bad state for autocars.