The Autocar

A Journal Published in the Interests of the Mechanically-propelled Road Carriage.

EDITED BY HENRY STURMEY.

INCORPORATING THE MOTOR CAR & MOTOCYCLE, THE HORSELESS CARRIAGE AND JOURNAL OF AUTOMOBILITY.

REGISTERED AS A NEWSPAPER FOR TRANSMISSION IN THE UNITED KINGDOM.

No. 182. Vol. IV. SATURDAY, APRIL 22nd, 1899. Price 3d.

NEW PENNINGTON CARS

After 15th of April the price of all cars will be raised twelve-and-a-half per cent., instead of on 1st May as previously announced.

"SOCIABLE" - - - Price 142 Guineas.

We are now delivering ten cars per week, and our output in a fortnight's time will be trebled. For the convenience of London customers, our cars can now be seen and tested at Mulliner's (London) Ltd., 28, Brook Street, W., and a new Depot is being opened by Mr. J. Burns, Berner's Street, Oxford Street, W., where our different styles of cars may also be seen.

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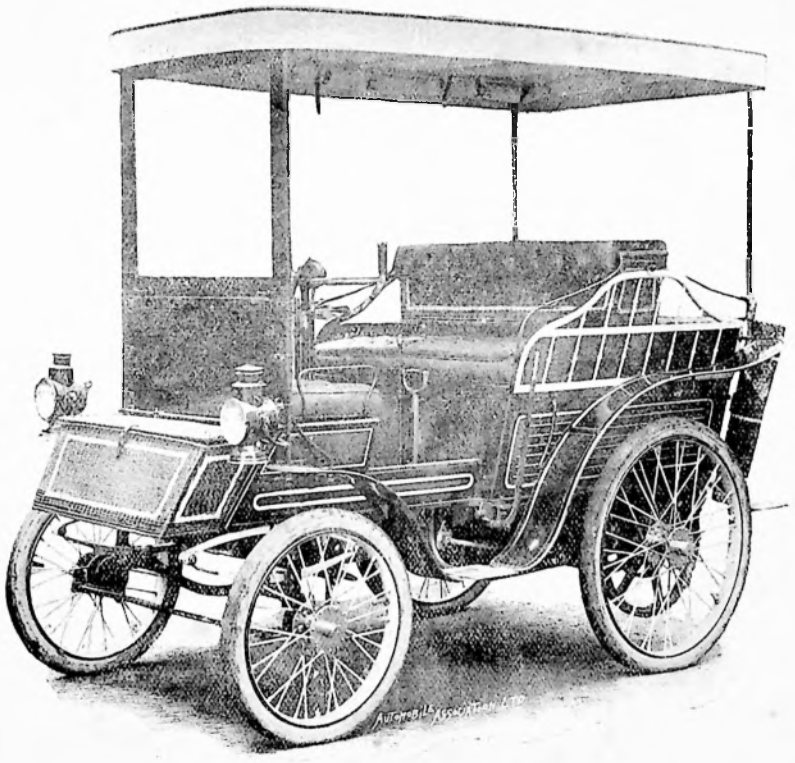
THE "MORS"

LEADING AS EVER.

PRICE, 380 Guineas.



THE IDEAL TOURING CAR.

Book your order **NOW** and write immediately to

The Automobile Association, Ltd.,

PRINCE'S ROAD, HOLLAND PARK AVENUE,

LONDON, W.

CRYSTAL PALACE,

SATURDAY, 6th MAY, 1899

(Under the auspices of THE MOTOR CAR CLUB.)

Great Meet and Contests for Motors.

Entries for Control (not Speed) Contests divided into the following classes:

A.—Cycles with three or more wheels which can be assisted by pedalling.

B.—Cycles with three or more wheels which cannot be assisted by pedalling.

C.—Light cars over 4 cwt. but under 10 cwt.

D.—Heavy cars over 10 cwt.

E.—Delivery and general commercial vans under two tons.

In each of these, provided that not less than three entries are received in such class, the Crystal Palace Company will give the following awards:

A Gold Medal to the entrant of the car or cycle doing the best net time.

A Silver Medal to the entrant of the car or cycle doing the second best net time.

Certificates to the entrant of every car or cycle completing the course within reasonable time.

FULL PARTICULARS AND ENTRY FORMS FROM

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10.—OXFORDSHIRE, by H. GRAVES, B.A.

12.—THE ENGLISH LAKE DISTRICT, by A. W. RUMNEY, M.A.

13.—HAMPSHIRE AND THE ISLE OF WIGHT, by W. A. BETTESWORTH.

14.—SOMERSETSHIRE, by HENRY HARBOUR.

15.—DEVONSHIRE, by H. S. VAUGHAN.

16.—NORTHUMBERLAND AND DURHAM, by R. T. LANG.

18.—ESSEX, by G. DAY.

19.—WORCESTERSHIRE, by C. CALDICOTT.

20.—BERKSHIRE, by H. GRAVES, B.A.

21.—BUCKINGHAMSHIRE, by H. GRAVES, B.A.

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If the County which you wish to explore is not named on this list please send a line to the Publishers, when they will be glad to inform you when that volume will appear.

OVER 1,300 IN USE, GIVING GREATEST SATISFACTION.

This is without doubt the most frequently met with car on the road, and everyone is loud in its praise. It is fitted with a motor of 3 or 4½ h.p., and will carry its full load of three persons at speeds variable from three to twenty miles an hour. Every car is finished in our best style, and is complete with new pattern throttle valve lever, starting handle, best chains of French manufacture, best batteries and coil, and all latest improvements. Every car is fully warranted, and we shall not attempt to shirk responsibility should occasion arise. We can generally deliver from stock. Cars can be tried over severe roads at any time without appointment or charge.

PRICES:

3 h.p. Motor, complete	**170 Guineas.**
4½ h.p. Motor ,, ...	**195 ,,**

WELLINGTON,
April 10th, 1899.

I shall be happy to give information about the car to any medical man who may require it. It is certainly very satisfactory, and you may make any use of this you like.
K. VICKERS, M.D.

KING'S LYNN,
April 10th, 1899.

We have been lately giving our car some long runs with three and sometimes four persons on board, and it means a lot when we say that we are thoroughly satisfied with its performances, as we are not easily satisfied. W. H. JOHNSON & SON.

INTERNATIONAL MOTOR CAR CO.,

15, HIGH ROAD, KILBURN, LONDON, W.

BUSES AND TRAINS FROM ALL PARTS PASS THE DOOR. *AGENTS APPOINTED.*

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EDITORIAL OFFICES

19, HERTFORD STREET, COVENTRY.

PUBLISHING OFFICES

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

Notes.

The Daimler Motor Co. have now delivered three eleven horse-power vans to the General Post Office in London for use for the parcel post and general collection and conveyance of parcels and letters at the different post offices in the metropolitan area. The vehicles are built to carry a load of 30 cwt., and weigh something over two tons, and are the largest petrol-driven cars yet built in this country. We understand that the service will be extended considerably if the running of these proves satisfactory.

* * *

Mr. Frank E. Duryea, the inventor of the Duryea motor waggon which distinguished itself so much in the London to Brighton ride on Emancipation Day, has broken out in a new place. Having parted with all his rights in his first successful waggon, he has now designed and built a new one embodying, as he claims, numerous improvements upon his first ideas, and some particulars of the new vehicle have reached us. In one respect, however, it does not strike us that Mr. Duryea has advanced, for he has built his machine—to carry four passengers, with seven horse-power—as a three-wheeler, and up to the present we are not inclined to prefer three wheels to four, but rather the reverse. This does not add to the appearance, as the new vehicle looks for all the world like an overgrown perambulator.

* * *

Rumour is rife with motor companies just now, and the story goes that several combinations and reconstructions are "in the air." Not the least startling of these stories is that Mr. Harry J. Lawson will shortly retire from the British Motor Co., and all its subsidiary companies with which he is still connected, and that these will be taken hold of by a strong syndicate of well-known city financiers. Another tale speaks of the business of the Daimler Motor Co. being taken over by a strong combination, who will acquire the rights of the present owners at par, payable partly in cash and partly in shares in a new and much stronger company. If all the stories we hear be true, there will, indeed, be a good time coming for the motor companies, but one never can tell, and we "tell the tale as told to us" for what it may be worth.

Our article last week upon company requirements was not much too early, for the prospectus of the first of the motor syndicates to make its appearance reaches us this week. It is true it is not a public issue yet, but there it is, with a share capital of £50,000, to acquire the rights in the Joel electric carriage, which we illustrated and described in these columns a month or two since. Of the directors, Mr. A. A. Common is, we believe, best known as an astronomer. Mr. Arthur Mulliner has had probably more experience in the building of bodies of motor carriages than any other man in this country. Of the others, we know nothing. Intending investors, however, who number themselves amongst the readers of *The Autocar*, will doubtless check through the prospectus in comparison with the points noted in our last issue.

* * *

Writing to us recently on the subject of his motor, Mr. Henry Sutton, of Melbourne, says that he has been informed that in Australia petroleum of ·730 is termed "light kerosene," and is not under the same restrictions as to carriage, transportation, and storage, as "gasoline," or petrol. This "light kerosene" of ·730, Mr. Sutton says, he vaporises in his motor with ease, and would have no difficulty in vaporising ·760, and Mr. Sutton naturally considers that he gained a considerable point in constructing a motor which traversed 400 miles of country like Australia upon fuel purchased *en route* without the help of special petrol stores. If some of our friends in the petroleum trade will help us, we think it will be of interest to our readers in all parts of the world if we can be informed clearly as to where is the dividing line between spirit and oil, or, at any rate, the point at which the restrictive regulations as to storage, carriage, etc., come in.

* * *

From the Isle of Man we learn that Mr. Brackenridge, who hires out cycle at Douglas, and who has opened new premises on Prospect Hill, will take over a few motor cars to the island for the summer season. These cars, in charge of competent drivers, will be hired out for the use of visitors. It appears, however, that the bill allowing autocars to be used on the Manx highways will not become law till July 5th, so that the vehicles will not be able to make their appearance in public until after that date. We should imagine that they will do well, as with visitors there no pastime is more popular than that of taking drives into the country round to explore the beauties of the island. This work has hitherto been in the hands of horse and brake proprietors, but there is no reason why autocars should not be used. Indeed, the introduction of the self-propelled vehicle would be a merciful provision in the interests of suffering horseflesh upon the long and steep gradients of some

of the mountain roads there, to say nothing of the novelty and convenience which would be afforded to visitors.

* * *

As sportsmen, perhaps few excel the Irish, and anything in the shape of a race or a wager is just the thing to whet Irish enthusiasm. Very few autocars are yet to be found in the sister isle, and they are still the subject of much comment and criticism, and speculation as to their capabilities, so that great interest is being taken in the results of a wager which is just now under discussion, a well-known Dublin doctor, an enthusiastic owner of a car, having undertaken to drive his machine from Dublin to Galway (133 miles) within twelve hours, including all stoppages. The race is to take place in May, and the doctor, needless to say, is confident of success. Doubtless, he knows his motor. The challenger, who is a County Galway gentleman, is equally confident that he will win, as the route possesses many difficulties in the way of bad roads and hills. We have not the pleasure of knowing the nature of the doctor's car and motor, but we have very little doubt he knows what he is about. Anyway, we wish him success, and if he wins, it will do a great deal for the motor carriage movement in Ireland, as it will remove much of the scepticism which undoubtedly still exists.

* * *

As has been already recorded in these columns, the autocar movement has come to the front with a bound in America, and, as we have also recorded, the Pope Manufacturing Co., the largest manufacturing concern engaged in the industry there, are already overwhelmed with orders. We now learn that this company has decided to conduct its automobile business separately, in the form of a distinct company, which has just been incorporated in New Jersey under the name of the Columbia Automobile Co. with a capital of £600,000 ($3,000,000), and with Col. Pope at the head. We are further informed that the European side of the business is being rapidly organised, and that the manufacture of the company's machines will be undertaken in France by the well-known firm of Clément et Cie., whilst the German patents have been taken up by those kings of the Continental engineering industry, Ludwig Loewe and Co., of Berlin, whilst it is further proposed to shortly inaugurate an English company to handle the British and Colonial rights. The Pope Manufacturing Co. are one of the most go-ahead firms in the world, and never touch a thing unless they are assured it is right, and we expect to see them and their allies cut a big figure in the automobile business before many years are gone.

* * *

In view of the recent exploitation of the motor car in Bournemouth, it may be interesting to record that the experiment which was related in our columns an issue or two back was not an absolute novelty, as, as far back as August, 1896, before the passing of the Light Locomotives Act, Mr. James Shepherd, of Boscombe, took a car through the New Forest from Boscombe to Southampton, *viâ* Lyndhurst, in order to test the capabilities of motor cars in actual service. The result was most satisfactory, and was duly recorded in our columns. Again, in the same year, and at about the same time, Mr. Shepherd ran two cars in the great floral carnival which took place in the south-country watering-place. These cars were hired for the occasion, one being a Daimler and the other an Arnold, and they were kept running about the town and in the park for several days, taking passengers freely with the object of spreading the interest taken in them. Mr. Shepherd, who, by the way, is a mechanical engineer, has always been a considerable enthusiast on motor car matters, and has visited France and Italy with the object of seeing for himself what was taking place there, so that in writing the history of the autocar in Bournemouth, the initiatory work done by Mr. Shepherd must not be overlooked.

* * *

As we have often stated in these columns, there is nothing like a little practical experience to convince even the most sceptical of the advantages, merits, and safety of an autocar, and a somewhat amusing instance of this reaches us from Grimsby, where Mr. Ryder, who has recently purchased a Daimler waggonette, was desirous of obtaining the license of the hackney carriage committee to drive it in the town for hire. Accordingly, Mr. Ryder arranged to meet the committee for an inspection of the car, and, having got them together, he suggested that a trial would be better than a mere inspection, and the committeemen being nothing loth, the mayor, the superintendent of police, and several councillors were soon on board, and made a quick run through the park, and back to the Town Hall, where it is recorded that, "When the vehicle had come to a stoppage, Mr. Councillor Wright immediately proposed, and Mr. Councillor Spring seconded, that the license should be granted. This was carried as the members of the committee stood round the car, and this unconventional meeting concluded." Another good old adage appears to come in here, which is that there is nothing like "striking the iron while it is hot," which Mr. Ryder appears to have done right well.

* * *

As recorded in our last week's issue, Messrs. Cordingley are arranging, in connection with their exhibition at the Agricultural Hall, a series of road trials, and in bringing these to the notice of the trade, they state that "the times and distances have been so arranged that it is hoped that all who enter will secure a gold medal." But we would like to ask of what value will a gold medal be to any manufacturer if all who enter secure one? Is this a bait held out to attract entries? Any way, the value of a medal secured under such conditions can scarcely be of more value than the metal of which it is made. To be of worth, an award of any kind must in the first place be made by competent persons, and, secondly, must be awarded for the performance of a more or less arduous test, and in this connection the proposals of the committee of the Automobile Club in their trials are certainly more to be commended (we desire to draw no invidious comparisons), for it is the intention of that committee to award medals only in respect of such vehicles as have satisfied the judges to the full in the trials which will be carried out, and when we say that these judges consist of Professor Boys, Hele-Shaw, and Boverton Redwood,

Major Holden, Sir David Salomons, and Messrs. Dugald Clerk, W. H. Preece, James Swinburne, W. Worby Beaumont, and Bryan Donkin, we think our readers will agree with us that any distinction awarded by such a jury will bear some value with it.

* * *

English autocarists will read with great interest the new rules which have been laid down in France for the conduct of automobilism, and which we publish in another column, and a careful and thinking reader will see that, in some respects at any rate, our French friends are reaping where they have sown. Except in the matter of speed (the limits set by the French authorities for which are more reasonable than they are in this country), English autocarists, as well as manufacturers, have a long way the best of the deal, and we hope that everyone interested in the movement, either as a manufacturer or owner, will remember that in his own particular conduct rests the future of English freedom, and that everyone will by proper conduct so behave that when any alteration is made in the conditions governing English autocaring they will be less rather than more restrictive, as has been the case in France. It is pretty clear from a perusal of the new French conditions that the authorities know what they are about, and that they have had the assistance of some practical man in drawing up their conditions. The only point which really affects English owners is that relating to the passing of English cars upon arrival, for, although we do not think that any English cars which are likely to be taken abroad by their owners would be likely to fail to obtain a certificate, the possibility exists that an English owner may not be allowed to drive his car after he has landed with it in France, or, at any rate, that considerable and vexatious delay may take place before a certificate is obtained.

ROADS OF THE FUTURE.

Mr. J. Pennell has a suggestive article in this month's *Contemporary Review*, in which, under the title of "The Welsh Cornice," he essays to wake up the authorities in regard to their responsibilities for our roads, particularly in coast districts. Indeed, it is Mr. Pennell's desire to get a good road right round the margin of our "nice little, tight little island." Such a road would be extremely useful, not alone to travellers, whether of the commercial genus or otherwise, but to military people, and all and sundry of her Majesty's lieges, especially to those who incline to the autocar or the cycle.

As to ways and means, Mr. Pennell suggests that all users of the roads should be called upon to share the cost in the form of a special tax.

No doubt, if such a scheme could be carried out, it would pay. For, continues Mr. Pennell, "All traffic in a very few years will be self-propelled, and will require good roads, and the action of the French and the Germans, the Belgians and the Americans, in attending to the wants of cyclers to-day is not so Quixotic or absurd as it is wise and far seeing. Once the desire for good roads has become sufficiently strong in Great Britain—and it is already beginning to be felt in Wales, in Scotland, and in parts of England—a uniform standard in excellence in making and maintenance will be enforced."

Mr. Pennell has other wise suggestions for local authorities, and, though we can scarcely expect that they will be listened to, we cannot do better than quote one or two more passages in the hope that the seed he sows may bring forth fruit in the way desired. "Then, too" (he continues), "it will be found that signboards and milestones, or rather kilometre stones—for, of course, we shall by that time measure by the universal continental system of kilometres—are not a foreign fad, but an absolute necessity; also that useful information can be furnished, quite freely, in towns and villages by signs which give the name of the village and the distances, placed on the last and first houses, as in France, and that these always available instructions are more to be trusted than the casual native. Then, with good roads, as I have said, will come good hotels, and with them the tourists. The farmer will learn that he can drive to market, instead of sending his produce by train. And, really, in fifty years, who can say how many and how great advantages to this country, as to every other, will not have been reaped."

THE SWERDNA AUTOCAR WHEEL.

Last January at the Birmingham Show, on the stand of the Motor Mfg. Co., this wheel was exhibited, and we briefly described it at the time. We are now, thanks to the courtesy of Mr. J. T. Scarborough, 184, St. Luke's Road, Bristol Street, Birmingham, who furnished us with a photograph of the wheel, able to give illustrations which will enable us to make its construction plain. Fig. 1 shows the wheel complete.

Fig. 1.

It will be seen that it is built on the tangential system. Each spoke is made from weldless steel tube with flattened end at the hub, which is formed into an eye, and the spoke tapers slightly at the rim for the nipple, which affixes the spoke at that end. The spokes at the hub are placed alternately inside and out the flange on short bolts. The rim of the wheel is channel section (fig. 3). On this rim is bolted what may be called a gutter of special section, and this gutter is in four equal segments. It is rolled to a section that fits a

special rubber tyre, which has a broad base or foot, wider than would be possible with the narrow orifice between the inturned edges of the rim if the rubber were forced in circumferentially, as is usual where the tyre channels are made in one piece. Now, with

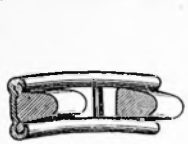


FIG. 2.

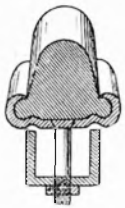


FIG. 3.

the segments the method of putting the tyre in the wheel is original, as to each segment two lengths of rubber are introduced, one at each end, and these meet at a stop in the middle, which can be seen in fig. 2, where the rubbers have been drawn back for the purpose. As soon as each metal segment has been mounted with its rubbers it can be bolted to the channel rim, whilst should any serious damage be done to any part of the rubber this part can be cut out, as it is a very simple matter to put in even an inch of new rubber, and this can be done, it is claimed, without in any way reducing the efficiency of the tyre. In the metal segments a couple of slight depressions are rolled to receive the edges of the channel rim, so that even before they are bolted firmly together there is no tendency towards lateral play. There is absolutely no question about the lateral strength of these wheels complete, and they can easily be proportioned to take any weight and drive which are likely to be required for autocar work. To our mind the great point in their favour is the practical impossibility of the rubber being removed by lateral strain, and if it is pushed home under slight compression we see no reason why it should not be equal to the wear of any properly-shaped brake block or spoon. The makers of the wheel are the Andrews Mfg. Co., Birmingham.

LICENSES FOR AUTOCARS.

How to get them.

Enquiries are constantly reaching us for information as to the licenses necessary for autocars. We do not wonder at this, for it generally happens that post office clerks, to whom enquiries are naturally addressed, as being the source from which ordinary carriage licenses are obtained, frequently exhibit a pitiful ignorance on the subject. A correspondent sends us the following account of his experiences in trying to get a license:

"I applied for an autocar license at the post office in one of the leading motor-car manufacturing towns, but the officials in charge were utterly bewildered by the request; they had a faint idea that such licenses were required, but beyond that their minds were a perfect blank, and they would thank anyone for information on the subject. I then asked for a form, and was given one of the ordinary carriage and dog license forms, which they said was the only kind they had. From this I gathered, though the information was concealed by a lot of verbiage, that for carriages 'with four or more wheels, to be drawn, or adapted or fitted to be drawn, by two or more horses or mules, *or to be drawn or propelled by mechanical power*,' the duty is £2 2s. The officials appealed to till that moment were unaware of the presence in their form of the words italicised, and, so far as they knew, the requirements of the Excise would be met by the two-guinea license there referred to. They told me, however, that I had better go and enquire at the Inland Revenue office, which is in another part of the town. I went; and the clerk at this office whom I saw said, 'I know nothing about it; you must see the Supervisor of Taxes.' It so happened that this gentleman's office was only open for one hour a day—twelve to one—so I had to make another journey into town before I could find anyone who was able to enlighten me on the subject. At last I gained access to the Grand Lama who issues autocar licenses, and I received from him another form issued in respect of 'light locomotives.' This gave particulars of the duty payable upon vehicles which come within that definition, and it appeared that for a locomotive exceeding one ton in weight but not exceeding two tons unladen, with four or more wheels, the duty payable was £4 4s., being made up of two guineas payable under 59 and 60 Vic. c. 36, and a like sum under 51 and 52 Vic. c. 8, the last-named amount being, apparently, the ordinary carriage license disclosed on the form obtained from the post office, and the former the additional duty chargeable upon motor cars weighing more than one ton, which are classed as 'light locomotives.' There was nothing on the post office form to show that there was any additional duty to pay on motor cars weighing over one ton beyond the two guineas there set down. What a lot of trouble! But I succeeded eventually in ascertaining what I wanted to know."

As other autocarists may experience similar difficulties in connection with license formalities, and may unwittingly offend against the law, we reproduce for the benefit of our readers the substance of the regulations bearing upon this matter:

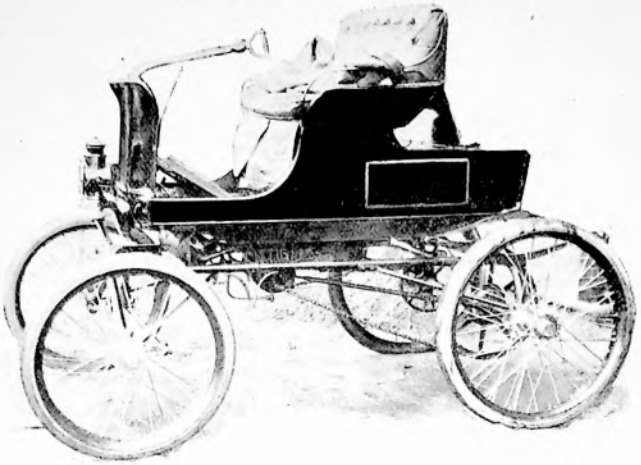
For an autocar having four or more wheels and not exceeding one ton in weight unladen	£2 2 0
Exceeding one ton in weight, but not exceeding two tons unladen, with four or more wheels	£4 4 0
Under one ton with less than four wheels	15 0
Under one ton with four or more wheels if licensed as a hackney carriage	15 0
Weighing between one and two tons with less than four wheels	£2 17 0
Between one and two tons (any number of wheels), if used as a hackney carriage ...	£2 17 0
For an autocar exceeding two tons in weight unladen, with four or more wheels	£5 5 0
Exceeding two tons with less than four wheels	£3 18 0
Exceeding two tons (any number of wheels), if used as a hackney carriage ...	£3 18 0

Licenses for cars weighing less than one ton can be obtained from any one of the following officials: Collector of inland revenue, stamp distributor, or postmaster.

Licenses for cars weighing over one ton, and which come under the Light Locomotives Act, are obtainable only from a collector of inland revenue or a supervisor of inland revenue, and not from a post office.

AMERICAN STEAM MOTOCYCLES.

3. The Whitney Steam Motor Waggon.



George E. Whitney was the first engineer to do serious work on the steam road waggon after Roger's efforts were ended by death.

Whitney had been familiar with Roger's work, and, indeed, had done some work for Roger on boilers, and as early as 1883 Whitney began the construction of a steam waggon. But at that time Whitney was busily engaged in building yacht engines and boilers to order, and the public demand for motocycles had not yet been made manifest, and so Whitney's first steam waggon was sold uncompleted, and he did not begin the construction of another until 1896. his first completed waggon going on the road in October of that year.

This first Whitney steam waggon weighed only 650 lbs., and the weights of these vehicles have been successively increased up to as much as 1,120 lbs., and Whitney now says that he believes the "Scott" waggon No. 3, the heaviest one he ever made, was also the best. Whitney wholly disapproves of the weights which Stanley is using, and expresses a conviction that the Stanley waggons will not stay together when driven by less careful hands than Stanley's own. Certainly nothing can be said with any show of authority in favour of extremely light road motocycles at the present time. Roger built a four-wheel steam waggon which weighed only 410 lbs., and did not fail from any want of strength. Stanley has built a 400 lbs. waggon which has been in use by him for a year, and has been so far from showing any lack of weight that the commercial model which Stanley is now completing only weighs about 360 lbs. to 375 lbs.

But a single waggon driven by its owner cannot be held as fully establishing any point of practice. It is only by a long course of tests made by different drivers and under varying conditions that a grand average of tests, sufficiently conclusive to establish practice, can be obtained.

Whitney's long experience with yacht boilers led him to adopt the vertical tubular form as the best suited to road waggon conditions, and he has settled on dimensions substantially identical with those later adopted by Stanley in his own waggon, and by Stanley as furnished to Mason and to the makers of the "Comet" waggon. Whitney had used in his yacht boilers various lengths and diameters of tubes, but he adopted for his autocar boilers copper tubes half-inch diameter, No. 20 B. and S. gauge, by thirteen inches long. The shell of Whitney's boiler is made of ten-gauge steel of the general form shown in fig. 1. The enlarged diameter of the water leg has two advantages: it gives increased burner diameter inside the water leg, and the horizontal annular member of the boiler shell serves as an expansion ring, and so prevents causing

FIG. 1.—The Whitney Boiler.

the tubes to leak from unequal expansion of the tubes and the boiler shell.

Whitney also places his cylinders in a steam chamber formed by a sidewise extension of his boiler shell. This secures hot cylinders, and does away with the need of cylinder drainage cocks.

Whitney's first waggon was driven by a pair of cylinders 2in. bore by 4in stroke; these dimensions he

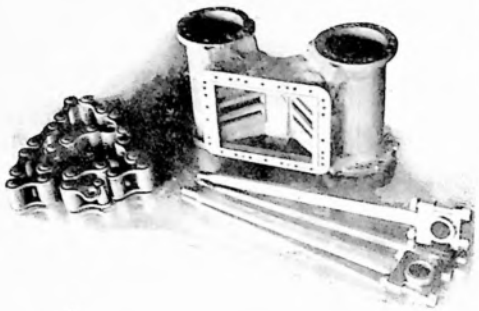


FIG. 2.—Cylinders, Connecting Rods, and Chain.

soon changed to 2¼in. bore by 4in. stroke, which he now considers "standard." The two cylinders are cast in one piece, united by the steam chest walls, all as shown in fig. 2.

Whitney uses gasoline for fuel, and vaporises the fluid before passing it into his burner. His burners have been made in various forms, none of which were mentioned as being absolutely the correct thing, and none of which, so far as is known to the writer, produced combustion absolutely without odour.

The point which has given Whitney the most concern, however, is the want of durability in his clements

FIG. 3.—Rear Axle.

of power transmission between his crankshaft and the compensating gear which drives his rear axle. Whitney uses wheels 32in. and 36in. diameter, wire suspension spokes, and steel rims, with pneumatic tyres 2½in. diameter blown up hard, say to about 100 lbs. Three-inch tyres were used on one waggon, but were thought to give no better results than the 2½in. There is unquestionably a much greater liability to puncture with increased tyre diameter, and the added wrappings of canvas demanded by increased tyre diameter make puncture repairs in large tyres so difficult that they cannot be accomplished by ordinary means. Any addition to tyre diameter, either total, or to the tube diameter, means added expense also, and it seems pretty clear that if a steam waggon can be made light enough to be successfully carried on 28in. wheels fitted with 2in. tyres, a great deal of money can be saved.

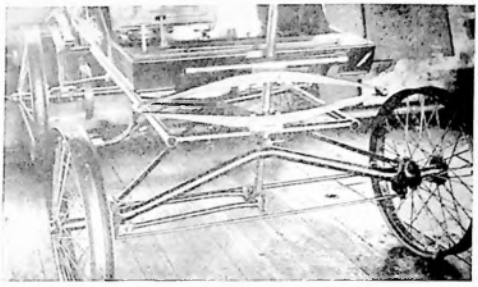


FIG. 4.—Front Axle and Frame.

Whitney's gear reduction from his engines to his driving wheels is five to one. To effect this reduction he has used bevel gears with a universally jointed transfer shaft, plain spur gears, and sprockets and chains.

Whitney's first chains were of heavy tandem pattern, and as they wore out quickly they were replaced with wider and stronger chains, and the chain pitch was also increased, until now it is two inches, and the rear sprocket is well towards twenty inches diameter, as

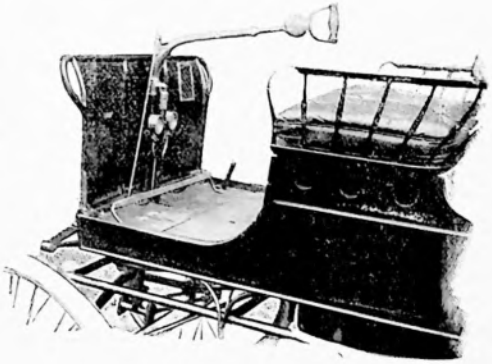


FIG. 5.—Steering Lever and Gauges.

shown in the view of the rear axle, and the chain blocks are made of five sections of Jessup steel, one-inch face, and even this enormously heavy chain does not promise a long life. It must be borne in mind that all of this rapidly moving transmission machinery has always been used naked, and fully charged with grease and fine road grit. It seems quite likely that, if perfectly protected from dust, the lightest of the chains used would have shown a fair durability.

Whitney's low gear, five to one reduction, and long piston stroke, make his waggons powerful hill climbers.

Whitney wants a waggon which will go fast and far over any roads which may come before it, and he has evolved a very substantial frame by which the rear axle and the boiler support are held in fixed relative positions, while the front axle support is pivoted to the reach in the form of a securely-braced structure, so that the front wheels can rise or fall independently in vertical plane. This makes the wheels accommodate themselves perfectly to the road surface, without any twisting action of the frame, or any extraordinary load thrown on the springs.

The steering lever of the Whitney waggon is highly ingenious, and combines in a single spade-handle grip the control of these three important functions: First, by slightly rotating the grip one way or the other the little crank seen at the front end of the steering lever, on top, is made to open or close the throttle valve, and so start or stop the engines; second, by pushing the grip a little way forward the sliding grip rod telescoping in the body of the steering lever, the valve gear is set ahead, and makes the waggon run forward; third, by

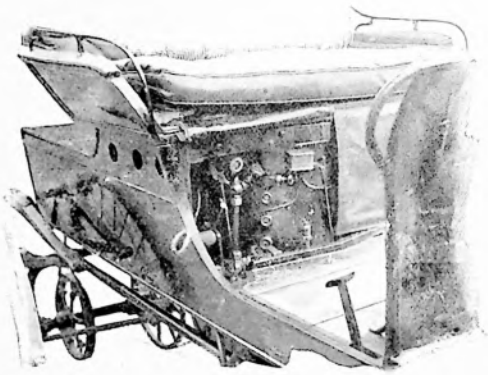


Fig. 6.—View Under Seat.

pulling the grip a little way back the valve gear is reversed, so that the carriage is made to run backward. It might seem that this variety of offices would be confusing to the novice, but such is not the case. The movements are very quickly and certainly learned, and as the whole control of the waggon is thus obtained with but one handle, the driver has one hand left free. The band brake is applied by a foot-lever, and that is all that the driver has to do with his feet, so that he has one foot and one hand always free. Of course, the engines can be reversed for an emergency stop, though reversing the engines is always liable to injure the tyres by sliding them on the road surface.

In an emergency the driver is much more likely to err if he has to let go of one lever and grasp another; besides this, the driver can more quickly move a lever already in his hand than he can select and grasp and move another lever. A somewhat extended ride with Whitney as driver in the crowded and very crooked streets of Boston convinced the writer of the great value of this many functional single steering lever, which is in strong contrast to that other practice, which often arranges the controlling levers of a motocycle so that both hands and one foot of the driver are constantly employed in directing the movements of the waggon.

To avoid the large diameter rubbing surfaces which belong to eccentrics, Whitney introduces a valve operating crankshaft, which is driven by sprockets and a short chain even turns with the crankshaft. The sprocket which drives the valveshaft is loose on a longitudinally sliding sleeve spliced to the valve crankshaft, and the outer surface of this sliding sleeve is cut with two spiral grooves which take studs driven into the sprocket, consequently, sliding the sleeve along on the valve crankshaft changes the relative angular positions of the valve shaft and sprocket, and so reverses the engines, the whole movement being the equivalent of the well-known shifting eccentric reversing action. The chain adjustment is by a screw strut from the rear axle supports to the engine frame, the engine being arranged to slide bodily to accommodate the chain adjustment.

The boiler tubes are enlarged 1-32nd of an inch in diameter at one end, and both ends are then threaded in two different diameters, 50 p.i., double V thread, and screwed into the tube sheets, which are tapped with a long tap, both sheets at once. The tube threading is parallel, not taper, and after being screwed to place the tubes are expanded tight with a three-roll expander.

The dashboard has on the inside two gauges, one for steam pressure and one for air pressure in the gasoline tank, and a water tank index, and a mirror, which reflects the water gauge, secured to the boiler under the seat, shown in fig. 6. The front curtain is made in two sections, and the waggon is driven with one section tucked under the cushion, thus exposing the boiler glass gauge and gauge cocks. The brake foot lever is seen in the foreground in fig. 6.

The outlines of the Whitney waggon are close to the ordinary light waggon forms, and horses pay very little attention to this vehicle. Hugh Dolnar.

Messrs. Baudoin and Co. is the name of a new firm which has just been formed at St. Etienne (19, Rue de Fontainebleu) with a capital of £400 to manufacture spokes for motor-car and cycle wheels.

* * *

La Compagnie des Automobiles et Cycles Hurtu is the title of a company which has just been formed in Paris (10, Rue Halévy) with a capital of £60,000 to acquire and carry on the business of cycle and motor-car makers of Messrs. Hurtu.

* * *

Articles of incorporation have just been filed at Trenton, N.J., by the Columbia Automobile Co., with a capital of $3,000,000 (£600,000). The concern will be authorised to manufacture and operate vehicles propelled by electricity, compressed air, and other power.

* * *

It is announced that Messrs. S. de Jong and Co., of the Minerva and Romania Cycle Works of Berchem, near Antwerp, are taking up the manufacture of motor tricycles. In a preliminary announcement the firm state that their motor differs from the De Dion, and therefore does not infringe the patents relating to that motor.

A DUCAL QUADRICYCLE.

The accompanying illustration represents the Duke of Manchester (at the helm) and Mr. Moffat Ford upon his Grace's latest acquisition in the form of an "Acme" motor tandem quadricycle, upon which the Duke spent the greater part of the Easter vacation. The longest run was from Aldenham Abbey, Watford, through London to Eastbourne, the severe gradients upon the route being successfully surmounted by the machine. The Duke of Manchester is delighted with the performance of his iron steed, and it is very probable that automobilism will enter very largely into his future recreations.

FRENCH JOTTINGS.

The great autocar race to be organised by the proprietors of *Le Matin* during the second half of July will be run off on very much the same lines as the similar events promoted by the Automobile Club de France in previous years. The vehicles will be divided into three categories—cars with two seats or more carrying their full complement of passengers, or its equivalent in dead weight; motor cycles weighing less than 150 kilos., and cars that do not enter in either of these two categories. The competing vehicles will start on the morning of July 16th, and at the end of each day's journey the time will be taken, as well as the number of passengers, or the quantity of dead weight. In passing through the towns, the competitors will not be allowed to drive at beyond a maximum speed to be fixed ultimately, and any infraction of this rule will result in disqualification. On entering and leaving the towns the times will be taken, and these will be deducted to secure the net racing time. The motors and the mechanisms will be marked, so that nothing can be changed during the race. At the end of each stage *parcs* or yards will be established for putting up the vehicles, and the drivers will have an hour on arrival, and an hour before starting, in which to clean their cars and get them ready for the next journey, but no repairs can be carried out in the yards. The drivers of the competing cars cannot be changed during the race, unless, of course, in the event of injury, or other incapacity, and each car must always carry its full complement of passengers, or their equivalent in dead weight. Entries must be sent in by July 10th with fees of 200 francs for the first category of vehicles, and 100 francs for the second and third categories, but after July 1st these fees will be doubled. Prizes amounting to £900 will be distributed, the winner in the first category getting £240, and the second £160. There will be eight prizes in the first class of cars, and four each in the second and third. The course has not yet been mapped out, but, as I said last week, it will be a circular race round France, and will have a distance of about 2,500 kilometres.

In the new autocar regulations published this week one of the rules provides that each vehicle must carry at night time a white and green light. This is already being done in the case of the electric cabs, and the result seems to be perfectly satisfactory. When meeting two or three vehicles with the white lights close together, some of them perhaps concealed by carriages in front, it is often very puzzling to see the exact position of the vehicles until you are close on them, but with the near and off sides

of a car distinguished by different coloured lights, this difficulty is entirely overcome. A driver meeting vehicles in the dark has only to keep clear of the green lights, and he is safe, for the white lights being away from him, he has not to take them into account. As for the hippomobiles, they still have the white lights, though in the nature of things they ought to be sanguinary red, and if nothing has been done to provide them with a more effective warning, it is probably because the authorities think that it is scarcely necessary to legislate for a class of vehicle whose days are numbered.

The race from Paris to Chantilly and back for autocars running with methylated spirits was not such an utter fiasco as was feared, when all the vehicles returned home from the Porte Maillot in the pouring rain, leaving only one competitor to brave the terrors of the heavy roads with very little confidence, it may be, in his ability to finish the journey with the new motive power. The little car of MM. Briest and Armand, however, did very well, for it covered the sixty-eight kilometres in 4h. 8m., and the driver and the commissaire had to be dug out of the mud before one could be distinguished from the other. The promoters of the race certainly accomplished their object in proving that autocars can be driven with methylated spirits under as good conditions, perhaps, as petroleum, but it is also shown that the cost of running with alcohol is three times that of petroleum spirit, and this was due as much to the larger quantity of methylated spirits consumed as to its higher price. The question of price, however, appears to be a secondary one, as it is upheld in this country by purely artificial means, and if the heavy duties were taken off, the cost of alcohol would be extremely low. It remains to be seen, however, whether this will compensate for the larger consumption of methylated spirits. It is to be hoped that the next event will be run off under more favourable conditions, and that it will provide sufficient data to allow of some definite comparison between petroleum and methylated spirits, for at present our knowledge of alcohol as a motive power for autocars is purely theoretical, and it is possible that the margin in favour of petroleum may not be so great as is represented. For the moment, the margin certainly seems to be a big one, and the alcoholists will have a lot to do to explain away the high consumption.

In the early days of the autocar industry the new vehicle got rather a mixed reception among the carriage builders, some of whom affected to look upon the self-moving vehicle with serene contempt, while others regarded it as a very important auxiliary to their industry. The former class was a small one certainly, and it has become smaller by degrees until now even the most refractory carriage builder has been converted to the automobile. All of them are making big efforts to insinuate their way into the autocar industry, and are looking out for mechanisms which they can adapt to their carriages, and happy is the man who can produce a satisfactory motor vehicle. An automobile which will give good results means a fortune to the carriage builder, and it is not surprising, therefore, that the *carrossiers* should be looking high and low for new mechanisms. The engineer has become the collaborator of the carriage builder, who usually takes his share in the work of experimenting, and the two enter into partnership of more or less duration, according to whether the inventions of the engineer are likely to prove satisfactory or not. As a rule, it must be confessed that these partnerships are very short, for not one in a score of the new inventions brought out are of any real value, but when a carriage builder is able to get hold of a good motor, his connection with the inventor is certain to be a very successful one. At first this association between the *carrossier* and the autocar maker was not without causing a little friction between the two branches of industry. The carriage builder made the mistake of trying to impose his own ideas as to autocar construction upon the engineer, who naturally wanted the vehicle built according to the requirements of the mechanism, while the carriage builder was ready to sacrifice everything to the appearance of the car. Even now this friction exists to a small extent. The autocar makers say that the carriage work is quite a secondary matter, as the mechanical vehicle need not necessarily be built upon the lines of the ordinary horse carriage, and, in fact, a good many of them affirm that in the future the automobile will be constructed without calling in the aid of the carriage builder at all. Naturally, this view of the situation does not suit the *carrossier*, who complains that if he is left out in the cold the autocar industry will go to the dogs. The automobile will no longer be characterised with the elegance of design which has placed the French carriage building industry in the very front rank, and the market will eventually be flooded with foreign autocars which combine the ingenuity of the engineer with the skill of the *carrossier*. It is very probable, however, that this dispute will end in a complete association of the two branches of industry, for, with the exception of one or two big firms, all the carriage work is supplied by the *carrossiers*, who are fast gaining the experience necessary for building the cars to the requirements of the mechanism, and are, moreover, giving them a decidedly more elegant and distinctive appearance. So far as the light cars are concerned, there is no doubt a tendency to manufacture them in their entirety at the autocar works, but, as buyers insist upon a certain elegance in the ordinary types of automobile, the carriage builder must continue to have a growing share in the new industry.

The motor cab trials to be held in Paris on June 1st and the eight following days will be organised on much the same lines as last year. The same three routes will be chosen, each of a length of about sixty kilometres, and the vehicles will be judged according to their economy, comfort, and ease of management. The cars will be divided into three classes—motor cabs for passenger transport, goods delivery vans carrying at least five tons, and light delivery cars carrying fifty kilos. and more, and driven by one man. All the vehicles must have a kilometric indicator, and must have two or more brakes, as well as a reversing gear. The entry fee for each vehicle up to May 15th is 200 francs, but after that date, and up till May 25th, the fee will be doubled. For the class of light delivery vans, however, the fees are reduced by one half.

Tours and Runs.

Under this head we shall always be pleased to insert notes descriptive of practical work by users of autocars.

FROM ENFIELD TOWN TO CAMBRIDGE.

On Easter Monday, Mr. Albert Olley, of Enfield Town, took the above drive on a Benz victoria, and sends us the following account of the journey: Our party consisted of A. Olley, Mr. Andrew Hill, and Mrs. Hill. We had breakfast about a quarter to seven, and left Enfield at 7.15, *viâ* Forty Hill, Waltham Cross, Wormley, and Hoddesdon, to Ware. Here we stopped to see if anything was wanting, and found that the cylinder lubricator needed a drop of oil. Otherwise, everything was satisfactory. We spun along in fine style till about halfway to Cambridge, after which the roads for about ten miles were like a switchback, some of the gradients being about one in four or five. We got out and walked, but did not push up two of the steepest gradients, when we mounted again, and found that we were at a good altitude with grand scenery for miles around, and a bright sun. We had now about fourteen miles to cover before reaching Cambridge, and were informed that the roads were good and level the rest of the way. We passed through one or two villages, where the natives seemed to be greatly astonished, and ran about like wild Indians. We were now running on a splendidly level road with milestones all the way, and we timed ourselves for one mile with flying start, which we accomplished in two and a half minutes exactly, and arrived in Cambridge at 11.45 a.m., putting up at the University Arms Hotel. Here we examined the car, and found that there was about one and a half inches of water in the tanks, and half an inch of petrol. This was after the run of forty-six and a half miles. However, we next ordered dinner, which was very acceptable, leaving the car without food or water, and, after dinner, we went for a walk through some of the colleges, being informed that they were open for the day. We also went to the Cambridge Museum, arriving back at our hotel about 2.30 a.m. I filled the water tank and the petrol tank from the extra reservoir which I carried in front, and oiled up in general. I found all grease cups empty, and, being without vaseline, I bought some from a local chemist, who asked me what I wanted it for. On my telling him, he evinced great interest in motor cars, and informed me that licenses for three had been granted the previous week for a service to run in Cambridge. These I noticed presently were Daimler waggonettes. We started back for Enfield Town at three p.m., going splendidly over our fourteen miles of flat country in just over the hour. Then came our ten miles of up hill and down dale, where we had again on two occasions to walk up steep gradients. Having accomplished about twenty-six miles on the return journey, we halted for oiling purposes, and then rode straight to Ware, arriving there about 6.45, having had splendidly clear roads all the way. We left Ware on the way to Hoddesdon, and soon began to get amongst 'Arrys and 'Arriets with ponies and donkeys, which gave us some amusement on the road to Waltham Cross, where we turned off to the right to Bull's Cross, Forty Hill, and Enfield, arriving there punctually at eight p.m., having had an enjoyable day, and accomplishing ninety-three miles without a hitch on our Benz victoria.

Correspondence.

MANAGEMENT OF THE BARRIÈRE TRICYCLE.

[694.]—I have been for five weeks the proud (?) possessor of a Barrière tricycle, purchased from the Automobile Association. Since then I have not ridden the machine twenty miles, and it has never gone satisfactorily, and I am writing to know if you can offer me any advice on the matter.

In the first place I could not get the ignition plug to spark satisfactorily, and as there was only one battery in the box, whereas provision was made for two, I thought this must be at fault. I therefore procured a set of four dry cells from the Automobile Association (for which, by the way, they charged me), and still the engine would not work satisfactorily, often missing two or three explosions consecutively. I am now using my fourth ignition plug, and there does seem to be a slight improvement now, as I got the last one from Blake, as recommended by "Medicus" in last week's *Autocar*.

I have tried the machine this afternoon with the new plug, and I can now at least make the machine go, but cannot get more than twelve to fourteen miles an hour out of it, although it should do well over twenty. I have had the whole of the engine taken to pieces, the valves, etc., thoroughly examined, and all seems to be in perfect order. The spark, however, appears to be very small, and I am now beginning to think the coil must be at fault.

Whilst writing allow me to state what great pleasure I derive from the perusal of your columns. I wish *The Autocar* were published twice weekly.

April 15th. TRIKE.

ELECTRICAL MOTOR CARRIAGES.

[695.]—There seem to be so many obstacles to the ultimate firm establishment, and apparently inseparable from the early life, of a new industry, such as the adverse state of the law, the over sanguine inventor, and lastly the professional company promoter, that those who are most interested in the matter, and one who has largely contributed to the years of labour necessary in making the electrical vehicles a practical success, take all these things as a matter of course. But when a gentleman of the standing of Sir David Salomons states (assuming that he has been correctly reported in *The Royal Magazine* of this month) that the electrically-propelled carriage is an impossibility, it is to be pardoned if the remark is not allowed to pass unchallenged. And one is almost inclined to think that it was made without due consideration, as was the case when the same gentleman, in estimating the cost of propulsion by electricity a year or so ago, based his calculations on the cost of electric current at 4d. per unit, whereas at that very time it was to be obtained in London at 1d. per unit!

That one does not see many self-propelled carriages on the streets here is not evidence that they are unpractical. Our natural caution in adopting new ideas and our love of horses are enough to account for this,

although, as a lover of horses myself, one of the last uses I would put a horse to would be the hauling of a tram-car or an omnibus, and I think that many of the horses one sees in cabs are fit subjects for anyone's compassion, and the sooner their use is rendered unnecessary by the introduction of electricity the better.

In spite of the long start which the automobile movement has had on the Continent, and in view of the fact that it is only during the last two years or so that one was allowed to run a motor vehicle on the street here at all, it is a very significant fact that the principal systems of electrical vehicles which have been adopted in Paris are of English origin.

The argument which Sir David is reported to have used when discussing the "inutility" *(sic)* of electrical motors, "It is as if one should go for a fast drive and expect the horses to gallop along with a load of passengers as well as a dozen sacks of coal," is not to the point, and one is tempted to remark that the horses would go very fast indeed if they had no load at all to carry. But why Sir David should try to prove the matter by wishing to carry accumulators (represented by the sacks of coal) in a horse-drawn vehicle I fail to understand, for when we carry a set of accumulators in our electrical vehicle we do not want to carry a horse, but do without it.

In conclusion, I can only say that regarding the weight of an electrical carriage it is now quite possible to produce one capable of carrying two persons for a forty-mile journey, the total weight of the carriage being under twelve hundredweight at a cost for electric current of two shillings, and an annual expense for renewal of accumulators of £20.

C. OPPERMANN.

The Automobile Club, S.W., April 17th.

COUPLING AN INDUCTION COIL.

[696.]—It would be impossible to explain the facts propounded by "G. D. S." under the above heading in your last issue, without inditing an elementary treatise on electricity, with a dissertation on the behaviour of high-tension currents. But a rough illustration may help your correspondent to some comprehension of his apparent difficulty, even though it does not explain it to him.

Let us imagine that he has a fountain on his lawn, worked by a water-tank at the top of his house from which a pipe is connected to the fountain jet. The over-flow pipe from the fountain basin may be supposed to be led into an adjacent pond.

Now, suppose that he reverses these pipes, leading that from the tank direct into the pond, and connecting the over-flow pipe from the basin with the fountain jet. Under such conditions the fountain will not play, and the only other result will be a slight temporary, local, and practically imperceptible rise in the level of the water in the pond.

C. E. S.

AUTOCARS ON SNOW-BOUND ROADS.

[697.]—We shall feel greatly obliged to have the opinion of some leading motor-car manufacturer with regard to the use and usefulness of motor cars during winter time in Norway.

You know that our roads and streets are usually snow-covered in the months of November-February, and we do not know if the rubber-tyred wheels will work satisfactorily upon the snow-clad grounds, but should be happy to enter into correspondence with some authority on this subject. We are somewhat anxious to hear expert opinions, having already made arrangements to have introduced a couple of motor omnibuses for passenger (tourist) traffic, and are now negotiating for undertaking the motor-car service in a couple of our principal towns, and should therefore be extremely pleased to receive proposals from some firms for a vehicle that would be practical for street traffic in our country for both summer and winter service.

The question of practicability during our winter also is applicable to other types of motor cars, such as waggons for heavy goods and delivery cars.

O. O. BULL AND CO.

Skippergd, 20, Christiania, April 15th.

[We have had very little experience ourselves over snow-bound roads, but what little we have had seems to show that where the snow is beaten hard at any rate a rubber-tyred autocar is away ahead of a horse-drawn vehicle, especially upon inclines. As it is possible, however, some of our readers more northerly located may have had extended and useful experience of the kind our correspondents require, we insert the letter in the hope that such may be elicited.—ED.]

SPEED ON THE TRACK.

[698.]—In regard to Mr. Norris's letter as to the machine which I rode on Easter Monday at the Crystal Palace, this was not a tricycle borrowed from Mr. S. F. Edge, but from Mr. C. Jarrott, I having sold my own some two weeks before, and, being uncertain of getting delivery of my new machine, I naturally asked Mr. Jarrott, who kindly lent me his one and three-quarter horse-power De Dion tricycle. My new machine arrived on the Saturday previous to the race, but owing to some defect in the carburetter I did not consider it advisable to run it in the race.

I thank Mr. Norris for his kindly interest on my behalf. As to his friend who is anxious to race me, he will see by this week's *Autocar* that I have issued a challenge for a one hour's match on May 6th, which will give his friend every chance he desires.

C. G. WRIDGWAY.

TUBE V. ELECTRIC IGNITION.

[699.]—I have been much interested in reading the various letters from your correspondents; none seem, however, to have had any experience with Simms's patent magneto-electric ignition. Can any of your readers speak as to the merits or demerits of this invention? Anyone who owns a motor knows how all important this question of ignition is, and it is practical experience we want.

13th April. NOVICE.

[700.]—I notice numerous attempts to put forth the so-called advantages of tube ignition for tricycles, calculated to lead intending purchasers into error. Most of the apparent objections to electric ignition therein laid down are new to me, and I think to most of the habitual users of De Dion tricycles—in fact, they seem imaginary and not practical.

Mr. Taylor, of Coventry, in the interests of his firm, is perhaps naturally very bitter against the electric

system, but I think beyond fairness. In your issue of 25th February he speaks of "intermittent explosions and loss of power" occurring with electric ignition after forty to fifty miles, unless carburetter is refilled; each of my De Dions would empty its carburetter dry and then continue a little with the remaining gas, firing regularly until the last, when it would stop fairly suddenly.

He says it is necessary with electric ignition to have petrol of the exact specific gravity; I only use Carless ordinary, though common benzoline will answer well.

As to a burner lasting two months without looking at, it has to be heated up every time before it can be used, and pressure pumped in; its tank also has to be filled every ten hours or so, whereas the new Dion igniters will last considerably longer with average use, while their source of current will last four to five hundred hours.

With regard to danger from fire, it is a matter of common sense that safety is considerably reduced by the proximity of a flame to petrol and its vapour.

Mr. Hicks (March 4th) alludes to his Beeston overturning, but the fact that on this occasion he fortunately escaped being "fried" does not to my mind "prove the safety of the tube and blow-pipe"; a paraffin lamp if overturned frequently ignites its fuel; on one occasion it may not, but this would in no way prove the safety of said lamp. A De Dion tricycle is more difficult to overturn than his owing to its broader gauge, but apart from this I should feel much more comfortable without a flame in the event of an upset.

Mr. Taylor is very pathetic as to the anxieties of the "poor fellow" who owns an electric ignition and leaves his machine in the street—in fact, I am led to think that my hair ought to be grey by now, as I have used several such machines for city and other use in London and elsewhere for a considerable time, yet have never had any trouble from leaving them in the street, although handles may be moved; and I think the "busybody" with sufficient intelligence to harm an electric ignition would very likely manage to extinguish the burner of a tube ignition and let the petrol flow through after; trouble is also likely to be caused by the roar of a burner frightening sensitive horses.

In your issue of 7th March your correspondent, in further praising the tube ignition, asserts that he has "ridden for miles through a heavy storm," but what regular user of electric ignition has not done this? I have frequently ridden regularly in winter time through continuous rain and slush, so that rider and machine have been after a few miles almost unrecognisable. As to leaving a machine "standing for hours in a downpour of rain," Mr. Wridgway (March 18th) has experimentally poured a can of water over his coil without effect.

I have never had any written instructions with my machines, but I recently glanced through De Dion's pamphlet shown me by a friend, and I cannot remember anything about hot water rags, etc.; neither have I ever had occasion to apply external heat, even in hard frost, whereas with tube ignition the burner has to be thoroughly heated externally before starting, and the said "medical man suddenly called out" would be just as likely to have "worry and trouble" through finding his burner faulty, and having to extinguish, change burner, or take it to pieces, thereby soiling his hands, and, if in a hurry, burning his fingers, then re-heat and pump up to see if right, and, if not, repeat the process.

It is also hardly fair for "A Roadster," in the March 25th issue, to "unhesitatingly recommend likely purchasers to . . . . . etc.," on the ground of his experience with an old type machine, especially if this was not made by De Dion and Bouton, of Paris. He recommends a "De Dion tube ignition," by which he means, I presume, a "Beeston," therefore one has reason to think that his "De Dion 1897 pattern" may have been an inferior copy of the De Dion, especially as he talks of "terminals continually breaking through acids from the cells," whereas Messrs. De Dion have for a considerable time discarded accumulators for dry primary batteries. Certainly the "failing points" that he enumerates cannot be endorsed by users of De Dion and Bouton's modern production.

Finally, I think that by doing away with the electric igniting device as at present made, with its readiness, control, safety, and *avancement d'allumage*, you do away with the essential features of the De Dion tricycle, which is the outcome of the firm's continuous experience and experiment since, I think, '83 or '85, when they were building steam tricycles.

R.Y.S. "Santa Maria." C. S. ROLLS.

Sevastopol (Crimea), 8th April.

THE STEEP GRADE GEAR, ETC.

[701.]—Having had many enquiries whether we can fit our new steep grade gear to existing small cars of our make, we shall be obliged if you will allow us to state publicly that this cannot be done satisfactorily, as the necessary alterations to the framework make it a very long and expensive job. We may, however, say that those who have our old pattern motors in their cars, and wish to have *more power*, can have our new '99 pattern *English-made four and a half horse-power motor* fitted in the same cars at a cost of £40 inclusive, in place of the motor of smaller power now in the car. To those who live in districts not blessed by good roads, this additional power is a wonderful improvement, and many are availing themselves of the opportunity of having this done. We may also mention that we can fit this motor to any Benz car, such as the Ideal, with slight alterations to framework and motor. The cost is the same as if fitted to our own cars. We can generally effect the exchange of motors in three days to a week.

The motor will also easily adapt itself to the '99 pattern Benz Ideal.

INTERNATIONAL MOTOR CAR CO.,
F. O. SEYD, manager.
High Road, Kilburn, N.W., April 14th.

MR. WEIGEL'S CHALLENGE.

[702.]—I should be very pleased for the sake of the sport to accept Mr. Weigel's challenge, and do so at once, and I suggest that the race take place from Purley to within three miles of Brighton, *viâ* Hickstead, the date to be kept secret between ourselves. Of course, it would necessitate us starting very early in the morning, also having a few judges on the road—probably to the extent of seven. I am sure that there are a number of gentlemen who feel interested in a competition of this sort who would be only

too pleased to act as judges; the race to be run within a fortnight from now.

Mr. Weigel does not wish to allow pedalling; I am quite agreeable to this, providing that no two-speed gears are used, as I understand that Mr. Weigel's tricycle is fitted with a two-speed gear—all that I should like to enforce would be that he either fixes on his top speed or his low speed, whichever he likes, as I take it for granted that he only wishes to test his engine against mine, and not merely to show us that the two-speed gear is an advantage, which everyone already knows and appreciates. All the same, I think it would be better if the race was simply a test between riders and tricycles, and that each man should get the best out of his tricycle possible, and I think it is hardly fair of Mr. Weigel to infer that I might beat him, because I am a better cycle rider, as anyone who rides a motor tricycle knows the difference between a good and a bad rider is of very little moment on a motor tricycle, as the power the individual can put in is very small, comparatively speaking. I would, therefore, like Mr. Weigel to have no conditions whatever, and I will enforce none; simply let it be a race from Purley corner to Brighton and back, this seems to be the simplest and most sportive.

C. G. WRIDGWAY.

50, Keppel Road, Chorlton-cum-Hardy, April 18th.

P.S.—I should like Mr. Weigel to give an immediate answer to this, either one way or the other.

FOR MAY 6th.

[703.]—After my win on Easter Monday, it was arranged between M. Rigal and myself to have another match on May 6th at the Motor Car Club's meeting at the Crystal Palace. I have just heard that M. Rigal, owing to business engagements, will be unable to come over. Therefore, as there seems to be such a dispute at the present time in regard to who has the fastest tricycle, I shall be very glad to meet any gentleman who is the owner of a fast tricycle on that particular date.

C. G. WRIDGWAY.

50, Keppel Road, Chorlton-cum-Hardy, April 18th.

MORS *v.* PENNINGTON.

[704.]—Eight weeks ago we issued a challenge to prove that our "Mors" was the fastest car in this country. Immediately Messrs. Pennington and Baines issued another challenge to go one hundred times up Richmond Hill. We accepted it. In reply to this Messrs. Pennington and Baines issued another challenge to race us in France for five hundred miles. Again we accepted, and again Messrs. Pennington and Baines have issued a new challenge, this time to go twenty-five times up the Shapfell. Again we accept, but for the last time, and the contest must come off within one month from to-day, April 18th.

THE AUTOMOBILE ASSOCIATION, LTD.

P.S.—Since writing the above we have received a letter from a client who purchased one of our cars in August last, who has expressed his desire to come with us to witness and follow on his car the hill-climbing contest, feeling sure that one of Messrs. Pennington's numerous customers will be equally interested to do so.

A FEW NOTES ON TROUBLES DURING THE AUTOMOBILE CLUB TOUR.

[705.]—In the last issue of your valuable paper I noticed a report about the cars having taken part in the tour, either wholly or partly, and the accidents having happened to them. I see that mention has been forgotten of two Mors cars, which started at two o'clock from the club, went through the parks to Bayswater, from where they started again at 3.40, one of them arriving at Reading, Queen's Hotel, 5.18, thus overtaking outside the town the last cars in a "cloud of dust," as a contemporary said. The same cars left Reading the same night at 10.10 p.m., and reached their goal, Twickenham, shortly before midnight. To one of the cars during the whole time absolutely nothing happened, whilst the other had half an hour's trouble with pneumatics.

FRED. FREUTZEL.

INJUSTICE TO AUTOMOBILISTS.

[706.]—It is a great pity that something cannot be done to restrict policemen from issuing summonses on such frivolous pretexts as occurred in two cases during the past week.

The first instance was a gentleman friend of mine driving a Bollée at eight miles an hour (admitted by the police not to be going faster), and therefore could not be summoned for furious driving, but was summoned for driving an autocar to the common danger at half-past ten at night when there was not another soul about. I think it is simply preposterous that such a thing should occur, and that the Bench should have the right to impose a fine on a man for such a thing, when no offence was committed of any kind, and it appears as if the summons had been issued simply with a view to getting something for themselves.

In my own instance only last week, driving between Handcross and Hayward's Heath, after descending Handcross at the rate of six miles an hour, when I got almost to the bottom I let the carriage go to get up a little pace to go up the next very steep hill, and was summoned for furious driving, although no one else was on the road, and fined £3 and costs.

If this is justice in England I am ashamed that I am an Englishman, for I am certain that such things do not exist on the Continent, and I cannot understand why Englishmen can be so conservative and prejudiced in the sight of a new industry and sport.

London, 18th April. C. FRISWELL.

FIRST—THE FACT.

[707.]—Always and for ever in all matters mechanical, great and small, the truth stands before everything else, and while, at the present time, no man knows what the final truths of automobilism may be, or what form they will take in the finally accepted types of mechanically-driven vehicles, it is very clear to my mind that it is really the duty of everyone having the advancement of the art in view to say what he surely knows, and not to hold his peace and allow errors small or great to pass unnoticed. *The Autocar* is, in my opinion, doing far more to hasten the day of successful mechanical traction by giving its pages over so largely to the free expression of opinion, and the narration of per-

sonal experience, than could be accomplished in any other manner. What is required now is facts—facts of belief and faith, as well as facts of actual mechanical accomplishment, although things which are built and in operation give, of course, the most convincing lessons possible.

Nothing could be of more value to the student of automobile performance and possibilities than the stories told by John Hope, "Medicus," Thos. Groves, and Mr. Duncan's narrative of the "Wolfmuller." These stories are distinctly in the same class with S. F. Edge's highly instructive narrative of his experiences with tyres, and Thomas H. Parker's story of his successes, which are remarkable examples of clear reasoning, although Mr. Edge and Mr. Parker are supposed to be in another class, but are not.

Holding these views, I feel that I should not permit things printed in *The Autocar* which I know to be incorrect to pass unnoticed, though they are too small, taken separately, to demand independent correction.

Before noticing some of these small errors, I wish to call the closest attention of all motocycle constructors to *The Autocar's* illustration, page 203, of the result of swinging both axles in turning. This is wholly unlike the practice of any other maker, and seems to me to be of the greatest importance as reducing strain on axles and wheels, as well as wear on tyres, and the likelihood of side-slip. The wheels and axles and tyres of motocycles are as yet unsolved problems, and I believe that the "double bogey" steering which Parker shows is the only correct thing yet exhibited, and it is perfectly certain that it is the correct thing which will survive, and prove final winners and money-makers, no matter how much juggling with figures and diagrams and high sounding engineering terms may be in evidence in support of fallacies.

Referring to *The Autocar*, April 1st, No. 179, it seems to me that the railway proscription of "petrol" transportation is a step directly in the best interests of humanity at large. Gasoline is a very dangerous substance in every way, and the sooner it is forced out of its present position in automobile driving, the better for all concerned. "Kerosene," as commonly used in lamps, is safe, and is undoubtedly more suitable in every way for use in explosion engines than is gasoline. The mere fact that so far the heavy oil explosion motor has been neglected in mechanical traction is only another example of taking the wrong way first, which is always done in every new art.

One of the most evident necessities of autocar use is a speed register. There is not a number of *The Autocar* which does not plainly demonstrate this fact. It may be difficult to produce such a register, because the record, to be of value in a court of law, must be in plain English, legible without translation by an engineer, but it seems that such an instrument must soon appear. It is ridiculous that the word of an untrained constable should be taken before the oath of an expert like Lieut.-Colonel O'Reilly, but when one thinks of it, it is even more absurd that a machine should not be able in some way to tell for itself how fast it is going.

Thos. Groves appears to me to have in his personal experience covered exactly and precisely the whole story of automobilism, as we who live shall know it twenty years hence. First, he tried steam, believing, which is true, that the steam engine was the best possible motor known, for a waggon or anything else, because of its certainty of action and its flexibility. That Mr. Groves was very far short of the best form of steam engine and boiler cuts no figure. The faults which led him to abandon the steam engine as a vehicle motor are inseparable from the steam engine, and will finally cause the steam engine to disappear from the list of suitable waggon motors, although it is unquestionably superior in action to anything else now known.

On page 251 Mr. Groves says: "We saw that, firstly, a *vertical* motor was no good," etc. If a motor includes a piston and cylinder as principal elements, the vertical is undoubtedly its best form. Vibration is not due to anything whatever, except faulty running balance, and any form of piston and cylinder motor can be placed in such perfect running balance that it will cause no vibration whatever at any speed. Of course, those makers who regularly produce motors which shake so they can hardly be held together will deny this, but really competent engine constructors well know that any form of piston and cylinder engine can readily and certainly be placed in perfect running balance for any speed. In finally adopting the explosion engine and electric ignition, Mr. Groves has done precisely what will finally be done by the art automobile at large. There is no other motor now known which has so few faults for road waggon driving, and so many advantages. The day will come when Mr. Groves will smile to think he was once complacent over his present motor, but he can in that future day have the satisfaction of remembering that, as he did, so all the mechanical traction world has since done. As with Mr. Groves's motor, so with his tricycle. The tricycle appears to every novice to have many advantages; in point of fact, it has none, and deserves no consideration.

The "Lifu" high-speed "waggonette," page 254, is a tidy little locomotive, yet it seems very strange to me that any one can expect a very extended city use for a waggon of this type. Undoubtedly steam motocycles will run on the road, and undoubtedly steam motocycles are the best driven waggons that will ever be made, but for all that there is no permanent place on public highways for light locomotives.

Charles McR. Turrell, page 261, does not seem to be aware that vertical cylinder locomotives have been used, and were satisfactory and durable machines.

Mr. Pennington stands in the history of vehicle motors as having produced the lightest weight motor for power delivered which has ever been made so far. This is a proud distinction, and Pennington cannot be deprived of it. I believe that when final types of mechanical traction elements are determined the works of Pennington will not be absent.

There is certainly no obvious cause for thin forged steel cylinders wearing oval more rapidly than cylinders of other material, and I do not believe there is any real fault in the thin steel cylinders.

Mr. Cross, page 261, has not seen all the steam engines. Forty years ago it was, and possibly still is, common western practice to attach the crank driving a "muley" saw directly to the crankshaft of an engine

having a cylinder about 12in. bore by 24in. stroke. I do not think these direct connected muley saws ran less than a thousand double strokes per minute, which would give a piston speed of 4,000 feet per minute. Pennington has never approached a piston speed as high as this, although, of course, he may have exceeded 1,000 revolutions per minute in some of his gas engines. The speed of a piston and cylinder engine can well be very far beyond any present practice if ball bearings are properly applied, as is done by Stanley in his steam waggons. I cannot resist the temptation to surprise Mr. Cross by saying that the western saw mill engine to which I refer was fitted with *wooden* connecting rods, same as is the practice with western river steam boat engines, which are of comparatively large size, ten and twelve feet stroke in many cases.

Let James Rickard, page 262, console himself with the reflection that *all* notable improvements in machines have been the work of the "clever devils." The "sound engineer" is of necessity bound to current practice, otherwise he is not a "safe" man; his work must not fail—hence he is forced to follow precedent. James Watt was a "clever devil," who ruined all his friends, and after ten years of heart-breaking work with the steam engine wrote that "it was buried," and he hoped it would "sleep in quiet." Ericsson was another "clever devil," who came to America with the screw propeller after the British Admiralty declared it was no good for marine propulsion, and who, later, saved our American Union with his "Monitor," which our own navy officials refused to build because it was a certain failure, and which was built and did save the Union, only because some New York merchants backed Ericsson and the "Monitor" to win, and the "clever devil" did win. I assert here and now that the "clever devil" will certainly be the author of the final motocycle types, notwithstanding the somewhat disproving advances made by Thomas H. Parker, who, in spite of his formidable handicap of "M.I.C.E.," is unquestionably capable of independent thought.

And for some years to come no autocar factory can hope for continued success without a constant and large expenditure for experiments looking towards the final types of mechanical waggons. The day will come when the automobile will stand where the bicycle stands now, in unimprovable form. There will be, perhaps always, a question between chain-driven and gear-driven road waggons, and the motocycle must have a great variety of forms to meet its various kinds of service, and in this particular will differ from the bicycle. The type of motor will finally become standard, without doubt, and certain forms of chains and certain organisations of gearing will be recognised as superior to any others. But it is a long way from the present to the time when any manufactory can say, "We rest; here is our waggon, take it or leave it." True, some makers have automobile orders far in advance. Why? Simply because they are afraid to lay down a plant sufficient to meet the present demand because of the faults of their product, better known to themselves than anyone else. It would be no trick at all to lay down a plant to produce fifty waggons per day, and orders will not be booked months in advance with makers who have confidence in their own productions. But so long as a maker is daily expecting a better vehicle to appear, it is, of course, not to be supposed that he will go to a large expense to meet a demand which may not hold, and probably will not hold, for any considerable time, and may cease at any instant.

New York, April 10th. HUGH DOLNAR.

PRACTICAL EXPERIENCES.

[708.]—I am surprised that many owners of Benz cars find so much fault with them.

As a second-hand car became my property last August I should like to say a few words.

Since then I have run it 988 miles (previously it could not have run more than 500). I have had very little trouble with it. In October one tyre came off; the wheels were sent to the agent, and the tyres rewired and secured in a different manner at a cost of £1. The brass drums on which the brake bands work were considerably worn when I got the car; they have had wrought iron rings fixed on them. Besides these no other repairs have been required, but a little spare gear has been bought at a cost of about £2. An extra air valve and the self-filler to carburator have been added.

I hold no brief for the Benz car, or am interested in its sale in any way, but if some owners fail to get good results I think the fault must partially lie in themselves, and not in the cars. There are some men I know in whose hands the most perfect car would be a failure.

JOHN HENRY KNIGHT.

Barfield, Farnham, 17th April.

[709.]—I have been most interested in the correspondence *re* Benz cars, as a friend of mine has just received delivery of a '99 pattern "Ideal."

"Medicus" and others have given some details of their difficulties; the following are our experiences of setting the car going, *ab initio*:

(1.) The top speed belt was so adjusted that the belt was half on the loose and half on the driven pulley when "off," the result being that the fly-wheel could not be moved without moving the car along.

(2.) The platinum wires of sparking plug were touching, therefore no spark.

(3.) Starting handle gearing very poorly fitted, therefore useless. Brass cogs being very soft, and gearing too fine, the teeth stripped and bent.

(4.) Crypto gear almost seized, owing to poor fitting. The keys projected and scored brass disc; the gear was too deep, thus making tremendous noise. When Crypto gear applied, front wheels of car jumped several inches from the ground. Can any of your readers give further information on this point? Lubrication of Crypto difficult to get at. Countershaft had to be removed to readjust Crypto and compensation gear.

(5.) The automatic spirit feed from carburetter would not act. The needle valve had to be reground and adjusted.

(6.) Compensation gear jammed at a certain point; had to file all the teeth and let them into gear. The cogs were quite rough, and had apparently never been finished properly.

(7.) All the valves were rusty, and would not work; had to clean them all. Inlet air valve at back of cylinder spring too weak, badly adjusted; had to fit new spring.

(8.) Exhaust valve spring too brittle; broke after running a few miles.

(9.) Water circulation would not act properly; had to disconnect all the pipes, etc., and clean out before proper circulation took place.

(10.) Horn very pretty, but useless; practically inaudible.

DISGUSTED.

Flashes.

A public motor-car service is about to be established in Grimsby by a local company formed for that purpose.

* * *

A motor-car company has just been formed in Leicester for the establishment of motor services throughout the town and district.

* * *

Mr. Frank Morriss, of King's Lynn, asks us to note that the car supplied to Mr. Ryder, of Grimsby, as recorded in our last issue, was supplied by him.

* * *

Mr. Ryder, of Grimsby, commenced an experimental service with his car on Good Friday, on which day he carried 543 passengers, whilst on Easter Monday his load totalled to no less than 790.

* * *

The example set by Boston, Mass., has been followed by Philadelphia, where the commissioners of Fairmount Park in that city have just issued a regulation prohibiting motor vehicles from entering the park.

* * *

In connection with the cycle show which the German Cycle Dealers' Association is arranging to hold in Leipzig in the second half of October next, one section will be devoted to motor cycles and vehicles. The conditions provide that the exhibits of complete machines will be confined to German and Austrian makers. The exhibits of parts and accessories will, however, be open for foreign makers.

* * *

A shareholder in the London Electric Omnibus Co. writes to one of the financial papers plaintively asking if anyone can tell him where the 'buses belonging to the company can be seen, or if there are any to be seen. He adds that he has written several times asking the secretary, but that he can get no answer to his question, and he thinks, as the L.E.O.C. was formed in May, 1896, there ought to be something to show by now.

* * *

Some years ago the North British Rubber Co. laid a section of hard rubber "paving" at the entrance to the St. Pancras Station. It is laid on a bed of cement, to which it is solutioned. The rubber has been down for nearly twelve years, and has been exposed to very brisk traffic all that time, but no signs of wear or decay are visible. A similar experiment is being carried out at another hotel by the same company, the *porte cochere* being laid with hard rubber sheets about one inch thick. Its great advantage is that it is noiseless, and affords a good grip to horses' hoofs when wet or dry. It would be an interesting experiment to "pave" an ordinary thoroughfare with this material.

THE FRENCH AUTOCAR RULES.

The new laws relating to the mechanical vehicle traffic in France, of which we gave a brief *résumé* a few weeks ago, have just been published, and though it is unnecessary to reproduce in full a document of such great length, it may yet offer sufficient interest to warrant our giving a summary of the various rules. They have been drawn up by a commission composed of members of the Government assisted by some of the leading representatives of the autocar industry, and on account of their completeness the regulations may no doubt serve as a model for other countries where the mechanical vehicle is at present regulated with an excessive regard for the susceptibilities of the noble quadruped. In the first section, dealing with "measures of safety," it is provided that the tanks and pipes containing inflammable products should be so constructed as to preclude any danger of explosion and fire; they must be arranged so as not to present any particular cause of danger, or frighten horses, or give rise to inconvenient smells; the driving gear is to be arranged so that the driver will be able to operate it without taking his eyes from the road; nothing must interfere with the look-out of the driver, and at night-time the indicators should be well lighted so that they may be easily consulted. The car must respond promptly to the steering gear, and be able to turn in a small radius. Vehicles weighing more than 250 kilos. must have reversing gear. Two different systems of brakes are insisted upon, and each must be capable of stopping the car alone. One at least of these brakes should operate directly on the wheels or hubs, and another is required to stop any movement backwards.

The duty of seeing that these constructive details are properly carried out devolves upon the engineers of the Mining Section, and a vehicle may be at any time examined at the request of the maker or owner. In the case of cars manufactured in France, the maker must have all his different types of automobiles—as distinct from each car of a similar type—examined and passed. Cars built abroad must be examined before they are allowed to run in France, and this examination may take place at any part of the country chosen by the owner, as, for example, at the ports of landing. This section is a very important one for autocarists visiting France with English cars, but if they have French vehicles it is only necessary that they possess certificates granted by the makers. When the inspector has examined the car he will draw up two reports, of which one will be given to the maker and the other to the owner. The maker will be able to place on the market any number of a given type which has already been officially passed. On each vehicle there is to be a series number corresponding to the type it represents, and the manufacturer will give to the buyer a copy of the report, and a certificate to the effect that the car is built to that particular type. Each car must have the name of the builder, an indication of the type of car, and a series number, and it must also bear the name and address of the owner. In the event of the engineers of the Mining Department refusing to give a report stating that the vehicle conforms to the rules, the maker or owner will be able to appeal to the Minister of Public Works, who will give a final decision after consultation with the Central Commission of Steam Engines. It may be remarked here

that this week Count de Dion, Count de Chasseloup-Laubat, and Commandant Krebs—that is to say, the leading representatives of the steam, electric, and petroleum car manufacturing industry—have been appointed members of this commission.

The second section, dealing with the putting of cars into circulation, states that the owner of a car must previously send a declaration of his intention to run the vehicle on the public roads to the prefect of the department in which he lives, and a receipt for this declaration will be returned to him. This declaration will be immediately forwarded to the Mining Section. The document must contain the name and address of the owner, and must be accompanied with a copy of the inspector's report stating that the vehicle conforms to the rules. A declaration in one department is sufficient for the whole of France.

The third section deals with the management and circulation of the cars. No one can drive a car unless he has a certificate of capacity delivered by the prefect of the department in which he lives upon the recommendation of the Mining Department. A certificate of capacity will also be required for drivers of motor cycles weighing less than 150 kilos, and this is of particular importance, as up to the present motor cyclists have been exempt from any such regulation. An autocar owner must show, when required to do so by the "competent authorities," his certificate of capacity, and the receipt for the declaration of the vehicle. The different parts of the mechanism, the driving gear, power transmission, etc., must be kept in good condition, and the driver must frequently see that the two systems of brakes act perfectly. The owner must always have perfect control of his car. He is required to slow down the car or stop it when there appears any danger of accident, and the speed is to be reduced to walking pace in narrow or congested thoroughfares. In no case can the speed exceed thirty kilometres in the country and twenty kilometres an hour in the towns, unless under special conditions to be referred to later on. The car must make known its approach when required by the sound of a horn, and at night time it must have a white and green light. The driver is not allowed to leave his car unless he has taken the necessary precautions to prevent accident and suppress any noise from the motor.

The clauses relating to heavy vehicles and road "trains" need not be referred to here, as they are merely intended to regulate public transport, but it may be pointed out that no limit is fixed to the weight of the cars or the length of the "trains." These rules do not apply to trailers weighing 200 kilos and less, which are subjected to the same regulations as ordinary automobiles. Under the head of "general arrangements" it is stated that autocar races can only take place with special permission from each of the prefects of the different departments interested, and at the same time the promoters of a race must apply for the consent of the mayors of each commune eight days before the date of the event. The speed may then exceed thirty kilometres an hour in the open country, but cannot in any case be more than twenty kilometres in the populous centres. In the event of an autocar owner being summoned twice in the course of a year his certificate of capacity may be withdrawn by the prefect with the consent of the Mining Department, and after taking evidence from the owner himself.

In addressing a copy of these regulations to the various prefects the Minister of Public Works amplifies the different clauses and explains the manner under which the rules are to be carried out. As previously explained, a manufacturer need only present for official inspection one carriage of a certain type, and by the word type is meant the arrangement of the machinery, power transmission, brakes, etc., while the carriage work may be varied as desired. The mechanical arrangement, however, must be identical in all the vehicles of the same type, and any variation, for example, in the brakes, would need a special examination. The type, too, may mean the same mechanism of different powers so long as the power is not increased to such an extent as to change the conditions under which the vehicle can be managed. The Minister has entirely condemned the methods of M. Bochet, the former inspector, whose absurd tests smashed up many a car and brought down well-deserved anathemas from the whole autocar community, and the Minister recommends that special care should be taken in dealing with new vehicles. It is, of course, necessary that the brakes should be tested as severely as possible, but in taking a new vehicle this should be done gradually. Several tests should be carried out with varying degrees of severity, reducing the distance covered by the car after the application of the brake until the inspector is able to get an exact idea of the power of the brakes, their rapidity of action, and the way in which the mechanism will stand the strain. The last tests should be sufficiently severe to prove the capabilities of the brakes on the biggest gradients to be met with on the public highways in France. As regards the certificate of capacity, the examiner will have to see if the candidate is able to conduct his vehicle with care, coolness, presence of mind, and whether he has perfect control of the steering lever, and can apply the brakes with sufficient promptitude, while the examiner will have to judge whether the candidate is well up in the rules governing the traffic on the public highways. A distinction is made between the certificates of capacity given to drivers of ordinary autocars and to owners of motor cycles weighing less than 150 kilos. In the latter case the motor cyclist will merely have to manœuvre his machine before the examiner, who will see whether he has perfect mastery of it. With autocars the examiner will take a seat beside the driver, and make him drive at different speeds with turnings, application of the brakes, etc., and put questions to the candidate as to the working of the mechanism, and the measures to be taken to remedy any irregularity in the running of the mechanism which otherwise might leave the vehicle at a standstill. This examination will be of a purely practical character, but in the case of steam cars it will be much more severe, and the examination will be largely theoretical. The certificates of capacity which have already been delivered remain valid, and the owners will not be required to undergo another examination. In concluding, the Minister of Public Works state that the regulations give considerable powers to the inspectors, but in exercising them they should endeavour to conciliate the needs of public safety with the requirements of an industry which is "highly interesting, and merits the most encouragement from the fact that it is only at present in its early stage. Its liberty should only be interfered with when it becomes absolutely necessary to sacrifice it to interests of a more general character."

The following is the wording of the two cards, which must be henceforth in the possession of every chauffeur in France. On the back of one is the statement that a declaration has been made by the owner to the prefect of his department, with his name and address, the type of car and its number, and on the other an announcement that the certificate of capacity is granted to the owner of a certain vehicle specified upon the recommendation of the Government examiner:

RÉPUBLIQUE FRANCAISE.

MINISTERE des TRAVAUX PUBLICS

DÉPARTEMENT. d

CIRCULATION DES AUTOMOBILES

(Décret du 10 mars, 1899.)

RECÉPISSÉ DE DÉCLARATION.

RÉPUBLIQUE FRANCAISE.

MINISTERE des TRAVAUX PUBLICS

DÉPARTEMENT d

CIRCULATION DES AUTOMOBILES

(Décret du 10 mars, 1899.)

Cadre destiné à la photographie du titulaire.

CERTIFICAT DE CAPACITÉ

Valable pour la conduite.

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(1) Désigner la nature du ou des véhicules auxquels s'applique le certificat.

PROJECTED MOTOR SERVICES.

Newcastle-on-Tyne will soon be in possession of a service of motor cars. A company is to be formed with a capital of £40,000 for the purpose of providing the inhabitants of this city with a service of cars worthy of the place. During the last few weeks a car capable of holding eight persons has been on trial, and has given the greatest possible satisfaction. It is the intention of the company, the prospectus of which will be issued within the next few days, to provide twenty cars at first, each capable of accommodating eighteen to twenty persons, and these will ply for hire in the populous routes in the town. Owing to the present muddle over the tram car question in Newcastle, it is expected that the motors will be freely patronised, and that the company, which will receive the support of many of the leading inhabitants, will prove successful.

A syndicate of Sunderland gentlemen has been formed for the purpose of introducing motor car services into various districts on the North-east Coast, the suggested routes including one between the Wearside borough and South Shields, and another between Tynemouth, Seaton Sluice (a coming watering-place), and Blyth. The project is chiefly due to the remarkable success with which the service of motor cars recently commenced in the west end of Sunderland has been attended. At first only one car was run, and it ceased operations at eight o'clock at night. Now, however, there are two carriages running, and the service is maintained up till eleven o'clock at night, so great is the public demand for conveyance in that direction. Silksworth, a pit village near Sunderland, has now a car running to Sunderland.

THE AUTOMOBILE CLUB.

Amongst those recently elected as members of the Automobile Club are the following:

Messrs. J. J. Acworth, Ph.D. (Camera Club), Edward J. Allday, Sidney Atkins, Major H. A. Barclay, J.P., D.L. (Cavalry and North County Clubs), E. Hodson Bayley, J.P. (Reform Club), Ernest M. Bowden, Wm. Bracewell, Louis Brockman, Charles Hartley Burton, Everard R. Calthrop, Archibald Campbell, W. W. Carlile, M.P. (Carlton, Junior Carlton, and Hurlingham Clubs), H. Tyrer Cheswright, Leigh O. Clare, M.P. (Carlton, New University, and St. Stephen's Clubs), Dugald Clerk (Union Club, Birmingham), A. A. Common, LL.D., F.R.S. (Whitehall, Savile, and Savage Clubs), J. A. Cooke (Scarborough Club), W. H. Cox, J.P. (Junior Athenæum and Piccadilly Clubs), Claud Crompton (London Rowing Club), Captain L. N. Hughes D'Aeth (Naval and Military Club), Roger H. Fuller (Royal London Yacht Club and Constitutional Club), John R. Hargreaves, J.P., D.L. (Carlton and Wellington Clubs), William Harper, Professor H. S. Hele-Shaw, M. Inst. C.E., LL.D. (Alpine Club), Lawrence Heyworth, J.P. (Junior Carlton and Junior United Service Clubs), J. J. Hissey (Thatched House, Royal Societies, and Devonshire Clubs), John Hollams, jun. (Conservative and Hurlingham Clubs), William Hurst, M. Inst. C.E., George Iden, A.M.I.M.E., Major-General C. B. Knowles, C.B. (Army and Navy Club), H. R. Langrishe (R.Y.S., Marlborough, Pall Mall, Wellington, Bath Clubs, etc.), John Love, J. M. MacLulich, Percy Mason (St. Stephen's Club), J. A. Mays, E. Grimwood Mears (Authors' Club), the Hon. J. W. E. Montagu, M.P. (Carlton, Beefsteak, Bachelors' Clubs, etc.), E. Campbell Muir (New Oxford and Cambridge and Bath Clubs), J. S. Peters, Montagu S. Pilcher (United Universities, Junior Athenæum, and Royal London Yacht Clubs), W. S. Playfair, M.D., LL.D. (Athenæum Club), Clement A. Poole, John V. Pugh, Bror Rade, Leslie S. Robertson, A.M.I.C.E., M.I.M.E., Edwin H. Roe, Charles H. E. Rush, Right Hon. Earl Russell (Reform and Whitehall Clubs), Edgar Scamell, H. Somers Somerset (Bachelors' Club), Robert Todd (Constitutional Club), A. Torres, Godwin S. Turner, Sir Edgar Vincent, K.C.M.G. (Guards and St. James's Clubs), R. Waddington (Constitutional and City Carlton Clubs), Fredk. J. Walker, J.P., D.L., Louis H. Walter (Royal Societies Club), Bernard Weguelin (Naval and Military Club), Lewis D. Wigan (Junior Constitutional, Wellington, Border, and Edinburgh Conservative Clubs), H. E. Zacharias (Grosvenor Club), Baron de Zuylen de Nyevelt (president of the Automobile Club de France), Professor Wm. Robinson, A. H. Howard (Whitehall Club), H. J. Dowsing, M.I.E.E. (Society of Arts), Arthur Ussher (St. Kildare, Royal St. George Yacht, Kingstown, Hurlingham, and Ranelagh Clubs, etc.), Reginald Donkin, Rev. Arundel Whatton (Oxford and Cambridge Club), George Hibbery Warne, W. Pearman Clarke, J. E. Thornycroft, and H. Niblett.

The Whitsuntide Tour.

Largely by the assistance of Mr. Alfred Bird the route for the Whitsuntide tour has been arranged as follows:

Friday, May 19th.—London to Oxford (fifty-six miles). Start from the club for High Wycombe (thirty-one miles) at 10.30 a.m., *viâ* Horse Guards Avenue, up Parliament Street, Pall Mall, St. James's Street, Piccadilly, into Hyde Park at Hyde Park Corner, straight ahead parallel with Park Lane and Bayswater Road, leaving the park at Victoria Gate, and proceeding along the Bayswater and Oxford Road *viâ* Ealing, Southall (ten miles), Uxbridge (five miles), Beaconsfield (eight and a half miles), to High Wycombe (five and a half miles) (luncheon at Red Lion), leaving High Wycombe for Oxford (twenty-five miles) at 3 p.m., and travelling *viâ* Stokenchurch (seven and a half miles) and Wheatley (eleven and a half miles) to Oxford (six miles).

Saturday, May 20th.—Oxford to Leamington (fifty-three miles). Leave Oxford at 9.30 a.m. for Stratford-on-Avon (forty-two and a half miles) *viâ* Woodstock and Shipston-on-Stour, and after luncheon at Stratford driving *viâ* Warwick for Leamington (ten and a half miles), where the Regent Hotel will be made the headquarters for the next two days.

Whit-Sunday, May 21st (optional).—To Redditch, Alcester, and back (forty-nine and a half miles). Leaving Leamington at 10.30 a.m. *viâ* the Ridgeway for Alcester (thirty-one and a half miles), going by Warwick (two and a half miles), Claverdon (five miles), Henley-in-Arden (four miles), Ullenhall, Ipsley Court, to Redditch (eight miles), and thence *viâ* Headless Cross by the Ridgeway to Dunnington (nine miles), and on to Alcester (three miles) for luncheon, returning from there to Leamington *viâ* Stratford and Warwick.

Whit-Monday, May 22nd.—To Stoneleigh, Kenilworth, Birmingham, Moseley, and back (sixty-one and threequarter miles). From Leamington the party will take the Bubbenhall Road to Stoneleigh Park Lodge (four and a half miles). Then (subject to Lord Leigh's permission) through Stoneleigh Park, leaving by the lodge on the Kenilworth Road to Kenilworth (six miles), and on *viâ* Leek Wootton and Guy's Cliffe (two and a quarter miles) to Warwick (one and a half miles), thence to Birmingham (twenty-one and a quarter miles), where they will lunch at the Grand Hotel, and leaving at 3 p.m. take the Calthorpe Road, Church Road, Priory Road, Edgbaston Road, Russell Road, Moor Green Lane, to Mr. Alfred Bird's "The Firs," Moseley (four miles), where, by the kind invitation of Mr. Bird, afternoon tea will be taken, after which they will take the main Birmingham and Alcester Road until threequarters of a mile beyond the eleventh milestone, turning there to Willenhall, and thence *viâ* Wootton Wawen on to the main Stratford Road, running to Brearley Cross and Norton Lindsay to Warwick and Stratford.

On Tuesday, May 23rd, the party will make the best of their way to London (ninety-four and three-quarter miles), *viâ* Southam (seven miles), Banbury (fourteen miles), Aylesbury (thirty-one and three-quarter miles), Amersham, and Ealing.

The Riker Electric Motor Co., of Brooklyn, have just brought out a new electric delivery waggon.

JUSTICES' JUSTICE.

At the Brentford Petty Sessions last week, before Mr. Montagu Sharpe (in the chair), Sir Geo. S. Measom, and Messrs. A. S. Montgomery, M. Buller, G. Barber, M. Davenport, E. Otter, and G. Gibson, Mr. Chas. Friswell, of Madeley Road, Ealing, was summoned for having furiously driven a motor car at Ealing. Mr. Geo. Skinner, of Woodville Road, Ealing, was summoned for having driven a motor car to the common danger of the public. The summonses were taken together.

P.C. Kimber stated that on March 30th, at 10.20 p.m., he was on point duty at Feathers Bridge, Ealing, when he saw Mr. Friswell, accompanied by a lady, driving a motor car over the bridge. He turned round the corner into the Mall at the rate of twelve to fourteen miles an hour. Fifty yards in front of him two horses attached to a large covered van were proceeding along the middle of the road towards Acton. He passed the van on the near side, causing the horses to shy, and went straight on. Mr. Skinner, who was driving a smaller motor car at a much slower rate, about eight miles per hour, followed him, and attempted to pass the van on the near side. The horses became unmanageable, and went across the road on to the kerb. Mr. Skinner then passed the van on the off side. The horses collided with an electric lamppost, and the driver, Hy. Lacey, was thrown on to the road on his head. The fall was so severe that he was rendered unconscious, and medical assistance had to be obtained. Witness saw Mr. Friswell returning with his motor car some time afterwards, and stopped him, and informed him of the accident. He said that he was not going at more than twelve miles an hour, and that he was not to blame.

Lacey, the driver, and a man who was riding at the back of the van at the time of the accident, corroborated. The latter denied that he was drunk and was strapped on to the van. Asked what became of him at the time of the accident, he replied:

"I saw Lacey pitched off the dickey, and I was up in the air with the horse and four men beside me." (Laughter.)

"What, all up in the air?"

"Yes, and the horses." (Loud laughter.) "It was a great slice of luck that there was no more accident than there was."

"Had you any liquor?"

"I never drink liquor." (Laughter.)

"What is your beverage then?"

"Ginger beer." (Laughter.)

Mark Jarvis, 23, Oak Street, Ealing, said the motor was going at a moderate pace—twelve to thirteen miles an hour.

Mr. Friswell, who went into the box and gave evidence, said that it was impossible to turn the corner at the Feathers Bridge at a quicker rate than eight miles an hour, or the motor would turn over on its side. The car was only geared to run at the rate of ten miles per hour, and he would give £100 to anyone who succeeded in getting it to go faster; it was an absolute impossibility. He passed the van without seeing anything of the accident.

The Bench decided to convict.

P.C. Jones said that in March last Mr. Friswell was fined 5s. and costs at West London for driving a motor tricycle furiously.

The Chairman said the magistrates were of opinion that Friswell passed the van at too quick a pace, and that Skinner should have noticed the horses shy and not have passed. The former must pay a fine of 20s. and costs, and the latter a fine of 5s. and costs.

A MOTOR CYCLIST FINED.

At the Kingston Borough Bench last week, Mr. D. M. Weigel, residing at Manilla Gardens, Notting Hill, was summoned for driving a motor tricycle along the Portsmouth Road on Good Friday at greater speed than was reasonable, having regard to the traffic. There was also a second summons against the defendant, which alleged that he was driving his machine to the common danger of the public. Mr. J. G. Gibb, of Ladbrooke Grove, Notting Hill, was summoned for riding a bicycle to the common danger of the public at the same time and the same place.

P.C. Nicholas said that the defendants came along at a terrific rate—fully eighteen to twenty miles an hour. He called upon them to stop, but they did their best to get out of his way, and would have escaped had there not been several vehicles about. Subdivisional-inspector West said that there were four other witnesses in Court, who would prove that the defendants were travelling at the same speed right away from Richmond Park to the Portsmouth Road. It was one of the worst cases they had ever had in the borough. A young man who appeared on behalf of Weigel said that he was instructed to plead guilty, but Gibb urged that the constable was mistaken in his judgment of the pace.

Alderman F. Gould, the presiding magistrate, said that the motor tricycle was a new difficulty which the Bench would have to deal with. In the case of Weigel, the Bench would inflict a fine of 20s. on each summons, and costs, amounting altogether to £3 14s., and in the second case the defendant would have to pay £1 13s., including costs.

The United States Automobile Co., of Pawtucket, have been recently incorporated with a capital of $250,000 (£50,000) for the purpose of manufacturing electric motor carriages and appliances. The company have taken offices at 623, Atwells Avenue, Providence, R.I.

* * *

Mr. Frank Fred Wellington, of 58, Rosslyn Hill, Hampstead, N.W., asks us to point out that he has no connection whatever with the Wellington Motor Car Co., nor has that company anything to do with the Wellington ignition tube for gas or oil engines, of which Mr. Wellington has supplied over twelve thousand.

* * *

In Dr. Boyton's letter upon "Double Bogie Steering," which appeared in our last issue, the word "fan" in line six of the extract, and "face" in lines ten, twelve, and nineteen, following should have been in each instance "fall." Fall is a nautical term, meaning the end or continuation of a rope after it has passed through a pulley.

* * *

It is stated that a mechanician named Vaucanson was honoured in 1740 by a visit from Louis XV. for the purpose of inspecting a carriage which ran without the aid of a horse or other visible means of propulsion. Two persons in the vehicle made the round of the courtyard to the satisfaction of His Majesty and suite, but, though a promise was secured of Royal patronage, the Academy of Sciences declared that such a conveyance could not be tolerated in the streets, so the scheme had to be abandoned. The motive power was supplied by a huge clockspring, so that only a short journey was possible.

AN AUTOCAR RUN.

The photograph, from which our illustration is made, was taken on Saturday last, at the autocar run organised by Mr. Hewetson. The cars are all of "Benz" make, and include Mr. Butler's two-cylinder doccart. The autocarists were photographed outside the Hotel Blucher, Effingham, near Leatherhead, where they stayed before returning to town.

THE FRENCH MOTOR CYCLE CRITERIUM.

The third annual criterium for motor cycles was run off on Tuesday on the usual route from Etampes to Chartres and back, a distance of one hundred kilometres. Out of fifty entries there were no fewer than forty starters, some of the others being obliged to abstain on account of the machines weighing more than two hundred kilometres. The weather was delightful except for a strong wind, which allowed of very fast times being made in the first half of the journey, when there was a keen struggle between Béconnais, Duanip, Tart, and Teste, but on returning home against the wind much of the advance was lost, though an excellent performance was accomplished by the winner, Teste, on a De Dion tricycle, who covered the sixty-two miles fifty-seven yards in 1h. 56m. 32 3-5s. Tart was second on a Gaillardet tricycle in 2h. 2m. 26s., and Osmont and Bardin followed a few seconds afterwards. There was a large crowd to witness the race. Several new types of motor cycles took part in the event, and we will deal with these in our full report of the contest next week.

The Automobile Club are arranging a club run to Frensham on the 29th inst.

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The Western Morning News is responsible for the statement that since motor car touring has come into fashion coaching has languished more than usual.

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Messrs. Friswell, Ltd., are prepared to let out on hire Benz carriages by the day, week, or month, either with or without a man, and we understand they are doing a very good business in this direction.

* * *

We understand that the refusal of the Birmingham authorities to license the motor cars intended to be put upon the streets of that town by the Motor Touring Co. of Llandudno will result in the winding up of that concern.

The Engineering Magazine for April contains an article on "The Commercial Aspects of Electric Traction in Great Britain."

* * *

The first autocar has visited Keelby. Keelby is a Lincolnshire village near Grimsby, and now Keelby considers itself up to date.

* * *

Messrs. James and Browne, of 125, Buckingham Palace Road, S.W., are making a specialty of fitting light oil-retaining gear cases to motor tricycles, and they inform us that they have met with success in silencing the noise from the teeth.

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A private trial of motor cars took place on Tuesday afternoon at Leicester, and the members of the council who accepted the invitation of the Leicester Motor Car Co., Ltd., seemed to take great interest in the new mode of locomotion. The cars are built by the Daimler Motor Car Co., Ltd., of Coventry, and will seat ten passengers. The engines driving each car are of five and a half horse-power, and are speeded to run at three, five, eight, and twelve miles per hour, and on the slowest speed it is claimed they will ascend a hill one in three and a half. The wheels are fitted with 2½in. solid rubber tyres, all fittings are nickel-plated, and each car is comfortably upholstered. Admission to the car is at the front, so that the driver acts as conductor and collects the fares. The application for license was considered by the Watch Committee on Tuesday evening and granted.

NEW COMPANIES.

LONDON TRACTION HAULAGE CO., LTD. (61,223.)—This company was registered on March 23rd, with a capital of £5,000, in £1 shares, to enter into an agreement with Walter J. Cattermole, for the acquisition of the business carried on by him at Furlong Road, Holloway Road, Islington, N., and to manufacture, sell, repair, let on hire, and deal with traction engines, motor cars, steam rollers, trucks, waggons, etc. The first subscribers (each with one share) are: John T. Chapman, The Laurels, Whittington Road, Bowes Park, agent; Frank Carter, 3, Furlong Road, Holloway Road, N., gentleman; Alfred Aldous, Winchester Street, Basingstoke; William S. Forward, 16, Crane Grove, Holloway, N., builder; John W. H. Brown, 55, Murray Street, New North Road, N., printer; James Jay, Clairville, Park Road, New Barnet, clerk; Walter Novis, 7, Clephane Road, Canonbury, assistant; and Ernest E. Baggs, 79, Queen Street, Cheapside, E.C., chartered accountant. Registered without articles of association. Registered office, Orleston Yard, Orleston Road, Holloway, N.

BEDFORD MOTOR CAR SYNDICATE, LTD. (61,388.)—This company was registered on April 6th, with a capital of £2,000 in £5 shares, to carry on the business of tramway, railway, omnibus, motor car and van proprietors, carriers of passengers and goods, motor car builders and repairers, etc. The first subscribers (each with one share) are: Paul W. Wyatt, J.P., Austin Canons, Bedford; Henry Bacelin, 35, High Street, Bedford, ironmonger; William E. Ison, 49, High Street, Bedford, jeweller; Thomas C. May, 34, The Embankment, Bedford, insurance agent; James C. Walker, The Elms, Newport Pagnell, manager; George C. Walker, 1, St. Paul's Square, Bedford, auctioneer; George Dudeney, Verulam, Rothsay Gardens, Bedford, provision merchant. Registered without articles of association.

JOEL ELECTRIC CARRIAGE-MOTOR AND BATTERY SYNDICATE, LTD. (61,315.)—This company was registered on March 29th, with a capital of £50,000 in £1 shares, to acquire the benefit of certain existing inventions relating to secondary battery plates, electro-motors, dynamos, and dry electrolyte for secondary batteries, to enter into an agreement with the National Motor Carriage Syndicate, Ltd., and to carry on the business of electricians, motor manufacturers, cycle manufacturers, factors and dealers, engineers, machinists, fitters, founders, wire drawers, tube makers, etc. The first subscribers (each with one share) are: A. A. Common, 63, Eaton Rise, Ealing, W., gentleman; A. M. Tod, Trent Cottage, Burton-on-Trent, gentleman; Arthur F. Mulliner, 79, Bridge Street, Northampton, carriage builder; Henry F. Joel, 74, Windsor Road, Forest Gate, E., electrical engineer; F. Wm. Potter, Withylands, St. John's Road, Harrow, engineer; G. de T. E. Duckworth, 22, Hyde Park Gate, W., publisher; Thomas A. Welton, chartered accountant, 22, Palace Road, Streatham, S.W. The first directors (to number not less than two nor more than six) are to be nominated by the subscribers. Qualification, £100. Remuneration as the company may decide.

COULSON'S SYNDICATE, LTD. (61,366.)—This company was registered on April 4th, with a capital of £10,000 in £1 shares, to enter into an agreement with Herbert Maw, of 77, Market Street, Manchester, and to acquire, develop, turn to account, work and deal with any inventions, patents and rights relating to cycles, motor cars, or like carriages. The first subscribers (each with one share) are: Rudolph Hagen, 17, High Street, Sheffield, artist; Ernest Gilman, 150, Myrtle Road, Sheffield, colliery agent; J. R. H. Durant, 24, Chapel Street, Liverpool, manager; Henry O. Coulson, 184, Howard Road, Sheffield, cashier; Wilfrid Gallagher, Rose Bank, Prestwick, Manchester, clerk; James E. Pilling, 27, Leaf Street, Hulme, Manchester, coal merchant; H. W. Jupp, 20, Napier Road, Chorlton-cum-Hardy, Manchester, clerk. The first directors (to number not less than three nor more than five) are Henry Logan, Bertram D. Beever, and Sydney G. Coulson. Qualification £200. Remuneration £150 per annum divisible. Registered office, 77, King Street, Manchester.

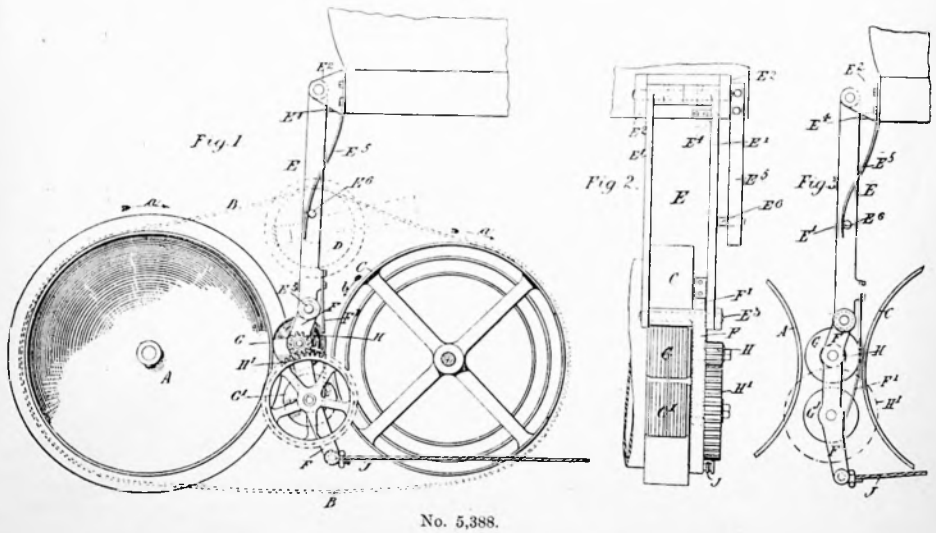
New Patents.

This department is conducted by Mr. G. Douglas Leechman, consulting engineer and registered patent agent, 18, Hertford Street, Coventry; 75, Chancery Lane, London, W.C.; 32, York Street, Dublin; and 9, Exchange Chambers, New Street, Birmingham; from whom any further information respecting patents, designs, and trade marks may be obtained. Any person interested in opposing the grant of patents on any of the undermentioned applications may give notice of opposition in the prescribed form not later than the day appended to each abridgment.

ABRIDGMENTS.

No. 2,910, A.D. 1898, FEBRUARY 4TH.—LUBRICATORS, H. HAMELLE. A rectangular casing is filled with oil and hermetically closed. To the outside of this casing the oil outlets are fitted, and a grooved pulley serves to operate the interior mechanism. This pulley is rotated from the machine through the medium of a cord. Each of the oil outlets is supplied by a separate pump. The apparatus has a spindle operating an eccentric shaft, which in its turn actuates levers, the movement of which is partially transmitted by screw stops to the heads of the pump pistons. During their downward stroke the stops push the pistons downwards, which in their turn force the oil through each escape valve. During their upward stroke the pistons, which are forced back by their springs, return to the end of their stroke and oil again flows into the pump cylinder.

No. 5,388, A.D. 1898, MARCH 4TH.—DRIVING GEAR FOR SELF-PROPELLED VEHICLES, THE BRITISH MOTOR CO., LTD (communicated by the Daimler Motoren Gesellschaft). One of the driving drums A of the vehicle is connected by a belt B to a drum C, which operates the road wheels. A jockey pulley D serves to tighten the belt B when it is desired to drive the drum C from the drum A when the vehicle moves forward. The direction of the rotation which then takes place is indicated by the arrows *a*. The belt B is of course slackened as shown in fig. 1 before the reversing gear is thrown into action. A hanger E comprising two levers E^1 is pivotally suspended in bearings E^2, which are attached to the frame of the vehicle. The lower ends of the levers E^1 are connected by a bolt E^3 serving as a pivot for a bracket F, which is suspended from it. Two rollers G G' are mounted upon the bracket F, and are geared together by means of toothed wheels H H', the diameter of the toothed wheel H being much smaller than that of the toothed wheel H'. The end of the bracket F remote from the pivot E^3 is connected by a wire cable J to a foot or other lever. A stop E^4 attached



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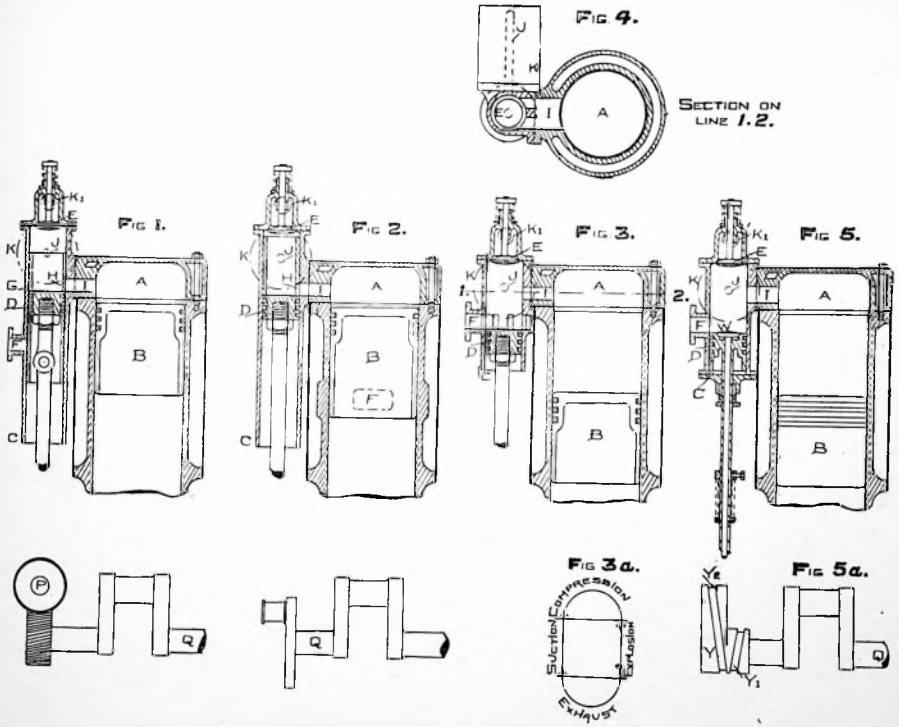
to the bearing E^2 limits the motion of the hanger E in one direction, and a spring E^5, one end of which is also fixed to the bearing E^2, operates upon a pin E^6 fixed to one of the levers E^1, and tends to keep the hanger E against the stop E^4. A spring F^1 carried by the hanger E presses upon the side of the bracket F, so that it opposes the motion caused by a pull on the cable J. When the reversing gear is out of action the action of the springs E^5 and F^1 keeps the rollers G and G' out of contact with the drums A and C. For reversing the motion of the vehicle the belt B is slackened, and the cable J is pulled. This causes the bracket F to move forward against the action of the spring F^1, and brings the roller G' into contact with the drum C. The roller G' then acts as a fulcrum, and a further pull on the cable J causes the bracket F to carry the roller G over into contact with the drum A. The drum A now drives the roller G, and the motion is transmitted through the toothed wheels H and H', and the roller G' to the drum C, which consequently rotates in the direction indicated by the arrow *b*, and drives the vehicle slowly backwards. A modification is described.

No. 20,761, A.D. 1897, SEPTEMBER 9TH.—INTERNAL COMBUSTION ENGINES, J. ROOTS. A relatively small cylinder C is attached for ignition to the cover of the engine with its axis parallel to the working cylinder A, and on one side of it in which a piston D is reciprocated by means of an eccentric on the crankshaft or on a half-speed pin. In the position fig. 1 ignition of the working charge in the main cylinder A has just taken place through the port I, and the piston B moves outward on the working stroke. The piston D also moves outward until the exhaust port F is opened by the piston, bringing its port G opposite F. The working cylinder is then exhausted through the port F; immediately on the closing of port F by the piston D, the suction commences through the valve E, the piston B drawing in a charge of oil vapour and air or air and gas by the port I to the working cylinder. The two pistons then move inward, compressing the charge, and upon the closing of the port I the piston D compresses the charge remaining in the ignition cylinder to a high degree of compression sufficient to ignite it without the assistance of any external heat. For starting the engine an ignition tube J is provided. After the cylinder is hot, the flame heating the ignition tube is turned out, and the charge is ignited by compression in the hollow tubular piston, figs. 1 and 2, and in the ends of the cylinders C, figs. 3 and 5, between the admission valve E and the piston D. In fig. 1 the valve shaft P makes one revolution for every two revolutions of the crankshaft Q, therefore the piston D makes one stroke for every two strokes of the piston B. In figs. 1 and 2 ignition takes place in the cylinder C and within the hollow tubular piston D just prior to highest compression therein, and on the port H opening to the port I the flame passes through and ignites the working charge in the cylinder A. In fig. 2 is shown the arrangement of piston for ignition only when not used as a valve for controlling the exhaust, and when applied to an engine having an impulse every revolution, and firing at every outstroke when the governor does not cut out. The exhaust port shown in dotted lines is in the working cylinder wall at F. In this case the piston D moves almost synchronously with the piston B, and the piston rod of the one may be operated by the piston rod of the other instead of being connected to the disc crank pin on the crankshaft Q of the engine, fig. 2, as both pistons

make the same number of strokes. On the crank side of the piston B in this engine, air is drawn into the crank chamber, compressed therein, and delivered by a connecting pipe through the valve E to the cylinder C, and through the port I to the working cylinder A. In the case of an oil engine the air may be first passed through a closed vaporiser K, figs. 2 and 4, surrounding the ignition tube, thence to the port K' leading to the valve E. On the return of the piston D, fig. 2, the charge remaining in the cylinder C is compressed to a high degree of compression sufficient to ignite it, and when the port H registers with the port I at the highest compression, the flame passes from the cylinder C to the cylinder A. In figs. 1, 3, and 5 the engine is arranged to work upon the de Rochas cycle. In fig. 3 the working piston B is shown shortly after the commencement of the exhaust instroke with the exhaust port F open; both pistons continue their inward stroke so that when the working piston B has reached the end of the instroke, the port F will be covered by the piston D. While the piston B performs the suction outstroke the piston D is moving forward on the instroke, and when the inward compression stroke of the piston B commences the piston D is about to close the port I leading to the working charge. The continued movement of the piston D now compresses to a high pressure the charge remaining in the cylinder C between the piston D and the valve E and ignites it. At the highest point of the compression stroke of the piston B the piston D has again uncovered slightly the port I, and the flame in the ignition cylinder passes to the working charge and ignites it. At the end of the working stroke the piston D uncovers the exhaust port F, and the working continues. In fig. 3A the movements of the pistons relatively to one another is approximately indicated, the line with arrows indicating the movement of the igniting piston, while the lettering shows the corresponding stroke of the working piston. In fig. 4 the piston of the vaporiser K for an oil engine is shown. In fig. 5 an additional valve W is fitted to the piston D, which valve may be used as a gas valve for a gas engine, and is so placed with its spindle in a tubular piston rod that it may be very conveniently governed by the usual mechanism. A cam Y, fig. 5A, is keyed to the crankshaft Q. A slide or a pair of rollers run in the figure of 8 groove cut in the cam, so that the igniting piston may be operated at the desired times. When the slide or rollers are in the centric groove Y^1, the piston valve or igniting piston is not operated, but when the slide moves across to the cam or eccentric groove Y^2 the piston or valve is forced upward to ignite the charge by compression. The diagram, fig. 3A, applies only to the movements of the pistons as shown in figs. 3 and 5. In fig. 2 with a working stroke every revolution, if the engine be used as an oil engine, it will require a closed vaporiser to convey the oil and air under pressure from the pump, reservoir, or crank chamber to the valve E, but in engines upon the de Rochas cycle the vaporiser will be of the Roots open type.



NO. 278, A.D. 1898, JANUARY 5TH.—COOLING WATER DEVICES FOR MOTORS, J. J. H. STURMEY. For keeping cool the cooling water of motors currents of air are passed directly through such water. The power of the exhaust may be utilised for operating the apparatus. A tubular frame or a grid is arranged at or near the bottom of the tank so as to form a chamber having perforations in its upper surface. To this frame or grid is connected a tube passing out of the tank above the water level and communicating at the other end with an air-pump or fan.

APPLICATIONS.

MARCH 6TH TO 25TH.

4,984.—P. M. Justice (Pope Manufacturing Co.), "Improvements in explosion engines."

5,049.—R. Stephens, "Balancing gear for equalising the weight of motor cars or road vehicles."

5,223.—A. G. Brooks (G. Whitney), "Improvements in and relating to motor or horseless vehicles."

5,230.—J. E. Bousfield, "Improvements in petroleum motors."

5,317.—E. H. Hodgkinson, "Improvements in velocipedes, automotor carriages."

5,443.—W. Wilkinson and W. A. Gent, "Improvements in driving gear for road vehicles and the like."

5,599.—W. E. Heyes (J. J. Heilmann), "Improvements in and connected with automobile road vehicles."

5,688.—M. C. Johnson, "Improvements in vehicle driving mechanism."

5,775.—T. Clarkson and the Clarkson and Capel Steam Car Syndicate, Ltd., "Improvements in or relating to steam generators."

5,830.—R. E. Phillips, "Improvements in carburetting apparatus or vaporisers for internal combustion engines."

5,839.—G. H. Condict, "Battery box and tray for motor vehicles."

5,887.—T. Myers, "Improved method of and appliances for varying the speed of motor cars and like vehicles while travelling."

5,992.—R. J. Wilson and A. E. Kitsell, "A liquid fuel water tube boiler for motor cars and steam launches, etc."

6,006.—P. M. Justice (Pope Manufacturing Co.), "Improvements in motor road vehicles."

6,008.—R. Winn, "Improvements in or connected with motor velocipedes and like road vehicles."

6,036.—T. Myers and the Anglo-American Motor Car Manufacturing Co., "An improvement in brake appliances for motor cars and other vehicles and machinery in general."

6,125.—P. M. Justice (Pope Manufacturing Co.), "Improvements in electrically-operated motor road vehicles, a part of the invention being applicable to secondary batteries, and to their charging connections and the connections of same with their motors."

6,136.—G. H. Condict, "Positioning apparatus for motor vehicles."

6,205.—M. Loir, "Improvements in or relating to electric motor vehicles."

6,342.—P. M. Justice (Pope Manufacturing Co.), "Improvements in explosion engines."

6,388.—T. Coulthard, T. Coulthard, jun., J. H. Toulmin, and W. Norris, "Improvements in steam motor vehicles."

6,511.—J. E. Bousfield (Morisse and Co.), "Improvements in automobile vehicles."

Answers to Correspondents.

JOHN HOPE.—Very many thanks for your last.

ALFRED BIRD.—To hand with best thanks. We note.

C. E. S.—We must congratulate you on your happy way of putting it.

HORACE L. ARNOLD.—To hand, with thanks, and contents noted. Very interesting.

J. WILKINSON.—To hand, with thanks, but it is not of sufficiently fresh interest to use.

E. T. A. BOYTON.—Many thanks for yours. We have called attention to the matter.

C. H. GUEST.—Very many thanks. We hope to use your article at the very earliest opportunity.

CANDID.—We quite agree with you, but we do not think any good will be achieved by publishing your letter.

W. CRAWLEY.—The only firm to whom we can refer you is the Joel Electric Carriage Syndicate, 37, Walbrook, E.C.

C. S. ROLLS.—Please accept our thanks for your kind congratulations. The two gentlemen most nearly concerned also ask us to convey their appreciation.

TRIKE.—As we have never used the machine about which you enquire, we are afraid we cannot help you other than by publishing your letter, which we do.

JAMES BROWNE.—The Dunlop tyre should answer well enough for a machine of the weight you name. The Michelin is the one chiefly used on the Continent.

F. W. STODDARD (Sweden).—In both cases the cars used are Daimler vehicles, with Daimler motors, and built by the Daimler Motor Co., Coventry.

F. O. HUGHES.—(1) We have no direct information as to the type of machine used by the German Post Office. (2) We are quite certain it will not, as matters are worse now than they were before. (3) We note your remarks.

T. I. H.—Many thanks for your letter. Sorry to hear of your unsatisfactory experience, also that you failed to get attention from the firm in question. We hope you will soon be able to resume operations, and shall always be pleased to hear from you.

DOCTOR.—(A.) Yes, 15s. for a vehicle with less than four wheels. (B.) This is generally given as £2 2s., that is, tricycle and trailer, but it is an open question whether it should not be 15s. for each machine, as they each have less than four wheels. It most districts it is sufficient to pay for a tricycle alone.

A. L.—In further reply to your query we may say that for an autocar with four wheels, weighing less than one ton, an ordinary carriage license (£2 2s.) is sufficient. Your car comes under this head, so that the tax is still two guineas. Cars weighing over one ton have to pay an additional duty as "light locomotives." That is, in addition to the ordinary carriage license of £2 2s., they have to pay a further £2 2s. if under two tons, or an additional £3 3s. if over two tons; in each case the weight refers to the car unloaded. See an article on the subject in this issue.

LANCELOT WOOD.—If price is no object, yes, undoubtedly. You will see particulars of the license matter in the current issue. If the carriage weighs under one ton without oil and water the tax is £2 2s., but we have never heard of the excise authorities weighing a car, and it may be just as well to be ignorant on the subject. At any rate, we know of one or two whose cars do exceed the one ton limit who are paying the ordinary carriage license of £2 2s. At present the business vehicle is not exempt from tax. Doubtless it will be so (within limits) later on, when the authorities understand that an autocar is not a traction engine.

IMPROVEMENT.—Frames are light enough in themselves, and several light tubular frames are already in use, though, as a fact, the channelled iron frames principally used are actually lighter than the tube frames. There are also several reliable high-speed motors on the market, some of which "could" be sold at reasonable prices, but there is a great deal more in a motor than designing it, and it is impossible for anyone to say anything about the motor until it has been actually made and put to the test. Certainly a four-cylinder motor could not be made "at a more reasonable price than any at present on the market," and we question very much if you will get anyone to assist you without some further information or advantages than those which you can give.

Miscellaneous Announcements.

All advertisements inserted in this column must be strictly prepaid.

Under this head we are prepared to insert advertisements of autocars and other goods for sale, situations vacant and wanted, patent rights, partnerships, businesses for disposal or wanted, and other miscellaneous announcements of a like character. The charge for each insertion is 2s. 6d. for thirty words or less, and 6d. for every six words or less in addition, and a discount is offered of one free insertion in a series of thirteen, i.e., a 2s. 6d. advertisement will be inserted thirteen times for £1 10s., etc. All advertisements or series of advertisements inserted in this column must be strictly PREPAID, *and must reach* COVENTRY *not later than* MIDDAY *on* WEDNESDAY *to ensure insertion.*

Numbered Addresses.—*For the convenience of advertisers, letters may be addressed to numbers at* THE AUTOCAR *Office. When this is desired, 2d. will be charged for registration, and three stamped and addressed envelopes must be sent for forwarding replies. Only the number will appear in the advertisement. Replies should be addressed "No. 000, c/o* THE AUTOCAR, *19, Hertford Street, Coventry," or if "London" is added to the address, then to the number given, c/o* THE AUTOCAR, *3, St. Bride Street, Ludgate Circus, E.C.*

Deposit Department.—*Persons who hesitate to send money to unknown persons may deal in perfect safety by availing themselves of our Deposit System. If the money be deposited with* THE AUTOCAR *both parties are advised of this receipt, and upon intimation of the arrival and acceptance of the goods, the money is forwarded less a charge of 1s. for registration, and a deposit fee of 1½ per cent. on the value of the transaction. All deposit matters are dealt with at Coventry.*

All advertisements inserted in this column must be strictly prepaid.

TRANSFERS for Autocars.—Write for sketch (free) and prices, enclosing wording, to ILIFFE, SONS & STURMEY LTD., Coventry.

JULIUS HARVEY & Co. supply steam, oil, and electric motor vehicles of every description; illustrated catalogues on application.—11, Queen Victoria Street, London, E.C.

DE Dion Motor Quadricycle, in perfect condition, seat two, all accessories, very fast and most comfortable. —W. H. M. BURGESS, 50, Birchanger Road, South Norwood, London.

ARNOLD Car for sale, powerful motor, splendid hill-climber, Brampton chain and wheels, Connolly's tyres, newest improvements, very stylish; £180.—CORNELL, Tonbridge.

CORNELL'S Anti-slipping Belt Dressing, a very little goes a long way, softens leather, grips fully, answers perfectly; in 1s. tins, by post 1s. 3d.—CORNELL, Tonbridge, Kent.

WANTING Cash, will accept £55 for ten £10 fully paid shares in the Daimler Motor Co.; and £40 for one hundred £1 shares in the Motor Manufacturing Co.—No. 1,466.

WHAT Offers for five hundred five per cent. preference shares in the British Motor Co.? Any reasonable offer considered; must sell.—No. 1,467.

WANTED, one or two young gentlemen as apprentices to learn the motor car business.—Apply to F. F. WELLINGTON, 58, Rosslyn Hill, N.W.

FOR Sale, one Daimler Rougemont, fitted with a spare 'bus top for winter use, painted yellow, 5½ h.p., to carry eight to ten persons, grand condition, new last August.—Apply to F. F. WELLINGTON, 58, Rosslyn Hill, N.W.

ONE Daimler Waggonette, to hold eight to ten persons, painted yellow, 5½ h.p., new last July.—Apply F. F. WELLINGTON, 58, Rosslyn Hill, N.W.

FOR Sale, one Daimler Waggonette, a grand carriage, quite new, to be sold cheap, 5½ h.p.—Apply F. F. WELLINGTON, 58, Rosslyn Hill, N.W.

ONE De Dion 1¾ h.p. Tricycle, fitted with detachable front seat, to carry two.—Apply to F. F. WELLINGTON, 58, Rosslyn Hill, N.W.

THREE De Dion Tricycles, in perfect order, only shop-soiled, to be sold very cheap.—Apply F. F. WELLINGTON, 58, Rosslyn Hill, N.W.

DRIVER (understanding repairs), also skilled Mechanic for Daimler motors, wanted.—C. R. Mortimer, secretary, CAMBRIDGE AND EASTERN COUNTIES AUTOMOBILE Co., Cambridge.

DAIMLER Stanhope phaeton for sale, 5½ b.h.p., condition excellent, has travelled two thousand miles in Lake District, trial any time; price 200 guineas.—No. 1,453, *The Autocar* Office, Coventry.

A GIFT.—International Phaetonette, new Ideal tyres, new ignition, in perfect order; price £90 cash; no offers, no exchanges. Golden coin only for a genuine bargain.—21, Priory Street, Coventry.

AUTOMOBILE Carriages for immediate delivery: Panhard & Levassor, Benz, Peugeot, Decauville.—Write for particulars to MR. GEORGE DE LA NEZIERE, 51, Rue Vivienne, Paris.

BEESTON Motor Tricycle for sale, 1¾ h.p., perfect order and condition, complete with all accessories: can be seen and tried by appointment; accept £39.—Particulars, GREGSON, Solicitor, Kirkby Stephen, Westmorland.

BENZ Sociable wanted, any condition.—State lowest price to CHAS. F. MONK, Marlborough Motor Works, 105, North Road, Brighton. Repairs, petrol, and storage for all cars.

BEESTON Motor Tricycle, 1¾ h.p., electric ignition, excellent order, new accumulators; £35. On view business hours; trial by appointment.—CATHCART & Co., 3, Dorset Buildings, Salisbury Square, E.C.

J. SCARBOROUGH, 84, St. Luke's Road, Birmingham, offers Beeston motor tricycle, in perfect order and finish, as new, tube ignition, extra reserve petrol tank fitted; immediate delivery against remittance.

J. SCARBOROUGH, 84, St. Luke's Road, Birmingham offers very fast Bollée, specially silent running, three seated, immediate delivery; also another two-seated Bollée powerful motor, good running order.

J. SCARBOROUGH, 84, St. Luke's Road, Birmingham, offers parcel van, up to 15 cwt., 6 h.p. motor, good appearance, immediate delivery against cash, £150; also Arnold car, for three, equal to new in appearance; delivery at once.

FOR Sale.—Water-jacketted horizontal motor, made from Endurance Company's castings, splendidly finished every respect, sparking plug, lubricators, etc., complete. Any further particulars by post. Offers.—HAYTON, High Street, Wigton.

DAIMLER Phaeton for sale, 5½ b.h.p., near to new, will take any hill, has been running in Lake District and Derbyshire; fittings, electro silver-plated; upholstery, best morocco; owner purchasing more powerful car.—Can be seen at our London Showrooms, 219, Shaftesbury Avenue, London, W.C.

FOR Sale.—Motor van, under frame, with road wheels, eight horse-power double cylinder engine, steering gear, radiators, carburetter, tube ignition; all best workmanship and materials; wants finishing off; intended to carry about 15 cwt. Can be seen in London.—Apply to 5,545, *The Autocar* Office.

BENZ Car Fittings.—Chain lubricators, guards, tanks, extra air valves and cylinder covers, plugs, Deitz lamps, rubber mats, long-spouted oilers that won't leak. Any other fittings quoted for.—Below.

ELECTRICAL Ignition.—Special coils, flaming spark, ignition plugs, portable accumulators a speciality; motors, frames, transmission gears, wheels, etc., manufactured to any specification; enquiries invited; repairs promptly attended to, charges moderate.—F. C. BLAKE, Ravenscourt Works, Dalling Road, Hammersmith, London, W.

EXCEPTIONAL Offer.—New Benz Cars, all our latest improvements, electric light, regulating lever handy, etc. Eclipse cars sold by others for power. £25 worth extra work put in. Sold at usual prices.—HUNTER, Eastdown Works, Lewisham.

EXPERIMENTAL Work, repairs, oil-retaining gear cases for motor tricycles a speciality.—JAMES & BROWNE, 155, Buckingham Palace Road, London, S.W. (near Victoria Station). Telephone 363, Westminster. Telegrams, "Jeminess," London.

ROBERTSON'S, of Eccles, Manchester, are open to undertake at their new works the construction of motor cycles, motors, or specialities; twenty-two years' experience. All appliances at our works.—1, Trafford Road, Eccles. Vacancy for apprentice.

MOTOR Cars.—Wanted, an exceptionally smart man, with a thorough knowledge in the construction of light oil motors, to act as erector and testor; only those of good education and long experience need apply; state experience, age, and wages.—ANGLO-AMERICAN MOTOR CAR MANUFACTURING Co., Halifax.

DRAUGHTSMAN.—Wanted, well-educated man, with exceptional experience in all details relating to the construction of light oil motors and gearing, good position offered to a smart, energetic man, with a thorough knowledge of the trade; state experience, age, and wages.—ANGLO-AMERICAN MOTOR CAR MANUFACTURING Co., Halifax.

"ON an Autocar Through the Length and Breadth of the Land," by Henry Sturmey, being notes on a tour of over 1,600 miles from Land's End to John-o'-Groat's, London, and Coventry, illustrated with thirty-six views taken *en route* by the author. Bound in green cloth. Price 4s. 6d. nett; postage 3d.—ILIFFE, SONS & STURMEY LTD., 3, St. Bride Street, Ludgate Circus, E.C.

THE renowned Delahaye racing car for sale, will take steepest hills loaded with six adults, smoothest and fastest carriage going, will go 120 miles without requiring further supply of spirits or water, fitted with pneumatic wheels, also a set of ordinary wheels; to be seen, tried, and tested.—Apply L'HOLLIER, 6, Bath Passage, Birmingham.

PASSENGER Waggonettes and Char-à-bancs.—We are building these in all sizes to carry from nine to thirteen. Prompt delivery. We delivered the first Bedford car to carry thirteen in three weeks from receiving the order. Passenger services arranged.—For photos and particulars write to SALMONS & SONS, Motor Car Works, Newport Pagnell.

PETROL.—CARLESS, CAPEL & LEONARD, of Hope Chemical Works, and Pharos Works, Hackney Wick, London, N.E., specially distil Petrol, the spirit best adapted for motors, motor carriages, launches, etc., etc. Maximum of efficiency and perfect combustion, therefore great economy and no deposit in cylinders. No smell, no dirt, no trouble. Carless, Capel & Leonard have supplied the above for the Daimler motors for over five years, and hold the highest testimonials. They also supply lubricating oils and greases. Samples and prices on application. Telegrams: Carless, Hackney Wick. Petrol.

SMART Voiturette for sale by private gentleman, for whom it was only recently specially built, practically new, of three-wheeled type (back wheel drives), and suitable for oil, electricity, or steam, carries two, seated side by side, has tubular frame, mahogany body, Dunlop tyres, lamps, etc.; cost, without motor, over £75, price, without motor, thirty-five guineas only. Photo.—No. 1,464, c/o *The Autocar* Office, Coventry.

MATS.—Sole manufacturer of the pure white indiarubber footboard mats; made to any pattern and accurately fitted by experienced workmen. Waterproof aprons, knee rugs, dust covers, waterproof coats, gloves, etc., etc., specially designed for motor car requirements.—Write for new illustrated catalogue, post free, from ALFRED DUNHILL, 145-147, Euston Road, London. Established over a century. Telephone, 568, King's Cross.

FOR Sale, 400 fully paid £1 ordinary shares in the British Motor Company, the parent company owning the patents under which the London Electric Cab Co., the Daimler Motor Co., the Motor Manufacturing Co., the London Motor Van and Waggon Co., the Beeston Motor Co., Humber & Co., the Cycle Components Co., the London Steam Omnibus Co., and other firms are working. Will accept £500, or offers.—No. 32,175 (London).

TO Manufacturers and Syndicates.—Persons desirous of securing land for manufacturing purposes in the Midlands can be suited with from one to twenty-five acres. The land is freehold, well situated for development, in close proximity to the motor-making quarter of the city, within a few yards of the L. & N.W. Ry., and possesses nearly a quarter of a mile of canal frontage. For all particulars apply to McCARTHY & Co., Well Street, Coventry.

NOTICES.

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"THE AUTOCAR" is published every Friday morning in Town and Country, and may be obtained of all Newsvendors and Bookstalls, or delivered first post on Friday, at the following rates:—

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Communications to the Editor should be written on one side of the paper only, and must be authenticated by the names and addresses of the writers—not necessarily for publication, but as a guarantee of good faith.

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Messrs. W. H. Smith & Son take *The Autocar*, and if ordered at one of their bookstalls they will supply it regularly at such place. Anyone not being so supplied should write to Messrs. Smith, at their head office, Strand, London, W.C.

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