

THE AUTOCAR

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

EDITED BY H. WALTER STANER.

No. 426.] Vol. XI. SATURDAY, DECEMBER 19TH, 1903. [PRICE 3D.

THE AUTOCAR.

(Published Weekly.)

Registered as a newspaper for transmission in the United Kingdom.

Entered as second class matter at the New York (N.Y.) Post Office.

EDITORIAL OFFICES:
COVENTRY.

PUBLISHING OFFICES:
3, ST. BRIDE STREET, LONDON, E.C., ENGLAND.

CONTENTS.

	Page
NOTES: REGISTRATION AND LICENSING—AN INSTITUTION OF MOTOR ENGINEERS—RAILWAY RED TAPE	737-739
A 14 H.P. DAIMLER (Illustration)	738
USEFUL HINTS AND TIPS: WET WEATHER WRINKLES	739
THE PARIS AUTOCAR SHOW (Special Report, profusely illustrated)	740-755
CORRESPONDENCE: HIGH VERSUS LOW-SPEED MOTORS—MECHANICAL VERSUS AUTOMATIC VALVES—THE DURYEA CAR—RE-VULCANISING OF MOTOR TYRES HEAVY MOTOR TRAFFIC—FRENCH OVER-PRODUCTION—SIDE-SLIPPING—RECHARGING ACCUMULATORS—THE MOTOR GADABOUT—SOLID TYRES—TYRES—THE OLDSMOBILE—THE CONVEYANCE OF CARS BY RAIL	756-758
"THE AUTOCAR" DIARY	759
FLASHES (Illustrated)	759-760
SOME QUERIES AND REPLIES: AUTOCAR TAXES—THE SECONDARY CIRCUIT—REGISTRATION AND LICENSING OF AN OLD CAR—ACCUMULATOR CHARGING—CHARGING FROM A TRANSFORMER—LAYING UP A CAR FOR THE WINTER—POLE FINDING PAPER... ..	761
THE STANDARD CAR (Illustrated)	762-764
OBJECTIONABLE CLAUSES IN INSURANCE POLICIES	764
THE 12 H.P. DE DION (Illustration)	764
SUGGESTIONS FOR FUTURE TRIALS	765
THE 1,000 MILES RELIABILITY TRIALS: A SUMMARY OF THE MARKS EARNED BY EACH COMPETING CAR	766-771
CLUB DOINGS	771-772

"THE AUTOCAR" SUBSCRIPTION RATES.

British Isles, 16s.; Abroad (thin paper edition), 22s. 8d. per annum.

Notes.

Registration and Licensing.

As all our readers well know, they must on or before January 1st apply to a county or county borough council—not necessarily their own local authority—for registered numbers of identification for their cars and driving licenses for themselves and their drivers where drivers are employed. The point which we wish to urge now is that there should be no attempt on the part of the automobilist to

evade the new regulations, or, perhaps we should say, to hesitate to carry out the provisions of the Act. In the first place, it should be remembered that the regulations are tentative, while the Act itself will only remain in force for three years. The point not generally recognised is that the Local Government Board have power to alter the regulations practically at any time, and while most of the regulations are unnecessary so far as law-abiding motorists are concerned, there is no doubt that under the Act as it stands those regulations might be made very much more stringent than they are—in fact, to some extent the Local Government Board has done the work which should have been done by the House of Lords. That is to say, it has stood as far as lay in its power between the Act, which was the outcome of prejudice and hysteria, and the automobilist, who was in danger at one time of being legislated out of existence. However unnecessary numbers may be, yet seeing that they have been imposed by law, automobilists should make a point of obtaining them with as little delay as possible. Nothing would be more likely to foster the opinion in prejudiced quarters that automobilists were not a law-abiding set of people than that the authorities should have reason to complain that the registered numbers and driving licenses were only taken out under compulsion. We do not believe in the ten miles limit; still less in the erection of notice-boards, but we urge automobilists to drive unselfishly not only in towns, but in villages and on all narrow or winding roads, whether such roads be scheduled or not.

An Institution of Motor Engineers.

Three weeks ago we published a few remarks on the advisability of the formation of an Institution of Motor Engineers. This was before we had received a circular from Mr. J. F. Marshall, of Farrar's Buildings, Temple, E.C. It would appear that this gentleman has gone into the subject very thoroughly indeed. He is most firmly convinced of the necessity for some such institution, and has drafted a remarkably comprehensive and complete scheme, setting forth the lines upon which such an institution should be based. The institution, he suggests, should comprise two sections—(1) A general section and (2) an educational section. The first of these would comprise four divisions—library, reading room, patents department, and lecture room or rooms. The educational section would comprise five principal divisions—a lecture room, or rooms, for classes adapted to the requirements of motor engineering students; drawing office; mechanical laboratory; engineering workshop; and an experimental track for the carrying out of tests of motor vehicles under various conditions—speed and other trials on accurately determined gradients, experiments on brake efficiency, road surfaces, prevention of side-slip, fuel consumption, wind resistance, etc. The proposals have been very favourably received

wherever they have been introduced, but, as is quite natural, there are some people who raise objections. These, Mr. Marshall tells us, are of two kinds—(1) Those who say the Institute of Mechanical Engineers does all that is necessary, and (2) those who maintain that the trials, etc., of the Automobile Club of Great Britain and Ireland sufficiently meet the needs of the case in the matter of experiments. The obvious reply to the former class of objectors is that those who raise objection on that score are either ignorant of the nature and scope of the Institute of Mechanical Engineers, or else they have not carefully read Mr. Marshall's proposals for the formation of a Motor Engineers' Institute. In regard to the second class of objectors, it may be pointed out that the A.C.G.B.I. trials, or trials by any other club, can do no more than draw attention to the defects of finished cars, whereas the primary aim of experimental research, such as would be conducted by the proposed Motor Engineers' Institute, is to anticipate and, therefore, avert such defects in the construction of motor cars. Mr. Marshall has certainly gone into the matter more deeply than anyone else, and he is to be highly commended for his pains. If the Cycle Engineers'

Institute has any intention of moving on similar lines it should announce its intention without delay, or else restrict its operations solely to the cycle. Certainly we do not think there is room for two institutions devoted to the subject of motor engineering. Even if there were, it would still be far better for efforts to be concentrated upon one institution, and the work performed by a single strong society, rather than by two bodies, each of approximately only half the power.

Railway Red Tape.

It is only a short time since that railway companies temporarily instituted absolutely prohibitive conditions with regard to the carriage of petrol. It will now be seen from a letter which appears in our correspondence columns that a most extraordinary clause has been incorporated in the consignment note or bill of lading, which one company requires to be signed by the sender before accepting the responsibility of carrying a motor vehicle. It is not merely a question of safeguarding the carriers against claims for damages to the car, but it is an attempt to coerce the sender into agreeing to indemnify the railway company against all damage or loss which



A 14 H.P. DAIMLER. This car is the property of Mr E. Hutchinson, of Orgreave, Lichfield, and its owner is shown at the helm in our illustration. Since he received it last April, he has driven it some 6,000 miles, including tours in the hilliest part of England, especially the Lake District, as well as one in Ireland. During the whole of the time he has had no trouble with the car, and only two involuntary stops, one for sparking plugs and the other for punctures. He is particularly struck with the hill-climbing powers of the car, and till he took it to Ireland never used the low gear on any hill, and then he only wanted it twice on very steep hills, and although the gradient was too much for the second speed the engine was cutting out all the time on the first. Mr. Hutchinson may be fairly regarded as a Daimler specialist, as he has owned several cars of this make, so that his satisfaction with the quietness and smoothness of running as well as the flexibility of the engine carries weight. Another feature which has satisfied him very thoroughly is the new type of foot brake, not only on account of its power, but because throughout the 6,000 miles he has covered on the car, he has only had to adjust the brakes twice. The ease of control and the wide range of speeds on the top gear enable long drives to be accomplished with the minimum of fatigue, while the comfort of the roomy body is also an important feature in this respect. Like most other Daimler owners, Mr. Hutchinson is an ardent advocate of the curved type of dashboard which has long been a distinctive feature of the Daimler cars.

may arise out of the conveyance of the car, and this despite the fact that all petrol or other inflammables have been removed from the vehicle. The condition that the accumulators shall be discharged or removed, vexatious though it is, may cause a smile, but the idea that the owner or sender of the car should be responsible if the railway companies' servants in unloading it should drop it on to a man's head, or through other clumsiness cause it to inflict damage to person or property, is nothing short of monstrous—in fact, it is so manifestly one-sided that we are constrained to believe that it has been framed in ignorance rather than malice. Mr. Instone's suggestion that the Automobile Club and

the societies connected with the motor industry and trade should approach the railways upon the subject is to the point, and will no doubt be acted upon. We hope also that individual automobilists will do their share. The matter is of importance to them as well as to makers. The average private owner very rarely sends his motor by train, but there are occasions when through lack of time and other causes he is compelled to do this, but if he is to be held responsible for the carelessness of railway officials, over whom he has no control, whose acts may involve him in claims amounting to hundreds or thousands of pounds, he will certainly decline to accept the risk.

USEFUL HINTS AND TIPS.

Wet Weather Wrinkles.

The chains should be run slacker in wet weather than in dry, and should also be given an ample supply of good thick lubricating oil.

* * * *

Clean and remake all electrical connections, particularly those which are attached to the frame or mechanism, painting them over with a coat of shellac varnish as an insulation.

* * * *

A good varnish for the insulation of electrical terminals is made by dissolving some ordinary red sealing-wax in petrol, adding a few drops of linseed oil. Well shake the bottle which contains the mixture, and leave out the cork until the varnish reduces itself to a working consistency.

* * * *

Where a commutator is mounted on the end of a shaft projecting from the engine, short circuits can frequently be avoided by wrapping a piece of worsted yarn around the shaft. This prevents the accumulation of water between the fixed and moving parts of the commutator, thus draining away all liquids and reducing the possibilities of short circuits.

* * * *

It is very necessary to protect the joints of the steering gear, and for this purpose many cars are provided with leather-covered joints. This is a very desirable provision, and one which should be made by all who use their cars irrespective of weather. The joints should be thoroughly washed with a painter's brush and paraffin, and then given a good supply of motor grease, the whole being enclosed in a flexible leather casing, which can be sewn around the joints by any harness maker or shoe repairer.

* * * *

If not already provided with drain holes, the tonneau of the car should have two or three $\frac{3}{16}$ in. or $\frac{1}{2}$ in. holes drilled in the floor board, in such a position that water running from the car body will not project itself upon the rear axle or silencer. A few weeks ago we found it necessary to remove quite a quantity of water from the tonneau of a car by the use of lumps of cotton waste—a long, cold, and wet process, which could have been obviated by the provision of some such drain holes. Needless to say, holes have since been made.

Thoroughly clean the connections at both ends of the carriage springs supporting the vehicle body. Give these a liberal supply of lubricating oil, and later lay a coating of vaseline or motor grease around the joints of the shackles, spring ends, and bolts.

* * * *

A leather flap fastened to the inside of the front mudguards will do much to protect the occupants of the front seat from mud and dirt thrown up by the front wheels. Further, it affords a very efficient protection for the engine and clutch, where it is not possible to provide an apron.

* * * *

Do not allow mud to dry upon the painted and varnish work of the car. It should be removed at the earliest opportunity by pouring water over the dirty parts. On no account should water be dashed violently against the panels; such a practice has the effect of driving the gritty particles of mud into the varnish should this latter be at all yielding. Dry off the wet with soft cloths, and polish the surface with chamois leather. Remember that mud allowed to remain upon paint or varnish invariably results in the spotting and dulling of the surfaces.

* * * *

The universal joints on the propeller-shaft of a gear-driven car should be given special attention during wet weather. While revolving at a high speed it is almost impossible for any water or liquid mud to lodge on these joints, as it will be thrown away by centrifugal force; but when the car comes to a standstill there is always a certain amount of water or liquid mud left around these joints, and unless they are well lubricated this will find its way into the joints and set up a good deal of unnecessary friction and squeaking.

* * * *

When a car has to be driven through the rain a lot of subsequent work and worry can be avoided if all bright parts are given a coat of pure vaseline or rangoon jelly. With such a coating there is no immediate necessity for wiping down and polishing such bright parts, as the grease prevents the rain from spotting and tarnishing, while it may be readily removed at any time. Should any plated parts become tarnished they may be restored to their previous brightness by the use of plate powder and a little liquid ammonia.



OUTSIDE THE GRAND PALAIS, SHOWING HOW THE VISITORS' CARS ARE LINED UP AGAINST THE KERB.

THE PARIS AUTOCAR SHOW.

LAST WEEK WE PUBLISHED A PRELIMINARY ILLUSTRATED DESCRIPTION OF THE SALON IN WHICH WE GAVE PARTICULARS OF THE MAIN CONSTRUCTIONAL CHANGES WHICH HAD BEEN INTRODUCED BY THE CHIEF FRENCH MOTOR BUILDERS. TO-DAY WE OFFER A GENERAL DESCRIPTION OF THE CARS AND ACCESSORIES TO BE FOUND IN THE GRAND PALAIS.

ON Thursday, the 10th inst., at 10.30 a.m., Monsieur Loubet, the President of the French Republic, and the head of the nation, opened the sixth exhibition of automobiles which has been held in Paris. This is not the first time that the President of the Republic has decreed open the doors of such an exhibition, and, in view of the immense encouragement afforded the automobile industry by the State in France, we are tempted to ask, in all loyalty, when an equal British honour may be afforded a British automobile exhibition like that which will open at Sydenham early in the coming year. Visitors from this country who have attended the three last shows held in that magnificent building known as the Grand Palais, in the Champs Elysées, will upon entry fail to notice any vast difference between the exhibition of last year and that of this year, until they turn their attention to the signs set up by the exhibitors, in which they will assuredly note a remarkable all-round improvement. Certain of these were all that could be desired last year, but now that wonderful taste in decorative ornamentation has been freely invoked, the results in colour, form, and lighting on every hand are remarkable. At night, when the building, the signs, and the stands are lit up, the effect is remarkably fine, for, not satisfied with the lighting of last year, the building authorities have traced out the main truss and purlin lines with incandescent lamps of orange and blue. These innumerable lines of warm-coloured light seaming the great dome to its centre, and running up and down the nave, together with huge pendant bunches of the glowing bulbs from the centre of the dome, and from the intersection of the light lines, make one of

the finest efforts in interior illumination it has ever been our lot to see. There can be no complaint as to lighting this year. It is perfect. It would be well for the comfort both of visitors and exhibitors if other things had been done as well. The coarse, pebbly gravel with which the gangways are spread is at once dirty and most tiring. The stuff rises in dust, and very shortly not only covers and dims the beautiful bodywork and glittering chassis on the stands, but goes far to spoil all the effect of feminine finery and the male temper, besides being most irritating to the throat and lungs. The Administration, too, is as hidebound as the directorates of such efforts in France invariably are. Instead of clearing the way before the home and foreign visitor, whose support of the manufacturers makes this exhibition possible, he is hampered and hustled at every turn. The catalogue is a disgrace to the show, and the grouping of the exhibits not much better, when it comes to things other than full dress automobiles. With so much space to spare, it would surely not have been difficult to have so arranged the stands and so prepared the catalogue—which is but an incomplete alphabetical list of the exhibitors' names—so that visitors could have found readily the exhibits they most required to examine, instead of first having to know the name of the exhibitor, and then having to hunt all over the various galleries and halls until they find him. Much foreign business, we are certain, has been lost to the exhibitors of accessories, parts, and partly manufactured goods by the difficulty of digging them out from the general maze. We understand that many of the exhibiting manufacturers are dissatisfied with matters generally, and that a strong

feeling exists that the French motor industry and business should take example by our own, and, following in the steps of the Society of Motor Manufacturers and Traders, run their own show. The total of exhibitors reaches the large number of 815, but many of these, in the main and subsidiary galleries, are small and unknown people.

Mechanical Tendencies.

An inspection of the main exhibits produces the impression that, while the exhibition boasts of nothing startling, there is an all-round improvement in detail everywhere, and a general effort to still further improve the internal combustion engine.

Automatic carburettors.—Last week, in our preliminary description of the show, we mentioned many of the main tendencies in design. Among the less noticeable, though not less important, items, we may note the fact that almost every exhibitor shows some form of automatic carburetter. Last year the Mercedes and Panhard-Krebs were almost alone, though they were quickly followed by the Germain, but now we have a very considerable percentage of carburettors, which automatically increase the air supply with the engine speed, and in a few instances regulate the petrol supply otherwise than by engine suction. It is only fair to say that some of them are untried, and the claims for them have not been proved, though many are exceedingly ingenious, and there is no doubt that they possess real merit in not a few cases.

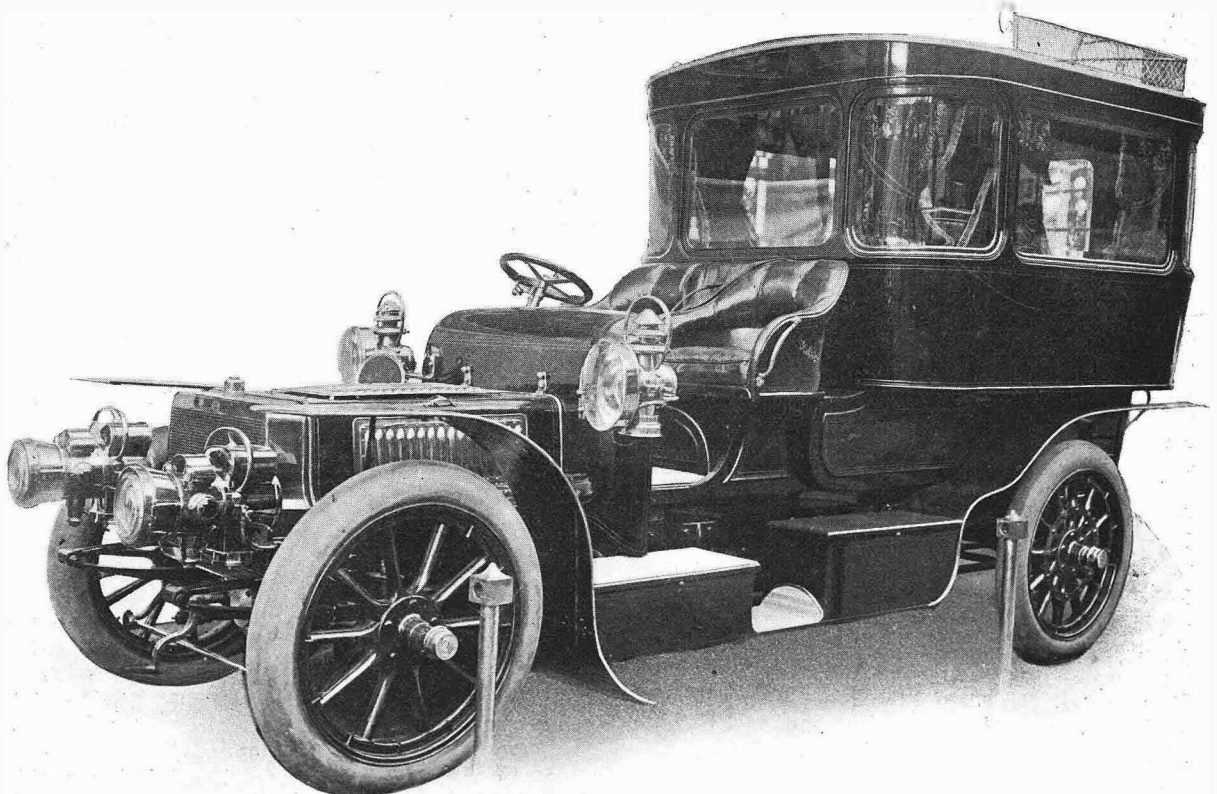
Under protection.—The Darracq and the Decauville are notable examples of the inward extension of the under web of the pressed steel frame on each

side of the car. To these extensions the engine and gear are bolted, and a very efficient support for and protection of the engine is secured, particularly in the case of the Decauville, which, in addition to the extension of the steel framing, also has an aluminium crank chamber, pit for flywheel and clutch, and the bottom of the gear case all in one aluminium casting, nothing else projecting below the frame, and, consequently, fully covering the mechanism. This may be taken as furnishing complete protection. Many makers, however, are fitting aluminium plates to shield the engine and gear, while others are supplying special leather aprons, which, if properly shaped, keep practically all water and mud from the engine. For a car not specially designed for a closed base, these leather aprons are probably the most satisfactory.

Three-cylinder engines are gradually winning their way, and are distinctly more numerous in this year's Salon than they were in the last.

H-section axles, which were first introduced by the Mercedes, are becoming more numerous; so also is the weldless steel tube axle with stamped steel ends. In brakes, the double block type is rapidly gaining ground, so far as the pedal brake on the countershaft is concerned. The rear brakes are often of the expanding type, but whether internal or external, provision is made for keeping them from rubbing when out of action, and for allowing of their proper position being maintained when the axle is shifted back for chain adjustment.

Square-treaded tyres have not gained ground; in fact, they are, if anything, less numerous than they were last year.



The 25 h.p. four-cylinder M.M.C. Pulman-bodied car exhibited at the Salon, and described in our preliminary report

Commutators, though very often fitted to the dashboard for the larger vehicles, are more often than not accessibly placed within the bonnet for the medium and smaller cars. In fact, in some cases, they are put in the Rex position—that is, in front of the frame below the radiator, between the dumb irons, where they are almost instantly accessible.

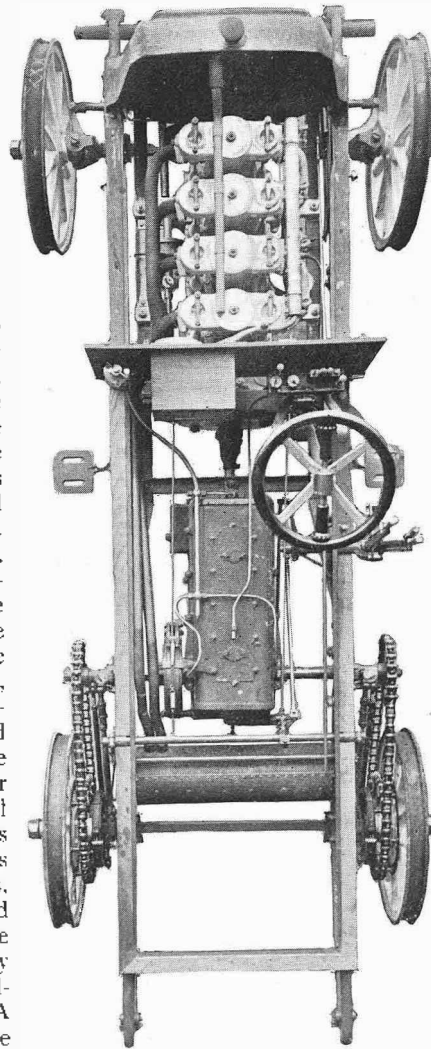
Magneto ignition is becoming more and more general; in fact, the number of machines that are

being fitted with the Simms-Bosch magneto is sufficiently large to excite remark. In very many cases the high tension ignition through accumulator and coil is also provided as a stand-by. There are various combinations, some of which are very ingenious, which permit a common coil and commutator to be used when the magneto is applied in conjunction with a coil and plugs instead of working direct to mechanically-actuated tappets on the low tension system.

THE EXHIBITS.

The Three-cylinder Panhard.

On entering the exhibition, one turns naturally to the exhibit of Messrs. Panhard and Levassor, as that firm must still be esteemed the head and front of the French automobile industry. The 24 h.p. chassis, excellently finished, at once takes the eye, but the engine does not exhibit any striking features over and above those that distinguished it last year. The cylinders are set singly upon the aluminium crank chamber, and have the trebly-fluted sheet brass water jacket covering the whole of the combustion chamber. The valves—both exhaust and induction are mechanically actuated, being set on opposite sides of the cylinders. The circulating pump is now raised to the level of the lower ends of the water jackets, and is placed in a very accessible position, but in this feature Messrs. Panhard and Levassor are by no means singular. It is, as before, driven by a friction wheel in contact with the motor flywheel. High tension ignition is retained, and the Krebs carburetter—unaltered, so far as it was possible to learn or to see—is fitted. The commutator, as usual, is on the dashboard, and is chain-driven, while the draught-inducing fan behind a stack of nested flanged pipe radiators is belt-driven off the engineshaft. The three-cylinder engine, of course, is the most novel feature of the exhibit. This engine has the usual water jackets and automatic induction valves, high tension current ignition, and Krebs carburetter; otherwise the cars do not appear to depart in any special feature from the well-known Panhard practice. A 24 h.p. four-cylinder car, made with a luxurious touring brougham body, attracts particular attention by reason of a hooded dickey seat, mounted high on the centre of the roof of the body. We presume this is intended for the accommodation of servants, and we are bound to say we do not envy the occupants the charm of their lofty position when the car is running fast over bad roads.



Chassis of the 24 h.p. Panhard.

A Geared Clutch.

The Hautier cars offer some interesting features, both in the motor and in the clutch. An independent clutch being used, the heavy flywheel is placed in front of the crank chamber, and a better balance of weight on the crankshaft is claimed. In the higher-powered engines, the make and break for the magneto ignition is most simply obtained by a V-shaped depression in the induction cam, which, operating on one end of a rocking lever permits a spring at the other extremity to give, through this lever, the necessary movement to the ignition rod. An ingenious form of clutch is fitted. The motorshaft has a toothed pinion at its rear end, and the forward portion of the clutchshaft is made with a fork carrying two similarly toothed wheels loose on their studs and meshing with the motor pinion. An internally-toothed ring surrounds these, the internal teeth being in engagement with the teeth of the clutchshaft pinions. The toothed ring or box also runs loose on the clutchshaft. The drive is conveyed more or less to the clutchshaft by the application to the outer periphery of the internally-toothed box of two brake blocks closed on the same by the depression of the clutch pedal, and it is upon the pressure upon the pedal that the slip or otherwise of the drive depends. The reduction from the motorshaft to the gearshaft brought about by this device is five to one. The connecting rods of the engine are made as to their big ends with an ingenious form of channel scoop, which serves lubricant most efficiently to their bearings and to the cylinder walls. The flywheel forward serves also as a fan for air induction through the cellular

type of radiator.

The Aster Engines.

The Aster engines, though exhibiting nothing particularly startling in detail, are very fine examples of engine building, and are fitted with a particularly neat design of plunger throttle-valve. These motors

are fitted with one layshaft only, from which both induction and exhaust valves are operated. The throttle is both governor and hand controlled.

Carburettor Control.

The various exhibits of the Société Peugeot have particular interest for English visitors, their cars being so much appreciated in England, and made so widely known by the enterprise and business abilities of Mr. Chas. Friswell. The 25 h.p. four-cylinder Peugeot, fitted with both high tension and magneto ignition—both variable as to timing—has a carburettor in which the feed of air and spirit is proportionately controlled by hand or governor. A controllable needle valve varying the spirit aperture is ingeniously connected with the gear varying the



The main entrance to the Grand Palais.

area of the air inlets, and these, working simultaneously, are operated as necessary by the governor or by hand from the steering wheel. The timing of the magneto ignition is cleverly effected by the backward rotation of the cam on the layshaft, the earlier or later movement of the lifter effecting the make and break earlier or later. On this car an additional footbrake, fitted to the forward end of the secondary gearshaft, is provided, and the actuation of this brake does not affect the clutch. The side brakes are of the expanding order. The gear box is so fitted that it can easily be taken down without disturbing any portion of the driving gear. The entire mechanism is lubricated from an oil box on the dashboard, whence oil is delivered by a special pump through various leads to all the bearings. The two-cylinder 7 h.p. car is a vehicle which is certain to attract the attention of those on the look-out for a medium-sized car on this side of the Channel. It is provided with mechanically actuated valves, set on opposite sides of the cylinders, variable magneto and high tension ignition, and a similar automatic carburettor to that fitted to the car referred to above, the chief differences therefrom being a wood and steel-fitted frame, the possession of a powerful foot-applied band brake on the bevel pinion shaft, the drum of which is formed with an internal ratchet to serve as mechanical sprag by means of a pawl controlled from the seat. All the shaft bearings have ring chain lubricators. The driving wheel brakes are applied by means of a deep compensating draw-bar placed across the car, and to which the pull of the

brake lever is applied centrally by a pivoted rod. Marked progress is noticeable throughout all the car mechanism exhibited by the Peugeot Co. It is hardly necessary to add that cellular radiators with an induced draught are fitted throughout.

The Henriod Change-speed Gear.

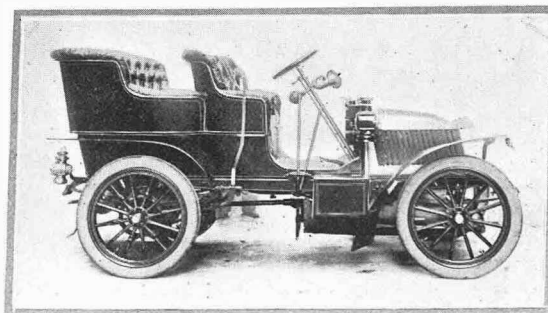
The Henriod exhibit is interesting by reason of the fact that the whole change-speed gear is removed to a large aluminium casing surrounding the live axle. The secondary gearshaft is carried in bearings contained in the gear case, and the sliding sleeve of the gear travels on a squared portion of the live axle. The differential gear is set to one side, the drive from the engine coming centrally on to a bevelled toothed ring from the propeller-shaft. Several cars of powers varying from 6 h.p. to 24 h.p. are shown so driven. It is difficult to see what is gained by the transposition of the change-speed gear, as it is almost an axiom that the less weight mounted on the unsupported portion of a live axle the better. However, the work is excellent throughout. M. Henriod claims that the gear so placed is beyond all possibility of twist or torsion from any frame deflection.

The Automotrice Clutch.

The chassis found at the stand of the Société l'Automotrice exhibits a clutch upon Mercedes lines, but has the coil tightened on the clutchshaft pulley by the early entry of a small leather covered friction cone into a corresponding cone formed in the rim of the flywheel, within which the metallic coil clutch is placed. The entry and withdrawal of the friction cone is controlled by a pedal in the usual way, and it is only when this cone is rotated by the flywheel, and the coil spring wound upon the clutchshaft pulley, that the motor and gear are connected up. Two compensated foot applied band brakes are fitted to the countershafts of these chain-driven cars, which have also an automatic carburettor, the details of which could not be afforded us.

The Argyll Exhibit.

The chief feature amongst the exhibits of the Hozier Engineering Co., of Glasgow, is the three-cylinder Argyll car, built with Ω -shaped steel frame, which is formed at the ends of the longitudinal members, with pockets to take the ends of the springs. The chassis shows, of course, the now well-known Govan gear, which attracts much interest amongst the visitors to the show. The 10 h.p. Argyll two-cylinder and the 16 h.p. four-cylinder are also shown, and compare both in finish and design most excellently with any of their neighbours. An



The 10 h.p. two-cylinder Argyll tonneau.

oil painting, by D. Murray, exemplifying the *entente cordiale* between the English and French automobile interests, in which a French bloated *ouvrier* is clasping hands with a British overalled artisan, attracts much notice. We hope to deal more fully with the 1904 Argylls at an early date. They are fully worthy of special mention.

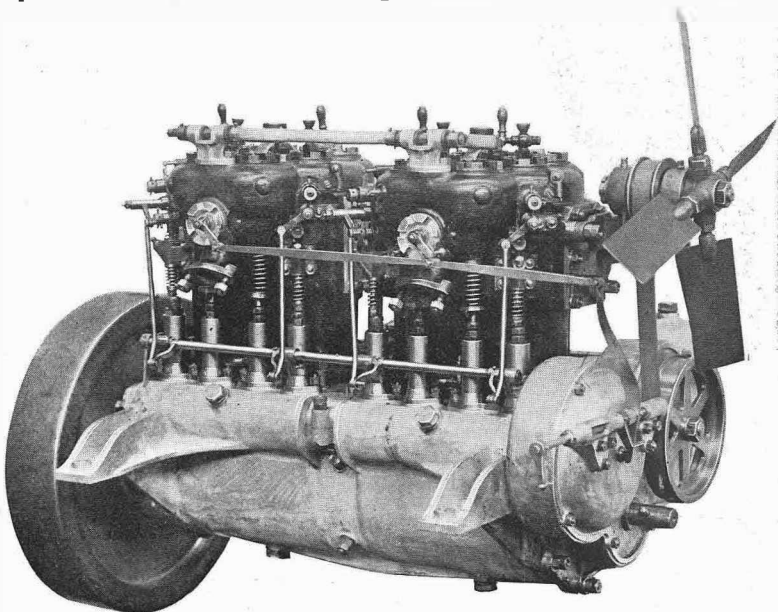
De Dietrich Details.

At the De Dietrich exhibit we were pleased to receive the personal conduct of the ever urbane Mr. Chas. Jarrott, who, first drawing our attention to that grand example of automobile building—the 35 h.p. four-cylinder De Dietrich—pointed out the new features which will distinguish the 1904 car. In the first place, the vehicle has now a well-designed stamped steel frame. The motor is fitted with mechanically actuated induction and exhaust valves, and in place of gravity the car has now pressure petrol feed to the carburetter, with special non-return and bypass valve in pressure pipe. The clutchshaft and gearshaft are now connected by a well-designed double link universal joint, and this is so fitted that the detachment of two nuts permits the withdrawal of the male cone of the clutch for any required attention, and this without disturbance of any other member. An alteration in the disposition of the De Dietrich clutch spring is also observable. It will be remembered that this spring has hitherto been set perpendicularly, but now the arrangement is so modified that the spring is placed horizontally beneath the foot-board. The pedal-applied brakes are now of the expanding order, and these are completely cased in, as are also the brakes on the driving wheels. The cutting out of the magneto ignition to one or any cylinders is neatly effected by the rotation of a slotted fibre disc, round which the connections are made. The piston throttle valve on the carburetter, which is governor and hand controlled, is also connected up to and actuated by the clutch pedal, so that the engine is conveniently throttled when changing speed. A strong form of H section front axle is now employed. The De Dietrich retains the radiator tube stacks in front of the bonnet, as these have given such good results in the past. It will be interesting to add that Mr. H. R. Kirk, the well-known Leeds motorist, purchased the 35 h.p. De Dietrich chassis early in the week.

An Improved Car.

The chassis and motors displayed by the Société Georges-Richard are, from the points of view of construction, design, and finish, the equal of anything in the show. The four-cylinder 16 h.p. car is a grand example of automobile mechanism, and we confess to a feeling of surprise at the great strides made by this firm, who are represented in this country by Messrs. Mann and Overton, of 25, Mortimer Street, Regent Street, W. The Georges-

Richard cars now have well designed stamped steel frames, with rear springs set outside on long dumb irons, while the underframe, which is of tube, runs two-thirds the length of the car, and depends from the frame proper by H section cradle slings, strutted from the transverse members of the chassis. A special form of universal joint, with a centrally jointed member, is interposed between the clutch and the gear, which enables either to be simply detached at will, while affording a perfectly flexible connection between the shafts. Circulating pumps are dispensed with, thermo-syphon circulation being depended upon, a tubular flanged radiator being employed, in connection with a cooling fan driven off the engineshaft. By reason of the specially made universal joint above mentioned, the clutch can be quickly dismantled without disturbing any other member. Each exhaust port in the engine has its own single exhaust tube until in rear of the



THE 16 H.P. FOUR-CYLINDER GEORGES RICHARD ENGINE. This engine which has mechanically operated inlet valves on one side of the cylinder and exhaust valves on the other, possesses a special feature which is not shown in the drawing. Four rods will be noticed running up to the magneto from an outside horizontal shaft. This shaft is connected with a small handle in front of the car, and the starting handle cannot be put into engagement with the engine crank axle till the small lever has been pulled back. The pulling back of the lever engages the starting handle with the crankshaft, and at the same time, by means of the rods referred to, retards the ignition so that it is impossible for the person starting the motor to get a back fire shock.

dashboard, when two are combined, and pass to the silencer set across the rear of the frame. From this silencer two splayed tube outlets issue, and the exhaust discharge therefrom is said to prevent the dust rising from the road into the back of the car. When the engine is started up the magneto ignition is automatically retarded, and this also occurs when the clutch is withdrawn. Otherwise, the magneto ignition is constant.

A New Four-cylinder Engine.

The Ader Co., who have hitherto shown only the Ader engines with inclined cylinders, have now, in addition, a vertical four-cylinder engine fitted to a chassis—an excellent piece of workmanship. They retain their separate clutch system, however. The

cars are fitted with magneto ignition, the current being supplied from a new Bassée-Michel rotary magneto, so wound that the current served is of high tension, and a commutator and ordinary sparking plugs are employed. This magneto will give a 12 mm. spark at atmospheric pressure. All the brake drums have blunt wedged-shaped peripheries, the brake blocks being of opposite section, and working in oil-retaining aluminium cases. The Radiator Guetal is fitted in front of the bonnet, the water spaces in which are very ample.

Detail Improvements.

The robustly-constructed Gillet-Forest cars and vans do not show much variation, save that one of the chassis is carried on extensible wheels, the spoke making connection with the steel felloe by means of hexagonal coupling nuts and studs. The clutch and brake pedals on this car, too, are provided with toeclips, very much after the manner of bicycle pedals which should both be convenient and comfortable.

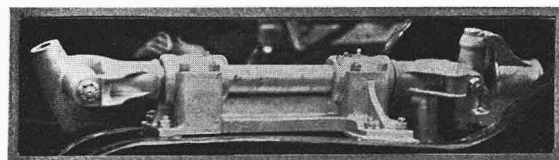
Variable Inlet Valve Mechanism.

MM. Cottureau and Co. make a really fine show with their variously powered cars and chassis. The four-cylinder 30 h.p. engine particularly attracts attention. It is provided with mechanically-operated valves, and both magneto and high tension ignition. A variable lift to the induction valves is used, in which the plunger is formed, as to part of its length, above the cam roller, with longitudinal teeth or grooves into which a long rack rod meshes, the rod running the full length of the camshaft. The plunger rod is formed with a thread in a sleeve which moves vertically, but cannot turn in the guide. The actuation of this horizontal-toothed rack from the steering wheel by means of a central

lever depresses the plunger rods, and so varies the lift of the induction valves at will. The throttle, ignition, and the valve lifts are all controlled from the steering wheel. The single-cylinder 7 h.p. Cottureau, accommodating two passengers, is driven by a single chain from the end of a short countershaft. The motors, gears, and chassis on this stand are well worthy of attention.

A Remarkable Train.

A remarkable exhibit is the Automobile Train *Système Renard*, which occupies a considerable proportion of the floor of the nave. The tractor vehicle in this connection is absent, and some secrecy is displayed in connection therewith, but the method by which the rear wheels of six waggons are mechanically driven, as well as those of the tractor



The universal joint and shaft employed in the Renard train.

itself, is shown. An over-shaft, universally jointed wherever necessary, runs the entire length of the train, and communicates the drive to under-inclined and universally-jointed propeller-shafts appertaining to each vehicle. The drive from over-shaft to under-shaft is through spur gearing contained in a gear box set in the frame of each car. The steering of each vehicle is articulated from each drawbar. The frame of each car is produced in the form of an overhanging bracket to carry the through over-shaft.



THE RENARD TRAIN. This extraordinary collection of passenger vehicles, which is drawn by a 60 hp. Darracq tractor, excited a great deal of attention. Unfortunately the tractor was not exhibited, but only its train.

Combined Ignition.

In the Germain cars it is noticeable that the engines are fitted both with magneto high tension and ordinary plug ignition, the cylinders being fitted with fluted brass water jacket spun on to the cast-iron barrel, as we described in our report of the last Agricultural Hall show. The variable lift of the induction valves, which is obtained by screwed caps on the valve plunger rods, and is controllable from the steering wheel, has been previously referred to in our columns. In connection with the ignition systems, only one coil and one commutator are employed, the ignition being switched at will from the magneto to the accumulator.

A New Contact Breaker.

Prosper Lambert shows in both his 8 h.p. single-cylinder and 12 h.p. two-cylinder chassis a motor flywheel, with a deep rim extension to form the female portion of the friction clutch. The whole driving gear is excellently cased in and protected in this car. The commutator, which is of the spring contact blade variety, has a neat and simple arrangement, by which it may readily be adjusted. The blade is held in a split-headed stud, through which it projects upwards for about an inch. At its upper end two thumbscrews running through suitably placed studs bear against it, and by the adjustment of these set screws, which cause the split-headed stud to take any desired radial position, the exact proximity of the platinum blocks on blade and platinum-pointed screw is determined.

A Departure in Brakes.

Leon Buat shows a chassis which exhibits the tendency to fit two compensated band brakes on to the countershaft of chain-driven cars in lieu of one round the differential gear, and others on the road wheels. A clutch of the internal expanding type is fitted, and I section of rear axle is provided.

The Hotchkiss Car.

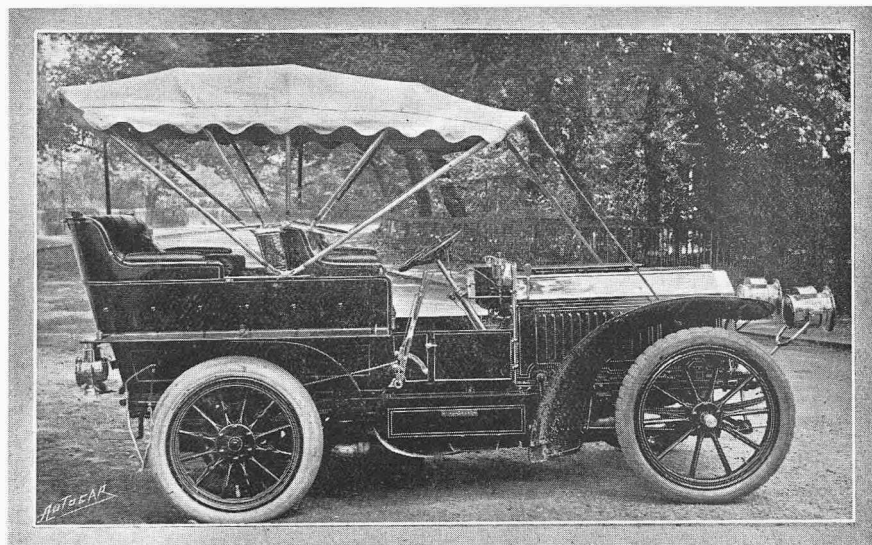
In the point of view of construction and finish, the Hotchkiss chassis are unsurpassed in the Exposition, the cellular cooler and circular bonnet giving these cars as they take the road a particularly smart appearance. The frame is of channel section stamped steel, there being no underframe. The crank chamber and gear box are supported from the frame proper by long stiff-sectioned brackets, which struck us as being hung much too low. Magneto ignition is employed. The double brake block on the rear of the gearshaft is of good design. A huge sheet of looking-glass was placed beneath the chassis, which served to show the underparts of the mechanism to advantage.

A Brevele Stand.

The Delahaye cars are worthy of inspection if only by reason of their stamped steel frame design, which is very deep in the web. There is nothing calling for further notice save a clever arrangement of clamps upon the male portion of the clutch, by which the leather can easily be withdrawn and renewed at will. If the Delahaye mechanism possessed other remarkable features, those in charge of the exhibit seemed particularly desirous of concealing all the points from the information-seeking visitor, and insisting ceaselessly upon the fact of everything being *brevele*.

The Napier Exhibit.

The Napier cars—a 12 h.p., 15 h.p., and 20 h.p., one a chassis and the remaining two fitted with handsome bodies finished in the well-known Napier colours—brook comparison from any point of view



THE 20 H.P. NAPIER WHICH IS SHOWN IN THE SALON. This vehicle, which is nominally of 20 h.p., is really much more powerful, being to all intents and purposes one of the small Gordon-Bennett type of racers fitted with a most comfortable body and a very smart Cape cart hood. It is specially designed for use on the Continent, where the long straight stretches of road permit of very high speeds. At the same time, with its very flexible engine and easy control it can be driven as slowly as wished with the utmost comfort to the occupants.

with anything in the exhibition. The Cape hood over the touring car excites particular interest, for it is at once light, stable, and protective as any canopy-topped body. The distinguishing features of the Napier cars are so well known to those who follow the columns of *The Autocar* in any sense diligently that we shall not detail them here at the present juncture. It is enough to say that the Napiers attract a continuous crowd.

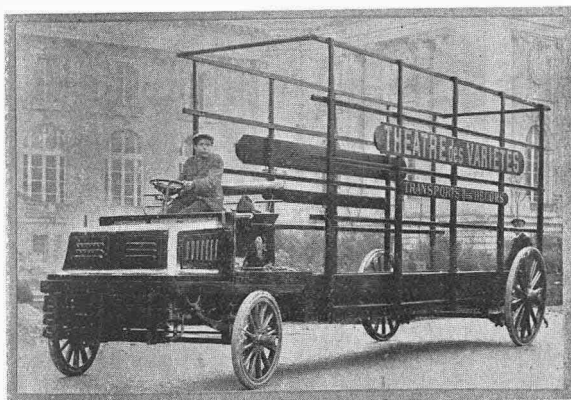
The Mountaineering Car.

At the stand where the Martini cars are staged was laid down a *facsimile* of the permanent way of the Rochers de Naye mountain railway, up and down which Captain Deasy, the British agent for these cars, drove one twice, as was graphically detailed in our columns. The actual car driven stands upon the permanent way, and when the narrow clearance between the wheels of the automobile, the body of the car, and the central duplex rack rail is noted, together with the roughness of

the road, the extreme difficulty of Captain Deasy's feat is more or less realised. The carburettors on the Martini cars are now exhaust jacketed, and the air control of the same is from the steering wheel. Wash-out cocks are fitted to the cylinder jackets and pump; the countershaft runs on ball bearings, and the form of the brakes on the countershaft has been improved. These are additional features since the recent exhibition of the cars in London.

The Magnetic Clutch.

The Pipe cars—remarkable for the fitting of the magnetic clutch, which was fully illustrated and described in detail in *The Autocar* of December 5th, page 684—are fine examples of their class, but we withhold any detailed description of their mechanical arrangements, as a diagram accompanied description of these cars will shortly appear in our columns.



A motor lorry for the transportation of scenery.

An Interesting Exhibit.

The firm of Cycles Clément show a chassis and two or three bodied cars, which are to be handled in this country by Mr. Lancaster, the late engineer to the Automobile Club of Great Britain and Ireland. We enjoyed the advantage of being taken over the four-cylinder 16 h.p. chassis by Mr. Lancaster. The motor is a four-cylinder Aster, with a spacious exhaust pot in gunmetal, into which the exhausts discharge and expand before proceeding to the voluminous silencer beneath the floor of the car. The commutator of the rolling contact type is carried on the forward end of the half-time shaft, and is in a readily accessible position. The engine has mechanically operated valves, actuated by one camshaft on the left of the cylinders, which are set upon the crank-chamber in pairs. In other words, the motor is the latest up-to-date Aster engine. The crank-chamber is carried on a channel steel under-frame, supported from the cambered stamped steel frame by suitable slings. The drive is conveyed to the change-speed gear by means of an internal coned friction clutch on an extension of the flywheel rim; the four-speed gear being of the ordinary type, with direct drive on the top speed. The brake drum on the rear end of the gearshaft is provided with a cleverly designed band brake, made with a simple but effective compensating device for taking up any slackness and providing adjustment. The drum web is cut as an internal ratchet, which with a suitably fitted pawl acts as a mechanical sprag at will. The cardan joints of the propeller-

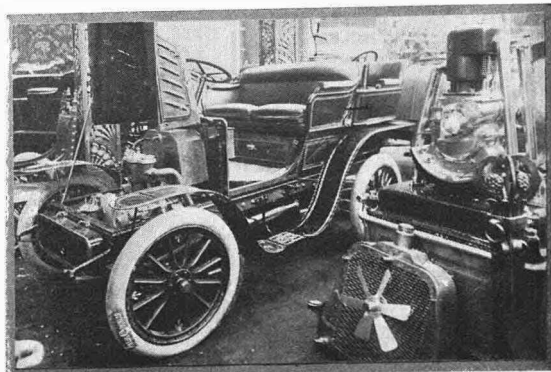
shaft are enclosed in leather grease-filled cases. The bevel pinion driving the live axle is made unusually large and strong. The band brakes on the drums of the road driving wheels are held off the drum when not in use by a spring hanger carried on the axle. The circulating pump is friction-driven off the flywheel, but the friction wheel is covered for all but its point of contact with the flywheel by a cowl-shaped aluminium case. The sleeve carrying the pump spindle from the bracket is pivoted and pressed outward at its rear end by a strong spiral spring, which keeps the friction wheel in contact with the flywheel, the pressure being nicely adjustable. The cars will be made in three types—12 h.p. four-cylinder, 16 h.p. four-cylinder, and 9 h.p. two-cylinder.

A New Lamp Fitting.

The exhibit of Messrs. Charron, Girardot, and Voigt is remarkable for the absence of the six-cylindered chassis, which so particularly distinguished it last year. The motors and general driving gear of the cars staged were fully referred to in our article of last week, but we remarked the fitting of a centrifugal oil pump of considerable dimensions, driven off the engineshaft, and serving to distribute lubricant throughout the mechanical economy of the car. On one of the cars an elliptical "phare" was pivoted on the radiator with its conjugate diameter across the car, and was linked up in the steering in such wise that it turned in equal plane with the steering wheels—a not altogether undesirable effect, as the lamp is always turned at the same angle as the steering wheels. A full-sized section of the crankshaft of a 25 h.p. motor was shown in partial section to exhibit the manner in which the ends of this shaft run in single ball bearings, the balls being over $\frac{5}{8}$ in. in diameter.

The Mercedes.

The Mercedes stand is chiefly remarkable for the staging of Mr. Vanderbilt's 90 h.p. racer, which is built with a hollow rearward sloped dashboard, under which come the flywheel and clutch. The 60 h.p. touring car is provided with a third pedal on the footboard, applying a third block brake upon the forward end of the secondary gearshaft. Otherwise, we did not discern any particular innovations in either engine or drive, but we are given to understand that certain new features for 1904 will be disclosed later.



The 6 h.p. single-cylinder Bayard (see page 750)

The Bollee.

The 24 h.p. Leon Bollée car, shown completed and in chassis, attracted much notice, but we dealt so lately with the salient features of this car and its mechanism that there is no need to repeat that description here, save to say that the vehicles shown were provided with the multiple jetted carburetter referred to in our previous description (see *The Autocar*, pages 514 and 626, Vol. XI.)

Constructional Similarity.

The four-cylinder chassis shown upon the Gladiator stand is practically the same in detail throughout as the four-cylinder Clément, already referred to, as being detailed to us by Mr. Lancaster, save that the drive from the gear box to the road wheels is by countershaft and chains, in lieu of propeller-shaft and live axle. It is excellently designed and made throughout.

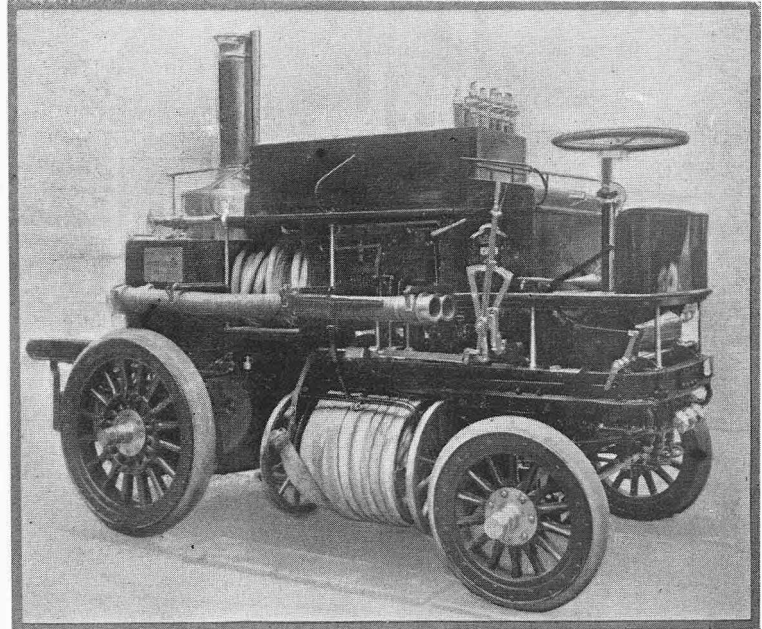
Low Consumption Cars.

A car which is attracting a vast amount of attention from the home and foreign visitors to this exhibition is the 18 h.p. Chenard and Walcker, which is shown in chassis as well as with three specially fitted and handsomely equipped bodies. The Chenard and Walcker engine is still fitted with the unique form of sliding cone, which governs the speed of the engine by cutting down the duration of the lift of the inlet valve, but not the lift itself, which always remains constant. In connection with this governor there is hand and pedal controlled valve lift, which has been improved and sensitised since last year. This car is now provided with a purely automatic carburetter, which responds instantly and absolutely to every variation of the engine speed, and feeds a constantly proportioned carburated mixture to the engine, whatever the demand upon it. In the cooling of this engine the thermo-syphon system has been adopted in connection with a honeycomb radiator, the special construction and cooling area of which was given in our issue of last week. Further, the jawed collars of the cardan joints are formed with segmental faces in contact, which allow of their moving upon each other, permitting any frame deflection without stress upon the driving members. The drive from the speed gear to the road wheels is precisely as last year, viz., through cardanshaft, bevel gear, live drivingshaft, and pinions at end thereof, engaging with the internally toothed drums set on the naves of the driving wheels, which themselves rotate on the ends of the fixed axle, which carries all the dead weight of the car, and receives all the road shocks. The bodies and upholstery of the cars shown are most thoughtfully designed and finished. The double phaeton body with side entrance is most luxurious. A special point, and one which can only be appreciated by actually driving the car, is the control of the maximum speed desired from the rotating lever in the centre of the steering wheel. The lever is so connected to the governor that the car cannot be driven beyond the speed desired, but

that speed can be attained always on the flat, or up and down hill.

Good Constructional Features.

The Decauville cars are all fine examples of automobile construction. The engines have mechanically operated valves, induction on one side and exhaust on the other. The crank chamber and gear box are carried on a steel bed plate, and not aluminium as heretofore. We noticed that the central lines of the cardan joints on the propeller-shaft intersect one another as they should, to be theoretically correct, this being one of the very few instances of such practice in the exhibition. The 12 h.p. and 16 h.p. four-cylinder cars are now fitted with ball bearings to the back axles. The circulating pump is now set on a level with lowest point



A French motor fire engine exhibited at the Salon.

of water circulating in the cylinders. Water test and compression taps are placed in each cylinder. The gusset stiffening of the steering box and of the cylinders is a thoughtful feature in the design.

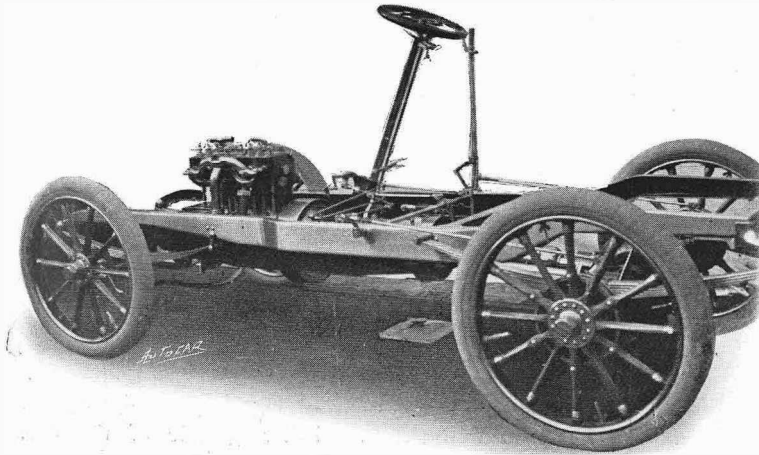
A New Automatic Carburetter.

In the economy of the Herald cars we noticed the introduction of an ingenious automatic carburetter with upper and lower inlets in an air tower, and between these a specially weighted piston, which yields to the increased suction of the engine and, rising in its portion of the cylinder, uncovers additional air ports. The piston is prevented from uncovering more of these ports than is required by a cushion of air about it, the presence of this cushion rendering the piston unaffected by road shocks. A piston throttle valve is also formed in connection with this carburetter, which, in addition to the performance of its regular duty, possesses another and an unusual feature. When the piston valve is so actuated as entirely to throttle the engine, it can be still further drawn back so as to uncover the aperture of a special air pipe, by which the pistons suck into the cylinders nothing but pure air, and no suction takes place over the jet. The rear wheel

band brakes on the Herald cars are fitted with additional radius rods, and are held steady between the flanges of the brake drums by a stay rod rising from the jaw of the lower rod. A particularly well-designed universal joint is introduced between the clutch and gearshafts. The ignition, throttle, and lift of induction valves are all controlled by three central levers set on the steering wheel.

A Special Frame.

The 1904 Darracqs, or at least their special features, were very fully dealt with in our last issue, but this stand is quite worthy of a visit if only for the remarkable stamped steel frame of the chassis.



The 12 h.p. Darracq chassis.

The lower edge of the frame is worked out and produced in a wonderful manner to form the bed plate for both motor and gear box. The frame is narrower at each end than in the centre, where it is fanned out to give space for the flywheel and the members referred to above. The chassis are among the best finished in the show. The same type of frame obtains in the lower as in the higher-powered cars.

Renaults.

The Renault cars of both high and low power attract much attention, but their special features were fully dealt with in our last issue. We noticed, however, that a sheet steel apron is now fitted under the four-cylinder car.

Detail Improvements.

Detail improvements only are discoverable in the case of the motors of the Gobron-Brillie cars, but a jet carburettor of special design is now fitted in place of the mechanical petrol feed for which these motors were once remarkable. The friction clutch is of duplex form, the inner member being of small diameter, and entering its opposite member formed in the flywheel earlier than the main clutch, which is faced with leather in the usual way. This is eminently calculated to avert shock to the gear, and must largely ease the gear change. The cars are splendidly constructed throughout. Rigolly's 110 h.p. hill-climber is on the stand, and excites widespread interest.

A Light Engine.

On the stand of E. Louet is found a six-cylinder engine with mechanically operated valves and two carburettors, one to each three cylinders, but with a common float feed chamber. The 90 h.p. engine is said to weigh 300 lbs. (French) only. The Louet gear, which was illustrated and described in our report of last year's show, is fitted to each of the cars shown, and gives a perfectly free pass through and change of gears.

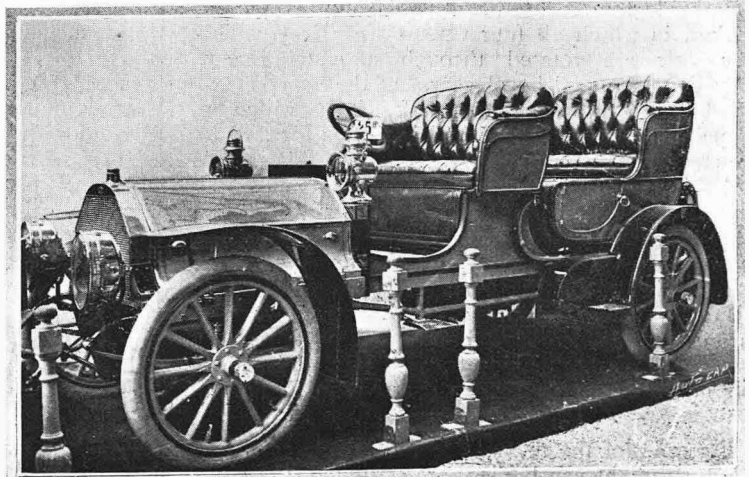
A New Inlet Valve.

The Ducommun 24 h.p. motor is fitted with automatic induction valves made in one piece, the valve ring and guide being formed in halves so fashioned that upon the valve and its seating being withdrawn from the valve box the valve itself can be detached and replaced in a few seconds. This car is provided with a very powerful duplex block brake drum on the rear end of the gearshaft, the blocks being hinged to a bracket below, and applied to the periphery of the drum by means of a left and right-handed screw provided with a central actuating arm, the screws passing through lugs on the upper ends of the brake blocks, and so applying these to the drum. Also a centrifugal pump is placed within the crank chamber, and through suitable leads oil is driven therefrom to all the engine bearings and the cylinder walls. The lower half

of the gear box is made detachable altogether, and can be removed by unscrewing four bolts, leaving the gearshafts, gear wheels, and gear clear for inspection and test.

Benz Improvements.

The Benz-Parsifal cars and chassis mark a great advance in construction. The engines have mechanically-operated valves on both sides of the cylinders, and magneto and high tension ignition. A feature is the tubular front axle, with immensely strong stampings forming the steering centre brackets fitted on to ends of the same. These

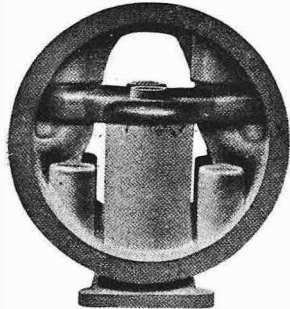


A 25 h.p. Gobron-Brillie car. Note the length of the wheelbase.

stampings are very long in the sleeve on the axle ends. The drive is conveyed to the change-speed gear by a small mechanical expanding segmental clutch of neat design. Both crank chamber and gear box are carried from the main frame by long but well-proportioned brackets, there being no cradle. The frame is stayed transversely by tubular distance-pieces, and altogether is a most creditable production as to frame, engines, and gear.

A Double-driving Six-cylinder Car.

An exhibit of the show is that made by the Dutch firm of Spyker Bros., whose English agents are the Elsworth Automobile Co., of Bradford, Yorks, and who stage two very remarkable cars. The first to come under our notice was the 16 h.p. four-cylinder Spyker, the engine casting of which takes a somewhat remarkable and unusual form, being circular in shape, with embossed plates bolted to each end. The four cylinders and valve boxes are formed in this circular hollow casting, this method being adopted to simplify the water jacket coring, and to get an ample body of water round the valve chambers. The exhaust valves are set on one side



End view of the Spyker water-jacket, showing the cylinder with the inlet and exhaust valves on each side.

and the induction valves on the other, both being mechanically actuated. Two cylinders are cast in one circular envelope, the two castings being flanged on their abutting faces and bolted together. The engine is carried on a bed-plate, which forms part of, and is stamped out with, the steel frame, and has four large and well placed inspection plates to the

crank chamber. The water jacket contains about one and a half gallons of water, and this is, of course, connected up with radiator and pump in the usual way. The gear box is carried on stamped extensions of the frame in a similar manner to the motor, the sliding sleeve of the change-speed gear being actuated by a fixed fork and rack moved by a toothed sector within the box. The other salient remarkable feature of the stand is the six-cylinder Spyker, in which all four wheels are driven. The rear pair are rotated through a clutch, gear, propeller-shaft, and bevel gear, but the gear is provided with an extra gearshaft, from which a propeller-shaft, suitably articulated, runs forward to the steering axle—which is a live axle in this case—and this is fitted with a differential gear and bevel wheel exactly as in the case of its rearward fellow. The steering axle, therefore, drives the steering wheels through ball joints, which permit of them being deflected for the purposes of direction. Mr. Elsworth, who was on the stand, assured us that this car was remarkably handy and proof against side-slip. We are looking forward to a trial run on this interesting vehicle when it arrives in England.

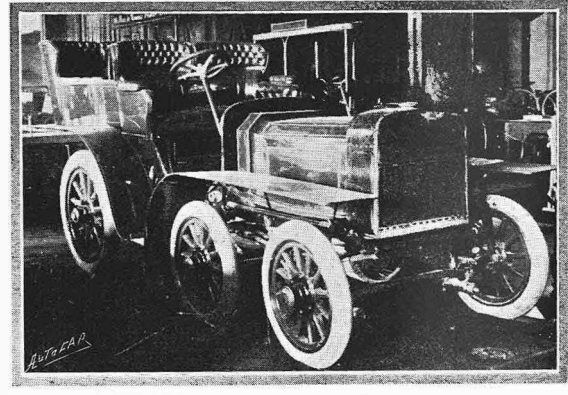
An American Exhibit.

Examples of the natty little Oldsmobile cars, two fitted with light van bodies, are exhibited, the chief attraction being a car which is jacked up, and which has a considerable portion of the cylinder

and valve chamber jackets cut away, thus displaying the relative movements of the piston and valves with their means of actuation, and the ample dimensions of the water jacketing. An electric motor placed beneath the car drives the road wheels, and this portion of the exhibit attracts a crowd of interested visitors all day.

An Unique Car.

The Flexbi bogey steering truck, exhibited by V. Janvier, is one of the most remarked exhibits of the show. It has four steering wheels carried on



The Flexbi bogey car.

spindles set at the ends of a cambered frame rocking centrally on the fixed driving axle of the car. The steering spindles are connected to an articulated steering gear, so that when the wheels are deflected they each take the angle necessary to the curve in which it is desired to turn the car. The longitudinal rocking of each side member, with its respective steering wheel at each end, permits of any wheel or wheels passing over obstacles they may encounter without lifting the car. The maker claims for this arrangement that it is infinitely steadier than the ordinary form, and is proof against side-slip. The steering centres of the wheels are in the hub centres.

Engine Control.

The engines of Mutel and Co. are well known, but those now exhibited at the Salon boast an improvement upon those previously seen, in the shape of an automatic carburetter, in which a double-ended piston with ends separated by a short spindle reposes as to its lower or flotation end in a bulb of mercury, and as to its upper end in a tube perforated with holes of suitable size and shape. The extra suction of the engine lifts the piston and uncovers the additional air ports in suitable proportions. The petrol issue, however, is not controlled.

A New Light Car.

The Bayard cars, save for the single-cylindered 6 h.p. voiturette and the 7 h.p. two-cylinder exhibited by Mons. A. Clement, are the same (i.e., 14 h.p., 20 h.p., and 27 h.p.) as were displayed lately at the Crystal Palace, where they saw public light for the first time. The 6 h.p. engine has a stroke of 120 mm. x 90 mm., and with the change-speed gear, which gives three speeds forward and reverse, is carried on a channel iron underframe. The automatic carburetter is fitted, and the engine is throttle-controlled. High tension ignition is

employed. Expanding brakes are provided both to differential and to rear wheels. A nested flanged tube radiator is fitted in front of the bonnet, and with a thoroughly comfortable, well-hung body this is undoubtedly one of the best light cars in the exhibition.



President Loubet inspecting the exhibits at the Salon.

The 7 h.p. two-cylinder engine has mechanically-operated valves on each side of the cylinders, with high tension ignition, the commutator being most conveniently placed at the end of the half-time shaft. The gear gives three speeds and reverse, and the engine is controlled on the throttle above the automatic carburetter. The pump (gear-driven) is lifted to cylinder level, and is most accessible. A better designed or more comfortable and handy light car for four it would be difficult to find. For full particulars of the higher powered Bayard cars, which have excited general admiration at the Salon for their design, construction, and finish, we would refer our readers to our report of the late National Show. This make is known as the Talbot in England.

Electric Ignition Apparatus.

E. Louet shows an ingenious method of current distribution, which allows one coil being employed for more than one cylinder. In the apparatus exhibited, three cylinders are provided for. The usual commutator is set upon the half-time shaft, as well as another of somewhat more robust construction, to the end of which a terminal for the high tension earth wire from the coil is attached. From the three contact terminals on this commutator high tension wires pass to the ignition plugs in the cylinder, and the high tension current is thereby distributed to its proper cylinder.

The Société d'Electricité "Nilmelior," better known as Bassée-Michel, show an ingenious method of detaching coils from the coil box, singly when it is necessary so to do, and also a most convenient provision of cutting-out studs, which render the holding down of the tremblers when proving cylinders quite unnecessary.

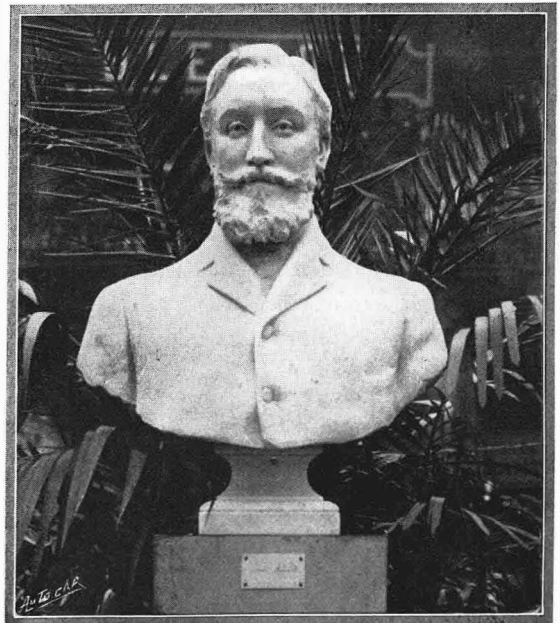
Electrical Transmissions.

Whatever may be said as to the value of electrical transmissions in combination with a petrol motor, there is no doubt that they are receiving a great

deal of attention from manufacturers of electrical vehicles, who are able to make out a very good claim in favour of this new type of car. MM. Ch. Mildé fils et Cie., Rue Desrenaudes, are showing private carriages and delivery vans upon this system. In the brougham, a little 4 h.p. motor is coupled to a dynamo under the driver's seat for recharging the battery, and this can be done either when the vehicle is running or at rest. This arrangement allows of a lighter battery being used, and with the generating plant the weight is the same as the battery alone in the ordinary electric carriages. Moreover, the energy stored in the battery only allows of the vehicle running fifty kilometres, whereas with the generator the vehicle will cover two hundred and fifty kilometres in a day. In the delivery van built for La Samaritaine, and carrying a load of 1,200 kilos., the battery has a capacity of one hundred and ten ampère hours, and is recharged by an 8 h.p. motor and generator. This van, it is said, will carry its full load one hundred and fifty kilometres in a day, the consumption of petrol being four litres per hour. Apart from the reserve of energy available in taking big loads up grades, the makers claim that the petrol-electric vehicle is more reliable than the ordinary type of petrol car, since, if the petrol motor should be placed out of action, there is sufficient energy in the storage battery to propel the delivery van thirty kilometres. A particular feature of the Mildé vehicles is their method of suspension by an arrangement of spiral and leaf springs, which allows of the cars running on solid tyres. That this system is very effective is proved by the fact that the vehicles have been fitted with solid tyres for some years, and there has never been any trouble through deterioration of the batteries.

A New Carburetter.

In the vehicles shown by Brouhot et Cie., of Vierzon (Cher.), the most interesting feature is the

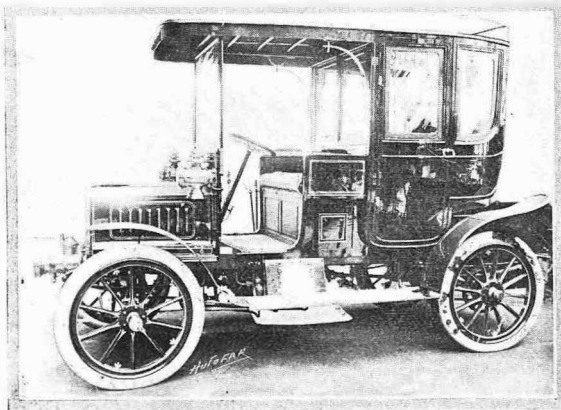


A bust of the late M. Marcel Renault, which was placed in a prominent position in the grand nave of the Salon by the Automobile Club de France

new carburetter, which has been designed to ensure a thorough admixture of petrol and air, and thus secure a perfectly homogeneous gas. The mixing chamber is composed of a vertical and a horizontal tube. Into the vertical tube communicating with the float chamber there fits a disc with which is cast a vertical spindle, carrying three triangular projections like the feathers of an arrow, except that they are placed in such a way that as the petrol sprays through the nozzle it has to pass up above one feather, then down under another, and up again over the third before it can enter the horizontal mixing chamber. In its passage the petrol becomes thoroughly pulverised, and in this state it meets the air coming from the other end of the mixing chamber. The air itself passes through a disc pierced with a considerable number of holes, the object of this being to give it a rapid churning motion, so that in contact with the highly pulverised petrol vapour it becomes thoroughly mixed. The admission of air is regulated by a milled headed screw. The carburetter is warmed by the exhaust, and this can be regulated according to the temperature of the air by allowing more or less of the exhaust to escape free without passing around the carburetter. This is simply done by covering or uncovering ports in the exhaust pipe leading to the carburetter jacket by means of a sliding sleeve. Another novel feature in the Brouhot car is the device employed for preventing jolting due to road shocks. On each end of the back axle inside the frame is a drum, around which is a metallic band sufficiently loose to allow of the free revolution of the drum. This drum is suspended from a steel cable, one end of which is attached to the frame and the other end to a strong spiral spring, to which the required tension is given by a cable passing around a ratchet wheel. With the vertical movements of the road wheels the drums on the axles meet resistances in the steel bands, which give according to the tension of the steel cable and spring.

An Accessible Steam Car.

M. Chaboche, Rue Rodier, has greatly modified his steam car, in which the principal feature is the automatic water, paraffin, and lubricating oil feed under air pressure. He has aimed at rendering everything accessible, and for this reason he now employs a vertical two-cylinder double-acting engine,



The Chaboche steam car. The extremely high finish on the body of this vehicle has caused the opposite stand to be reflected in its panels.

which is placed under a bonnet. A gill radiator is carried in front, and the condensation is so far effective that it is claimed the consumption of water is only ten litres for 100 kiloms. Among other changes is the fitting of a by-pass burner, and a gauge on the dashboard to indicate the temperature of the generator. The Chaboche car is interesting in that its action is absolutely automatic. The vehicles shown are fitted with the 10 h.p. and 20 h.p. engines, the former being specially suited for town use by medical and other professional men who need a silent car.

Three-point Suspension.

The vehicles presented by the Société des Automobiles Belgica, of Brussels, show many departures from the models exhibited last year, when it will be remembered that one of their special features was a three-point connection for the engine and gear, the idea being to take off the mechanism any stress due to frame torsion. The experience of the past year with these flexible suspensions has not been altogether satisfactory, and the firm are now fixing the machinery rigidly to the frame. The engine is carried on three transverse tubes, passing through lugs on the crank chamber. The motor has also been entirely changed, and the cylinders are now cast in pairs without the flat plate head which, if we remember rightly, was characteristic of the old Belgica engine. The position of the valves is altered, the makers now following the growing practice of mechanically operating the induction valve by the same camshaft that actuates the exhaust valve. The propeller-shaft has been abandoned in favour of the chain-drive, and the design of the whole car now runs on the usual lines, with the addition of the well-known Belgica lubricating and other devices which have stood the test of practical working.

An Exhaust-driven Turbine.

The utilisation of the exhaust gases in one way or another has long attracted the attention of engineers, who have felt that the waste heat from the exhaust (representing twenty-five per cent. and ever more of the total developed by combustion) should be made to do useful work. Among the devices brought out for the purpose, one of the most interesting is that shown by the Usine Electro-Mécanique, of Voiron (Isère), in which the gases propel a turbine coupled to a small dynamo. The turbine is carried on a shaft running through the cylindrical silencer, and the exhaust impinges upon it, and on issuing from the centre of the turbine passes along a tube to the other end, and then further expands between the tube and the outer casing before escaping through the holes. The turbine is coupled to a 100 watt dynamo when used with a 6 h.p. motor, though dynamos of greater force are employed with engines developing higher powers. The turbine turns at about 3,000 revolutions a minute. The dynamo charges a small storage battery, which is automatically cut out when the speed of the dynamo falls, such, for instance, as when running downhill. The makers claim that there is no back pressure whatever, and this can easily be conceded, in view of the small resistance offered by a turbine at such a high speed, and, moreover, the churning up of the exhaust ought to contribute to the silent running of the engine. The

energy stored in the battery is used for ignition, electric headlights, and for heating electric foot-warmers. One of these devices was shown at work on a car running outside the exhibition, and, so far as can be judged by results, the system is one that is worth investigation.

A Special Steering Gear.

Tony-Huber, of Billancourt, Seine, has carried out only a few modifications to his car, in which the engine is still built with steel cylinders and copper water-jacket casings, but on the 25 h.p. cars he has replaced the propeller-shaft by chain-drive, though the cardan is still retained for the lighter vehicles. Passy-Thellier, Boulevard Bineau, has hitherto been specialising in the construction of voituresses, which have prominently figured in the different races and trials, and for the first time he exhibits a large vehicle that presents quite a number of interesting points. The worm on the steering-shaft is curved inwardly, so that all the teeth of the sector are in mesh, and while being smooth in action, the arrangement provides an absolutely irreversible gear. The change-speed gear is said to consist of an arrangement of sliding wheels and cams, but pending the conclusion of the patent formalities, the gear was not shown to the public. The clutch is of the internal expanding type, metal to metal, and is entirely enclosed, and runs in oil. The crankshaft, gearshafts, and road wheels all run in ball bearings. Ignition is by the Eisemann magneto.

F.I.A.T. Features.

The F.I.A.T. have several improvements, many of them suggested by the Mercedes practice, notably the pressed steel frame, the honeycomb radiator, and the pressure feed to the carburetter. Its chief novelty is the clutch, about which it was difficult to get any details beyond the fact that the friction cone acts upon a strong spiral spring around a cylinder of tempered steel keyed on to the primary gearshaft. The whole is enclosed, and runs in an oil bath. In a word, it would seem as if motion is given to the gearshaft through a very strong spring.

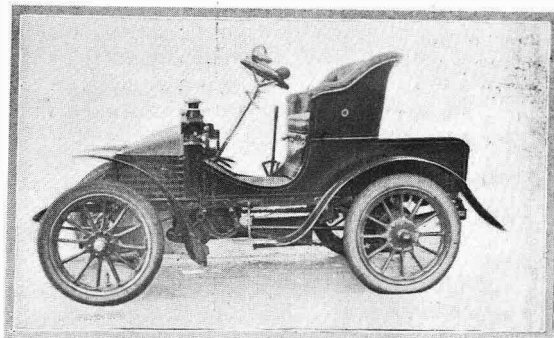
A British Light Car.

The Wolseley 12 h.p. chassis was an example of some of the soundest work in the show, although it had suffered from some days delay in transit and with being exposed to the weather, the coverings provided for it by the makers having been torn off. This chassis is a facsimile of that which made an unbroken series of non-stop runs in the thousand miles trial, and among the features which distinguish it from the 10 h.p., the most prominent is the pressed steel frame. In the details we noticed the substitution of flat springs for spiral springs for the actuation of the exhaust valves, and also that a brake is fitted to the clutch disc, so that when changing up the velocity of the disc is reduced and shock avoided. When changing down the braking action is not wanted, so that the pedal is not depressed quite so far. The silencer is new and very effective, giving constant escape rather than a series of beats. The method of supporting the change-speed sector and of fitting it to the frame is worthy of study. The gear case is now oil-tight, and the top half of it can be entirely removed without upsetting the bearings. The pedal brake no longer works upon a

drum on the countershaft, but is of the internal expanding type in a drum upon the back wheel. On the outside of the same drum the band brake applied by hand is fitted. This, of course, applies to each back wheel.

The New Small Wolseley.

The 6 h.p. two-seated car is, with one or two exceptions, without an equal in the show in its class. That is to say, it is a miniature Wolseley in fact as well as in name. The single-cylinder horizontal engine is placed forward under the bonnet in the usual way, but the tiers of radiators are reduced in



The 6 h.p. Wolseley voituress.

size step by step, so that the bluntness of the front is overcome, and a very neat-looking "bows" secured. The three-speed gear is encased in what is practically an enlargement of the engine crank case, and, through the intervention of an ordinary cone clutch worked by pedal, transmits power by a single chain to the balance-geared live axle. A light sheet metal box entirely encloses the engine and gear from below. The commutator is on the dashboard driven by a chain, and the coil and lubricators are also affixed to the dashboard. An improved form of induction valve is used, and the carburetter has been modified so far as the air supply is concerned. We were most thoroughly impressed with the machine, which is, by the way, thoroughly well tyred, and we hope shortly to report upon it from actual trial.

A Strong Voituress.

While dozens of firms are specialising in the production of cheap voituresses, these vehicles are all built more or less upon the same system, and they often err on the side of excessive lightness. Grégoire et Cie., Boulevard Devaux, Poissy (S. and O.), aim at constructing cheap cars, with a special view to strength, and their 5 h.p. voituress is built upon exactly the same lines as the bigger cars, with steel frames and gears of ample strength, that would apparently stand the hardest work likely to be put upon them. The single-cylinder motor has a mechanically-operated induction valve, and both valves on the top of the cylinder are actuated by stems and tappets from one camshaft. The car has a strong propeller-shaft, and a gear giving two speeds forward and reverse. We mention this vehicle because it is of a thoroughly practical type, and in solidity of construction it is a distinct departure from the general run of voituresses, while it is claimed to be the cheapest car on the market. The carburetter is a novelty, and we hope to give full details of this later. In the big cars, the lubrication is effected by circular pumps, driven in one case

from the crankshaft, and in the other from the differential-shaft. The Fabrique Suisse des Automobiles "Berna," of Berne, exhibit a car propelled by a vertical motor with mechanically-operated inlet valves, but, instead of throttling the admission on the carburetter, the induction valve is given a variable lift, by which it is claimed that the motor gives a very high economy. It is not easy to understand why this should give better results than throttling on the intake, but the figures of consumption given by the makers are certainly remarkably good.

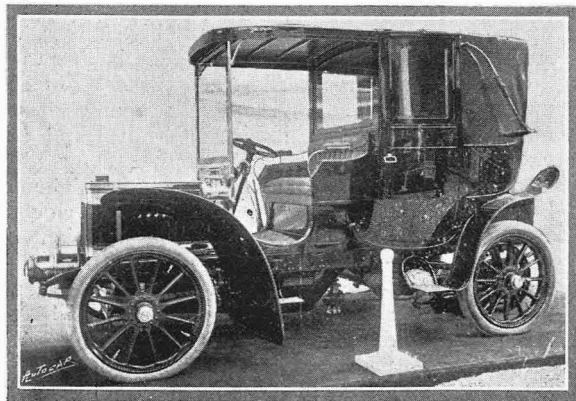
New Change-speed Gears.

On the stand of Méran et Gervais is shown a new change-speed gear with revolver action—that is to say, the gearshafts are carried on a barrel, which is turned to bring the reducing wheel sidewise against the wheel on the primary-shaft, while the reducing wheelshaft clutches by forks on to the drivingshaft. The barrel is turned by a spindle, which is raised by a handle to put a bevel wheel in gear, and is then turned to change the speed gear when the handle is dropped into a notch. The advantage claimed for this device is that, as the gear can be changed from the highest to the lowest without passing through intermediate gears, the car can be driven even though one of the wheels should be broken, and, moreover, the wheels can be replaced with the greatest facility.

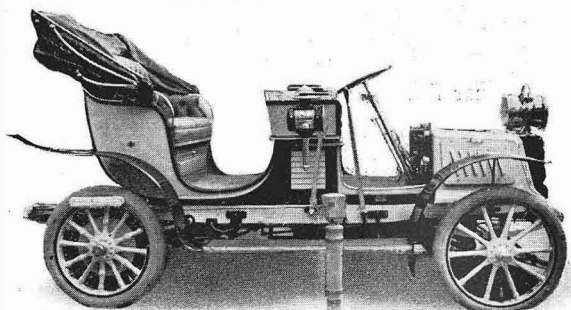
The Denis De Boisse car, exhibited by E. Denis, 38, Rue Chanxy, has been entirely redesigned, and has now little in common with the type of vehicle previously turned out by this firm. Its special feature is the placing of the change-speed gear in a box forming an extension of the differential box, while the live axle on each side of the differential is jointed, so as to take all jolting strains off the gear.

The only Chain Cases.

Many meritorious exhibits in the show were more or less hidden, or, at any rate, difficult to find; in fact, anything which was not in the great nave, stood in danger of being overlooked, and among the exhibits so buried was a 12 h.p. Sunbeam car, in one of the side galleries on the right of the cupola. The four-cylinder 12 h.p. Sunbeam is now too well-known to need description, but we may say that the efficiently fitted gear cases—which entirely cover the chains and protect them from dirt and wet—a pair of which, by the way, ran through the 1,000 miles without giving a moment's anxiety, attracted great



The Krieger petrol electric car with brougham body.



The new 9 h.p. Gardner-Serpellet Simplex

attention, perhaps even more than they have done in England, as it will be seen from the report of the French Show as a whole that the use of chains on the larger French cars is increasing rather than otherwise.

A Comfortable British Car.

The Motor Manufacturing Co.'s Pulman car was one of the most striking exhibits in the show, and probably attracted more attention than any other covered car there. We referred to this last week, but it will be interesting to add that special provision is made for ventilation of the four-seated apartment, for we can call it nothing less. There is a double roof, and so arranged that a current of air passes between the two surfaces, and by opening one or two of the disc ventilators in the inner roof a strong induced current is set up which completely renews the air in the closed portion of the vehicle. Provision is made for warming, and the heated air from the hot-water circulation can be shut off instantly at any time. Every detail of the interior fitting of the body is well considered, and does the greatest credit to Mr. Iden, who designed it and turned it out in less than six weeks. It will be remembered that the glass ends are curved, and that the four corner seats, which are of the arm-chair type, are fitted on pivots, so that they can be turned to any angle most convenient to the users. The wheelbase is 10ft. 3in., and, despite the very commodious accommodation and the 36 h.p. four-cylinder engine, the total weight is, we are informed, only 32 cwt. Another car which attracted much interest on this stand was the 8 h.p. single-cylinder chassis—a *facsimile* of the vehicle which won the gold medal in the recent thousand miles trials.

De Dion Features.

The 8 h.p. De Dion single-cylindered car has in the model shown an arrangement of gear giving three speeds forward and a reverse, while the 10 h.p. and 12 h.p. two-cylindered cars will be seen here by many for the first time. The details of the self-lubrication of both the engine and gear boxes through the medium of rotary pumps fitted in both cases, and driven off the half-time and gear-shafts, are most interesting features of these cars. The control of the exhaust valves is by means of a wedge-shaped lever thrust by an eccentric between the plunger and the exhaust valve stem, and by a side movement of the sleeve cutting out exhausts altogether. When desired, these cars will run from one hundred and sixty to one hundred and seventy miles without any trouble as to lubrication. The 10 h.p. chassis is one of the best mechanical exhibits.

in the show, and attracts the attention of all who admire ingenious design and sound work. The full sized sectional models of engine and gear are of great practical use in demonstrating the details of the De Dion system of propulsion. The 10 h.p. car, which M. Cormier drove in a tour of upwards of four thousand miles, is exhibited, and attracts a considerable amount of attention. This car we illustrated in *The Autocar* of October 31st, page 548.

The Albany Silent Car.

Too late for inclusion in our report we discovered in an obscure corner of Gallery E an Albany silent petrol car by the Albany Manufacturing Co., of Cumberland Park, Willesden, N.W. The lateness of the hour and the urgent remonstrances of the show officials compelled us to forego examination, so we must leave further reference to a very interesting vehicle till next week.

Parts and Accessories.

Messrs. Bleriot have an interesting combined horn and side lamp, the casing or body of the lamp forming the horn, quite independently of the horn proper, and yet giving perfect warning in good tone when the bulb is squeezed. The appearance of the lamp is in no wise interfered with. This firm also show a new acetylene headlight, for use in which they supply metal cartridges of acetyloid. It is only necessary to punch two small holes in the cartridge, place the same in the generator, and turn on the water. When done with, the metal cartridge is withdrawn and thrown away. If necessary, ordi-

nary carbide can be placed in the generator and used in the usual way.

Amongst many interesting examples of their renowned work, Messrs. Malicet and Blin show a novel steering gear, in which the sector or block is done away with. At the end of the steering-post within the steering box is fitted a cuvette-shaped stamping something in the shape of an inverted scalloped saucer. Below this, and moving up and down in the box, is a double ring, between which are set two conical rollers. This ring is connected to the steering levers, and as it is pressed up or down by the pressure or release of the cuvette, affords the necessary motion to the steering gear.

Messrs. Bara and Pascault show an induction coil with an extra central terminal, to which it is claimed the high tension wire can be attached and sufficient current obtained for ignition purposes, should the trembler become disarranged.

Messrs. A. Cohendet and Co. have a motor, upon the end of the crankshaft of which, and within the crank chamber, is fitted a somewhat complicated form of sun and planet drive, giving two speeds forward and a reverse. The end of the driven shaft is carried in an eccentric block in the crank chamber, in which the shaft has a short longitudinal motion, by which the toothed wheel at its end is brought into mesh with either of the four internally and externally toothed wheels of the sun and planet gear on the end of the crankshaft. The arrangement is ingenious, but would throw much strain and wear on the joints and slide of the propeller-shaft.



A diagonal view across the Salon from the second gallery in the centre of the building. This view, although an excellent one, only gives a faint idea of the size and general effect of the show. It was taken practically from the centre of the building, but even although only half the length is shown, the perspective as seen by the eye, is considerably more imposing than that rendered by the camera.

Correspondence.

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

HIGH VERSUS LOW-SPEED MOTORS.

[3357.]—In reference to your correspondent's (Mr. E. P. Bowen's) letter, I do not think he will have cause much longer for regret "that there are not more automobiles fitted with multi-cylinder high-speed motors." The tendency is distinctly that makers are manufacturing lighter and neater petrol motors, getting the same or greater power than previously by increasing the number of revolutions. In this respect the 12 h.p. Napier approaches—if it does not exceed—the 12 h.p. Ariel in the number of revolutions at which its engine is capable of running.

Many objections have been raised to high-speed motors, such as the Ariel always has been, but they all fall down in actual practice; and now, after nearly three years' experience, our aim still is to get greater and greater speed for, among others, the following reasons:

(1.) High revolutions enable a much smaller, more compact, and therefore lighter engine to be made.

(2.) The wear and tear on cylinders, pistons, connecting rods, and crankshafts and their brasses has been proved to be less—in fact, with proper materials hardened or ground, or both, as the case may be, fitted into specially-selected phosphor bronze bearings of ample dimensions, the life of a high-speed motor with us is an unknown quantity. Apparently, it will not wear out at all, and I can say with every confidence that any of our engines, of which we still have trace, either are, or with the expenditure of a few shillings can be made, as good as they were the day they left our shop. This can only be accounted for by the fact (apart from great care in workmanship and materials) that the impulse per revolution is much less wearing and shattering than the thump, thump, impulse of a slow-running long-stroke motor.

(3.) The main advantage, apart from saving of wear, which high speeds have is to give an elasticity to the engine which is nothing short of extraordinary. An Ariel engine, under certain favourable conditions, will run as fast as 3,000 revolutions per minute, and we have had instances of even greater speeds. Our last record of low speed with the same engine is an average speed of 160 revolutions per minute for a six hours' continuous run. In practice, therefore, here we have an engine which is capable of driving a car at from, say, 250 revolutions per minute up to 2,500; and provided the engine has a reasonable amount of work to do all the time, the vibration, to all intents and purposes, is as little at the fastest speed as at the slowest.

It would be indeed interesting, as your correspondent writes, "to hear what objections (if any) our leading makers have toward the high-speed motor."

For the ARIEL MOTOR CO., LTD.,

CHAS. SANGSTER.

MECHANICAL VERSUS AUTOMATIC VALVES.

[3358.]—I do not claim to have any experience to compare with that of Mr. Walker, but from experiments which I made I satisfied myself that the automatic valve does not act altogether as he says. It is the case that when an engine with automatic valves is turned by hand or is working considerably below its normal speed, the inlet valve has an intermittent and pulsating action, but I found that so soon as the engine ran at a fair speed the pulsating action ceased. I made an indicator with a long and a short arm with the short arm connected to the valve, so that the action of the valve was greatly multiplied at the end of the long arm. I found the result the same with a stationary oil engine with a normal speed of 250 revolutions per minute and with each cylinder of my car engine.

The springing of automatic valves as usually fitted is unsatisfactory, due to the difficulty in adjusting the spring and its liability to get hot and lose its temper. The valve spindle should be brought through the casing, as with a m.o.v., and the spring placed on the stem outside.

I would like to add that my engine was controlled by a throttle in the inlet near the carburetter. The running has been improved by fitting a separate throttle to each cylinder close to the inlet valve.

H. G. M. CONYBEARE.

THE DURYEA CAR.

[3359.]—Will any reader of *The Autocar* kindly tell me whether the Duryea car is reliable, whether it is economical in petrol, whether the horizontal engine gives any trouble in lubrication, whether the transmission system is likely to give trouble, whether the cooling system is good, etc., etc.?

The Duryea car has no unsightly steering wheel and no lumbering bonnet in front. The horse-power is equal to about 1 h.p. per cwt. of the total weight of car. There are no unsightly radiators in front of the car. There are no sliding gears to go wrong, no sparking plug to get fouled, and no pump to give trouble—all good points to my thinking, but should like other opinions thereon. Will Duryea users kindly oblige?

NORMAN.

REVULCANISING OF MOTOR TYRES.

[3360.]—I have noticed the letters in your correspondence column *re* the above, and agree with the strictures passed by those who have condemned the different methods and results of revulcanising which they specify. Permit me to draw attention to a recently discovered process of revulcanising—that of the Glasgow Motor and Tyre Company, whose wares are advertised in your journal.

In addition to revulcanising a lining is placed of specially manufactured woven cord, which will stand about one ton of pressure. This is so fixed as to strengthen the whole tyre, making old tyres superior to new one, and new tyres last double the length of time. Having used the contrivance for fully five months past, I can commend it to those who complain in your columns. I may state that the charges for the invention are very moderate.

H. M. SAMPSON.

[We have seen samples of the revulcanising referred to, and have examined the special lining employed, and find this to be of great strength.—Ed.]

HEAVY MOTOR TRAFFIC.

[3361.]—Allow me to point out that your correspondent Mr. W. E. Suggett, letter No. 3334, has evidently missed the opportunity of seeing an illustration of the Rubber Cushion hub, for my contention is that it so greatly benefits everyone in any way connected with wheeled traffic of every kind that I must confess I am surprised that any reasonable person can attempt to raise any objection to its employment; moreover, motor car owners have, on seeing the drawings, at once given orders for it to be supplied to their motor cars, as they appreciated the ability to avoid punctures and side-slip.

Apart from this, it does not appear that your correspondent is aware that no length or width of ordinary springs can save the axle (and the gearing attached to it) from the concussion and vibration due to rough roads. But the R.C. hub absolutely prevents any sudden shock or vibration from reaching the axle—the sensation may fairly be described as floating on rubber.

As to your correspondent's assertion that a naval engineer has no knowledge of vibration, etc., I will simply note that having had over forty years' experience I will place on record that I am diametrically opposed to his opinion.

EDWIN N. HENWOOD.

FRENCH OVER-PRODUCTION.

[3362.]—I must emphatically object to the letter that appeared in your last issue entitled "French Over-production," and signed by a firm who are trading in British goods. The remark, "that the French are now 'dumping' their surplus products, which are unsaleable at home, upon the British markets at prices which are far less than the cost of production," is a most distinct slander upon such a firm as our own, the De Dion-Bouton Co., Jarrott and Letts, A. Darracq and Co., the Farman Automobile Agency, S. F. Edge, Ltd., and many other firms of a similar description.

It is astounding that the firm in question should make such a broad statement in view of the fact that De Dietrich cars, Talbot cars, De Dion-Bouton cars, Darracq cars, Gladiator cars, Panhard cars, Mors cars, etc., etc., are being sold in this country of the very latest production, and I believe in most cases at exactly the same price as in Paris, or perhaps more.

I do not wish to pose as the champion of the other firms I mention, but I must say that I think it is scandalous that any firm of repute should make such a broad statement as this.

This is not the first time that I have called attention to the fact that the correspondence columns of *The Autocar* are being used for self-advertisement, and it appears to me that this is a distinct case of it, as the remark that I refer to above cannot be justified in any way whatsoever.

As regards the other remarks that the French cars are being sold as British ones, and the remainder of the letter, that is merely a matter of opinion, but I think that the firm who have signed the letter should withdraw their statement at once or make it more precise in its meaning.

D. M. WEIGEL.

[3363.]—I was very pleased to read the letter of the Duryea Company (3356) in your last issue. I think that they have raised one of the most important points in reference to automobilism in this country that has been raised for a very long time, and one that should be taken up by the Automobile Club, and a certificate issued which clearly sets out which are English vehicles and which are the foreign vehicles being sold at present ostensibly as English.

There are several firms in this country—some of them old established in other lines of business—who lead the public to believe that they are selling English-made cars built at their English works when they are nothing more or less than nameless foreign ones, the complete chassis being imported to this country and simply an English body fitted in the English works.

A very great deal of the foreign importation into this country is made possible by the goods being eventually sold as English.

The Duryea Company are to be thanked for bringing such a crying evil before the public, and now it only rests with an authoritative body to investigate the whole matter and do a great deal of good to the British user and the British manufacturer.

S. F. EDGE.

[A prosecution under the Merchandise Marks Act, if sufficient evidence could be procured to ensure a conviction, would have a salutary effect.—Ed.]

SIDE-SLIPPING.

[3364.]—Under this heading in your issue of November 28th appears a letter and illustration from Mr. Brankstone. It seems to us so peculiar and so contrary to our experience that a car should behave as shown that we think it would interest your readers to know the make of car which did so. All the cars with which we are acquainted would have behaved in quite a contrary manner—namely, if steering wheels were turned to left, as shown, the tail would have swung around to right, and not to left.

BRADBURY BROTHERS, LTD.

RECHARGING ACCUMULATORS.

[3365.]—I have been reading with great interest of late, both in *The Autocar* and other papers, the subject of electrical ignition and recharging. Until recently I and several other friends in the neighbourhood used to send our accumulators to be charged from the local mains, but owing to the number of damaged accumulators resulting therefrom, I procured a series of primary cells from two London firms who have of late been largely advertising these goods. The cells, so far as small bicycle accumulators are concerned, answer very well, but for accumulators in connection with motor cars they are nothing like powerful enough. On the advice of other readers I dubiously procured a set of Boron cells, and was so satisfied with the result obtained therefrom that I at once placed an order in hand with the company for twelve cells, with which myself and several others are now charging the whole of our accumulators, and are never without a good supply of current. I shall be pleased to make anyone a present of my former cells who may have any very small accumulators for charging. In conclusion, I would most emphatically advise anyone procuring primary cells to be careful what make they use, as in my mind a battery with appearance only is worth little to a practical motorist.

C. COLLIN.

THE MOTOR GADABOUT.

[3366.]—In a recent issue of *The Autocar* I noticed a letter over the signature of "An Old Cyclist," in which he states his requirements in the way of a small car. In response to his expressed wish to hear from some owners of the cars he mentions, I should like to clear up any doubts he may have as to the hill-climbing powers of the Vauxhall. I invested in one of these servicable little cars this autumn, after having carefully considered the merits and demerits of several of the other light cars of which your correspondent speaks, and I am pleased to be able to say that I have so far not had any cause whatever to complain of my choice. The car tackles the hills grandly, and comes out on top with a far better turn of speed than many cars of double the h.p.—and this is in Devonshire, which is pretty well known as an extremely hilly part of the country. Perhaps the best instance I can give of her power on hills is the following: When bringing the car down here from London, on her maiden trip, I was anxious to see how far her petrol tank would carry me on one filling. It brought me through Bath, and ran dry on a stiff hill near to Shepton Mallet—about 120 miles—and she came to a stand. I replenished the tank from the spare can, and she started again up the hill!—a performance which, having regard to the stiffness of the rise, was, I thought, most creditable, and which, I must confess, I never expected she would do. There are very long and severe hills around Sidmouth and Exeter, as well as in the immediate neighbourhood, which she takes without overheating, and her excellence in this respect is due, no doubt, to the strength and efficiency of her general design. Speaking professionally, I should like to take the opportunity of congratulating the designer of this handy little car on having turned out a sound piece of work—both structurally and with due regard to general appearance—at such a moderate figure.

MARINE ENGINEER.

P.S.—I enclose my card, and if "An Old Cyclist" would care to communicate with me—I too have cycled for the past twenty years or more—I should be happy to discuss details with him.

SOLID TYRES.

[3367.]—As Mr. Bath cannot reply to Mr. Strickland's enquiry with regard to live axles and solid rubber tyres, may I be permitted to do so. I think the best answer I can give to Mr. Strickland's letter is that we have converted some hundreds of pneumatic-tyred cars to Royal Buffers, many of which are fitted with live axles, and these have given excellent results, as you will see by the enclosed copies of letters, and especially that from Mr. Donne referring to a De Dion car which we converted. We could refer Mr. Strickland to many people whose cars we have converted if he would like to communicate with us, and I might say that we are at present converting nineteen De Dion cars, amongst others, from pneumatics to Royal Buffers, and that the writer shortly hopes to have his new De Dion car fitted with them on all four wheels, and will arrange to let any *bona-fide* enquirer try them.

As you are doubtless aware, we have for some time past given trials by appointment on the writer's 10 h.p. Wolseley car, which travels with every comfort up to about thirty-five miles an hour on 3in. high-speed Royal Buffers. The cost of repair to this car during the three to four thousand miles it has run has been a few pence for an exhaust valve spring, which is apt to require renewal on any car with any tyres.

The tyres which you saw on the 1,000 miles reliability trials show practically no signs of wear yet, and we expect them to last for more than 10,000 miles.

For THE SIRDAR RUBBER CO., LTD.,

J. M. MacLURICH, managing director.

[3368.]—I should be glad if any of your readers would tell me of a thoroughly reliable solid tyre for an omnibus with removable top, weighing with this on just under 27 cwt. I have used a Benz with Connolly's wired-on tyres, and 6½ h.p. Daimler weighing a ton with 2½ in. Clincher solids, both of which gave great satisfaction.

In 1902 I purchased a 9 h.p. car, weighing without omnibus top just under 25 cwt., with the top just under 27 cwt. This was fitted with 2½ in. Sirdar Buffer tyres. In my ignorance I supposed solid tyres never gave any trouble, but after fourteen months' use one of the tyres suddenly began to "lift." It was sent up and put straight, but then began to "lift" again. The company then made the statement that the car was too heavy for the tyres, and I must have new back tyres of a stronger type, though the old tyres were only half worn out. The company who built the car repudiated liability, and the Sirdar Rubber Co. also repudiated it, saying the motor company did not tell them the weight of the car (though they must have guessed it to 2 cwt., as they have supplied many tyres for the company's cars). The Sirdar Rubber Co. have given me a sort of loosely-worded guarantee with their 3 in. tyres, but I should like to know from your readers whether it is necessary to have such a heavy tyre as a solid 3 in., and whether any company makes a reliable 2½ in. tyre to carry 25-27 cwt., my car going at from 13-16 m.p.h. on the flat and up to 18-20 with the top off. A BELIEVER IN SOLID TYRES.

TYRES.

[3369].—With reference to the correspondence that is going on headed "Tyres," I see nothing remarkable in Mr. Valentin's statement, and probably an experience of my own would put an end to the argument.

In the Paris-Vienna race on the first day I drove upwards of eighty kiloms. on two deflated tyres, and they were not Colliers, but ordinary thickened edged tyres, and they were worn to rags, yet they remained on, and I feel sure that I am safe in saying that the speed at which I went was greater than that of any of the gentlemen who have taken part in this discussion.

On the third day I rode about fifteen kiloms. into Innsbruck with one deflated tyre, which was also in a practically completely worn out state.

There is nothing extraordinary in an ordinary thickened-edged tyre staying on the rim after deflation, although I believe that the odds are that it comes off, but many isolated cases such as described by Mr. Valentin have occurred.

D. M. WEIGEL.

[3370].—I can corroborate all that Mr. Picton Philipps and Mr. Valentin say of the possibility of running on a deflated Collier tyre. I have run sixty-eight miles with my 12 h.p. Darracq on a deflated Collier tyre (a third of the distance in the dark, with lamps, of course) without the least difficulty or slowing down, the outer cover being practically uninjured. I have no hesitation in saying that it is perfectly safe to run at top speed on this tyre when deflated. It is fortunate that it is possible to do so with this tyre, for it is extremely difficult to take off for repairs when damaged, and needs two men with an ample stock of patience to shift it from the rim. Another drawback is this: The makers of the tyre do not seem to care about repairing their damaged tyres. In my own case they have returned inner tubes and covers, stating that they could not repair them, and advising me to have new tyres in their place, while other firms have satisfactorily repaired these damaged tyres. If the makers of these tyres would attend to their repairing and could make them less difficult to detach, they might fairly claim that they were at least the equal of any tyre on the market—perhaps the best.

NAUNTON DAVIES.

THE OLDSMOBILE.

[3371].—Being on the lookout for a handy, light, and cheap car, I had been much impressed by some of the very neat arrangements of the Oldsmobile; but a letter which appeared in your issue of Nov. 21st, and which, though otherwise favourable, implies that the chain sprocket wheels are of cast iron, has considerably damped my admiration. I naturally thought there must be some mistake, and fully expected to see in your next issue an explanation or denial from the agents; but although they write as to general improvements they are silent on the subject of cast iron sprocket wheels. If the sprockets are not of cast iron, it is certainly a mistake to leave your readers under the impression that they are.

J. G.

THE CONVEYANCE OF CARS BY RAIL.

[3372].—The salutary effect of the outcry raised by the automobile and other industries against the prohibitive conditions with regard to the carriage of petrol, which the railway companies endeavoured to enforce some eighteen months ago, has unfortunately not proved of a lasting nature, and the antagonistic attitude of these companies to the new form of locomotion is once again made manifest by the issue of an extraordinary form of indemnity which they require to be signed by the consignor of a motor carriage before they will accept it for conveyance.

The actual notice and indemnity form as sent out by one of the railway companies reads as follows:

"CONVEYANCE OF MOTOR CARS AND MOTOR CYCLES INDEMNITY."

"The Railway Company hereby give notice that they do not accept for conveyance motor cars and motor cycles charged with electricity, or with gas, oil, or other inflammable liquid or vapour, and that they require the following indemnity to be signed before accepting such machines."

Station.

190

"I hereby declare that the motor which I require to be conveyed from to is not charged with electricity, or with gas, oil, or other inflammable liquid or vapour, and in consideration of the Railway Company accepting the said motor for conveyance, I agree to relieve the company from all risk and responsibility in respect of the same, and I also agree to indemnify the company against all damage, loss, or expense which may arise out of, or be incurred in consequence of, such conveyance."

Signature of Sender.

Address.

Witness

The obligation laid upon the consignor to withdraw all petrol from the vehicle prior to its despatch is perfectly reasonable, and while the need of removing or discharging the accumulators only carried on a car for ignition purposes may rightly be regarded as a vexatious and unnecessary precaution, still this point sinks into insignificance besides the indemnity involving the consignor in almost limitless responsibility in respect of any damage, etc., which may arise out of the conveyance of the vehicle.

As the railway companies refuse to accept at all a vehicle charged with electricity, gas, oil, or any other inflammable liquid or vapour, it is obvious that the latter portion of the indemnity can only refer to motors not so charged, and therefore the companies evidently intend to hold the unfortunate sender responsible for all damage, loss, or expense arising out of the mere conveyance of the vehicle, surely a most preposterous condition.

The possibilities it opens up are numberless. For example, a vehicle might break loose and cause damage to the companies' property; the consignor could be held liable. It might cause injury to an employee of the companies during loading; the consignor could be held liable.

Of course, it is conceivable that the railway companies mean this letter of indemnity only to apply to losses resulting from omission to discharge petrol, etc., from a vehicle, but, if so, it should be clearly stated, and I think the words "in case it shall be found that the said motor is so charged" should be inserted after the words "I agree," in which case the complete clause would read as follows:

"And in consideration of the Railway Company accepting the said motor for conveyance, I agree, in case it shall be found that the said motor is so charged, to relieve the company from all risk and responsibility in respect of the same, and to indemnify the company against all damage, loss, or expense which may arise out of, or be incurred in consequence of, such conveyance."

It is evident, however, that to rectify the present state of affairs concerted action is imperative, and I venture to hope that, not only will the various automobile clubs and trade societies take immediate steps, but that automobilists all over the country will protest in no uncertain manner against such unjust conditions of conveyance.

E. M. C. INSTONE.

Flashes.

Next week, owing to the Christmas holiday, *The Autocar* will be published a day earlier than usual.

* * *

Messrs. Carless, Capel, and Leonard inform us that they have reduced the price of their standard petrol one penny per gallon.

* * *

"Consul," a performing man-like monkey, went for a motor car drive recently with a couple of friends. In Queen Street the car broke down, and the presence of the chimpanzee in a brilliant tweed suit caused a large crowd to assemble. The police in consequence are reported to have taken Consul's name and address, with a view to issuing a summons for causing an obstruction.

* * *

The authorities of the county of Surrey are now attacking light locomotives used for haulage purposes. Messrs. Mears, the well-known wharfingers and haulage contractors, were recently served with no less than three summonses for different offences alleged to have been committed under the Traction Engine Act of 1898, presumably on the ground that a light locomotive used by them was a traction engine, because it emitted a little visible vapour. The police seemed to throw as much energy into the case as if it had been a burglary, and strove their utmost to obtain a conviction. The Bench was composed of Mr. Farmer and Sir William Vincent. The case throughout was very keenly contested, Mr. T. W. Staplee Firth being for the defence. Ultimately all three summonses were dismissed.

* * *

The Brotherhood-Croker Motors, Ltd., inform us that they have taken temporary offices at 19, Hanover Square, London. They have also taken large premises in the West End for showrooms, garage, and repair shops, etc. Besides the sale of their Brotherhood motor carriages, they are laying themselves out to cater for automobilists in all departments.

* * *

We cannot help calling attention to the remarkable results which have been achieved by the Wolseley cars during the year which is fast coming to a close. In addition to the consistent average running displayed by the 7½ h.p., 10 h.p., 12 h.p., and 24 h.p. cars competing in the 1,000 miles trials, in which the solid-tyred 12 h.p. Wolseley completed a non-stop run on each of the eight days, it is interesting to note that the 10 h.p. car has had a most successful year in hill-climbing competitions, first prizes being obtained in the following various club events: Scottish, Sheffield, Lincolnshire, Midland, Wolverhampton and District, and Johannesburg—a remarkable record.

Will the makers of Deau's motor spirit be good enough to send us their address?

* * *

Cardiff has ordered a couple of motor waggons for scavenging purposes. If they prove successful, orders will be placed for others.

* * *

Mr. John Grose, of Bitterne, Hants, speaks very highly of the facilities placed at the disposal of automobilists in the matter of repairs and the recharging of accumulators by the Pytchley Autocar Co., Bradshaw Street, Northampton.

* * *

It should be clearly understood that the new Nil-melior magneto (Bassée and Michel), which has just been introduced into this country by the United Motor Industries, Ltd., has no separate coil, the transforming of the low tension current from the magneto to high tension being effected through a special winding in the apparatus itself.

* * *

Last week when in Paris we enjoyed a short spin upon the 18 h.p. four-cylinder Chenard-Walcker.

We reported our experiences upon this car, with its remarkably flexible engine, on November 21st, and the reason of our trial was to satisfy ourselves that in the short interval a very considerable improvement had been made. The automatic carburetter provided remarkable elasticity on our first trial, but certain detail improvements which have been made in it since have increased its efficiency, and the way in which the machine can be driven on the top speed at any pace, from that of slow walking up to the

very highest permissible on an open road in the environs of Paris, requires to be experienced to be appreciated.

* * *

Although thick grease is frequently used in gear boxes, we have never regarded it as in any way the perfect lubricant for gear wheels in mesh. In a very short time the wheels cut a path through the grease, which stiffens, and is gradually packed up clear of the rotating pinions, so little or no lubricant reaches them. Casting about for something to serve the purpose properly, we came across a gear oil prepared by Messrs. R. S. Venables and Co., of 53, Didsbury Road, Stockport, which they have sold for some time for use in the gear boxes of steam lorries. This oil is not so thin that it is thrown off the toothed wheels the instant they emerge from the bath, or so thick that it behaves as does the grease to which we have referred above, but seems to strike the happy medium, and to be just the thing to perform the highly important duty required of a gear box lubricant. One of our gear boxes was charged with this oil in the middle of August last, and when we removed the inspection lid last week end we found the gear in excellent condition, and the gear oil just as it was introduced, save for discoloration. The lubricant shows no tendency to gum or clog, and is clearly free from acid.

"THE AUTOCAR" DIARY.

- Dec. 10 to 25.—Paris Autocar Show, Grand Palais
 " 24.—*The Autocar* published one day in advance on account of Christmas holidays.
 " 31.—Entries close for 1904 Gordon-Bennett Race.
 Jan. 1.—Motor Car Act, 1903, comes into force.
 " 15 to 23.—Madison Square, New York, Motor Show.
 " 15 to 23.—Leeds Cycle and Motor Show.
 " 18.—Scottish A.C. (W. Section). Paper, "Reminiscences of the Road." By Mr. C. Jarrott.
 " 23 to Feb. 4.—Brussels Autocar Show.
 " 23.—A.C. of America Annual Banquet.
 " 28.—A.C.G.B. and I. Paper, "Railway Companies and the Motor Problem." By Mr. G. Montagu, M.P.
 Feb. 1.—Entries close for Harmsworth Cup Yacht Race.
 " 1.—Scottish A.C. (W. Section). Paper, "The Evolution of Road Making in Scotland." By Mr. R. Drummond.
 " 12.—A.C.G.B. and I. Non-stop Trials, Oxford Road.
 " 12 to 24.—Crystal Palace Motor Car Show.
 " 15.—Conference between A.C.G.B. and I. and Provincial Clubs.
 " 29.—Entries close for A.C.G.B. and I. Side-slip Trials.
 A.C.G.B. and I. Side-slip Trials (date not fixed.)

The Bridgwater Motor Co., which has had a successful career at East Quay, is about to be reconstructed, with a largely increased capital, and will remove to new and much more convenient premises in the heart of Bridgwater.

* * *

In reply to a number of enquiries as to where the ratchet spanner which we described recently can be obtained, we may say that the inventor of the tool is Mr. F. W. Schroeder, 126, Copthall House, Copthall Avenue, London, E.C., from whom, no doubt, it can be obtained.

* * *

The sixteen autocars ordered by their Celestial majesties of China from a German firm are now on their way for delivery. A number of Chinese engineers have been learning to drive them. Should any mishap occur to the Emperor and Empress while out in the cars, the prospective drivers say they will pay the penalty with their lives.

* * *

While age limits are fixed by law for the drivers of motor cars, there is absolutely no prohibition upon horses being driven by children of very tender age, to the danger of themselves and the public. We saw in a newspaper the other day an account of an accident which happened to a little boy of eight, who was riding alone on the front of a cart and fell off. The danger, not to say criminality, of setting children to drive horses is only too patent, and it is high time that some age limit was imposed upon drivers of these uncertain animals.

* * *

The British Consul-General at Frankfurt reports that a great autocar exhibition is to be held there from March 19th to 27th next year, under the patronage of H.R.H. Prince Henry of Prussia. The exhibition will include automobile vehicles of all kinds, such as motor cycles, motor boats, parts of motor vehicles, wheels, tyres, motors, etc., designs, photographs and maps, and clothes and requisites for automobilists. For further particulars British applicants are referred to Mr. Carl Gruber, secretary of the International Motor Car Exhibition, 1904, Adler Fahrradwerke, Frankfurt-am-Main.

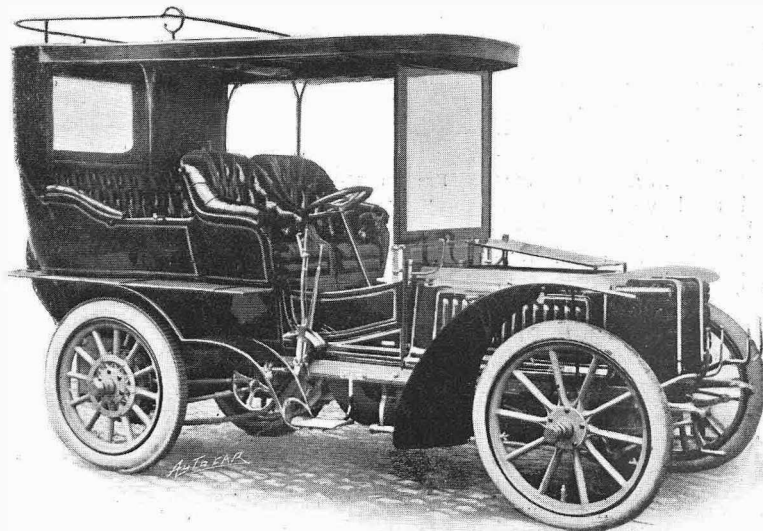
* * *

Much to the astonishment of the good people of Cobham the full strength of the police in the village—three policemen and a sergeant—paraded up and down the main road upon a recent Sunday afternoon. As the district surrounding was thus left without any protection, there is not much doubt that the ratepayers of the county will have to provide a few additions to the Surrey force very shortly, as the number of men available cannot possibly cope with this recent desire to exhibit them on the main highways.

The County Chemical Co., Ltd., Excelsior Works (off Moor Street), Birmingham, are the British agents for the supply of Cox's puncture-proof device for motor tyres, respecting which several correspondents have lately been enquiring. We are informed that during the past season the device has given every satisfaction.

* * *

The Roadway Autocar Co., Ltd., have acquired the patent rights of the Société Mors, of Paris, for Great Britain and all British possessions, together with the exclusive right to use the name and trade mark "Mors." The company further inform us that they are the sole agents throughout the British dominions for Renault cars. The Roadway Co., by the way, have just changed their address to 19, Newman Street, Oxford Street, W.



PRINCE HATZFELDT'S 24 HP. DE DIETRICH. This car, which was purchased by H.R.H. Prince Hatzfeldt from Messrs. Jarrott and Letts, is a very handsome one. The body is by J. Rothschild et Fils, made in their London factory, and the tyres are Clincher-Michelins. The leading features of the De Dietrich cars are given in our Paris Show report to day, and include among other features magneto ignition, a new clutch, pressed steel frame, etc. It is worthy of note that the flanged tube type of radiator has always been adhered to by these makers.

As many people who reside in or near London are interested in the Miesse car, it will be useful to them to know that these vehicles can now be tried by appointment with Messrs. Bailey and Lambert, of 217, Piccadilly, W. They are also agents for the Herald and B. and L. cars.

* * *

Messrs. Charles Letts and Company, the publishers of the well-known Letts diaries, send us some attractive samples of their productions for 1904. The pocket editions all retain the self-opening tablet, which has been very greatly appreciated by the users of these very handy little books. A feature which should appeal to motor cyclists is the increase of the insurance policy given with each of these books from £500 to £1,000, and a perusal of this policy shows it to be on an even more liberal scale than that which was given with the previous £500 policy. These diaries are extremely useful for jotting down runs, and also for the cost of repairs, lubricating oils, etc.

SOME QUERIES AND REPLIES.

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

When advice concerning different makes of cars is sought, each vehicle should be given an identifying number. Letters should be addressed The Editor, "The Autocar," Coventry.

AUTOCAR TAXES.

I should like to know if I am compelled to pay a tax for my car under the following circumstances: It is an Oldsmobile; I use it only for business purposes, viz., visiting my patients. If I have my name and address painted on it, shall I save the £2 2s. Inland Revenue tax?—Y.

We are afraid that the exemption from excise duties of vehicles used solely in the course of trade does not apply to a doctor's carriage or autocar used only for visiting patients. This is so for two reasons: (1.) The exemption does not apply to every carriage, but only to a waggon, cart, or other such vehicle constructed or adapted for the conveyance of any goods or burden in the course of trade or husbandry. (2.) The vehicle must be used solely for the conveyance of goods or burden in the course of trade or husbandry.

THE SECONDARY CIRCUIT.

In the electric coils generally used on motor cars there is only one terminal to the secondary coil. Will you kindly inform me how the other end of this secondary wire is attached?—R. J. H.

The secondary circuit in the ignition system takes the following course: From the high tension terminal on the coil through a heavily insulated wire to the central insulated pole of the sparking plug. When the current has jumped the gap it returns through the metal of the engine and the frame, thence by a wire connected to the frame, to the earthed terminal of the coil. This terminal and wire thus provide the return lead, for both primary and secondary windings are connected to this terminal. In coils using four terminals it is sometimes usual to connect, by means of a plate on the outside of the coil, the low tension and high tension return terminals together, and attach the earthed wire to one of these terminals. A full explanation of these circuits was given in *The Autocar* of March 28th, 1903.

REGISTRATION AND LICENSING OF AN OLD CAR.

With regard to the new Act, I have an old car for which I do not wish to take out a license next year, but which I wish to sell. Will there be any arrangement by which a trial run may be given to a prospective buyer in 1904? Owners of old unused cars will not be wishful of paying for a license for a trial run. May a car be towed by another, say, to the railway station, the tower, of course, being licensed and numbered, but the towed one not? If the answer to the latter is a negative, then an unlicensed car may not be towed to a private road for trial.—J.H.C.

With regard to the first paragraph of our querist's letter we are not quite sure whether he refers to the registration fee payable under the new Act or to the annual license payable under the Act of 1896. He first mentions that his query is with regard to "the new Act," and then states that he does not wish to take out a license for "next year." The provisions as to a trial run only apply to manufacturers and dealers who take out the £3 license provided for in the 1903 Act, S. 4, and then only to the provisions as to registration of the car. This is, of course, a small matter so far as a private owner is concerned, as the duty is only £1, and he should be able to add 15s. of this on to the purchase price, seeing that the purchaser can have the benefit of such registration on payment of 5s. We expect, however, our querist is referring to the Act of 1896, and so far as we can see he will be in no way exempt from payment of duty under the circumstances stated in his letter, either as to a trial run or as to a car being towed.

ACCUMULATOR CHARGING.

There is an electric light installation here, giving 160 volts, with one pilot lamp and switch on switchboard. Will you kindly inform me how to charge my four volts accumulators from same for motor car; also how to connect a light from a four volts. cell to water gauge on dashboard, and what wire to use?—W. R., Bracknell, Berks.

To charge an accumulator from your switchboard you will require three 32 c.p. lamps connected in parallel. A diagram of this connection was given in *The Autocar* of November 28th, page 669. To connect up an electric lamp to illuminate the water gauge upon the dashboard you should use ordinary low tension flexible wire, the ends of which must be connected to the lamp and to the positive and negative terminals of the accumulator. In this instance, the particular terminals to which the wires are attached are of no importance with regard to positive and negative. It will be necessary to insert a small switch in the circuit by cutting one of the wires and connecting the break to the two terminals on the switch. By putting the switch on the lamp will be lit, and show the water gauge. It would be unwise, of course, to keep the lamp continually burning, as this would draw too much upon the resources of the accumulator.

CHARGING FROM A TRANSFORMER.

Too late to make the necessary alteration, we noticed that the reply to our correspondent H. B., under the above heading, was liable to misinterpretation owing to certain words being omitted. The sentence in question should have read as follows: "A rotary transformer will convert an alternating current into a continuous one suitable for recharging accumulators." We have to thank several of our readers for calling our attention to this unfortunate omission.

LAYING UP A CAR FOR THE WINTER.

Sir,—I notice in the articles as above you made no mention of any dressing for tyres to prevent them from perishing whilst standing. I have used "Tyreine" now for two winters and also from time to time during the summer on the tyres of my car—an 8 h.p. M.M.C.—and a cycle, and have found that the tyres have greatly improved after standing a few days. C. W.

POLE FINDING PAPER.

Sir,—In your reply to queries re charging thirty ampère hour accumulator from a 210 volt circuit, you say that the wire which turns the pole finding paper red is the positive pole. This is surely a clerical error, as it is the negative wire which colours the paper, and should be connected to negative pole of accumulator. CHAS. PERCY DEAN.

For the 1904 Gordon-Bennett race nominations have already been sent in to the Automobile Club for three out of the five drivers that will be required for the five Napier cars which will take part in the Gordon-Bennett elimination races. They are Mr. John Hargreaves, the well-known Somerset automobilist, of Templecombe; Mr. Mark Mayhew, a vice-president of the Automobile Club and commander of the Motor Volunteers; and Mr. S. F. Edge, the 1902 winner. The other two names have not yet been decided upon.

THE STANDARD CAR.

SINGLE OR DOUBLE CYLINDER—5in. BORE, 3in. STROKE, SPEED 250 TO 2000 R.P.M.
 —SLIDING TYPE CHANGE SPEED GEAR, FOUR SPEEDS AND REVERSE—BEVEL GEAR
 TRANSMISSION ON TO LIVE AXLE—A NEW GIRDER FRAME.

(Continued from page 725.)

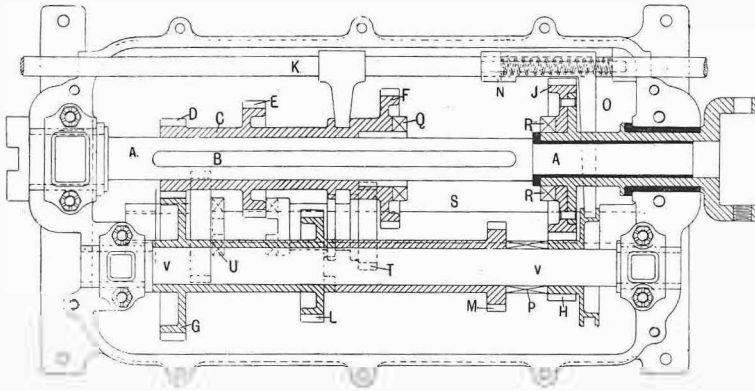


Fig. 3.—Plan of change speed gear.

- | | | |
|-----------------------------------|--|-------------------------------------|
| A, primary gearshaft | J, gear wheel on AA carrying propeller connection. | P, jaw clutch |
| B, feather on A A | K, rod carrying gear changing fork. | Q and R, jaw clutches. |
| C, sliding sleeve on A A. | L, second speed gear wheel. | S, reverse gearshaft. |
| D, slow speed pinion | M, third speed gear wheel. | T, sliding sleeve for reverse gear. |
| E, second speed gear wheel. | N, boss on the rod K. | U, reverse gear jaw clutch. |
| F, third speed gear wheel. | O, tongue piece operating high speed gear. | V, V, secondary gearshaft. |
| G, slow speed gear wheel | | |
| H, pinion on secondary shaft V V. | | |

The Change-speed Gear.

The change-speed gear is of the sliding tooth variety, and gives four speeds forward and one reverse. In the low speed the drive is taken through a coupling from the engineshaft to the shaft A (fig. 3), through long keys, two in number, B; thence

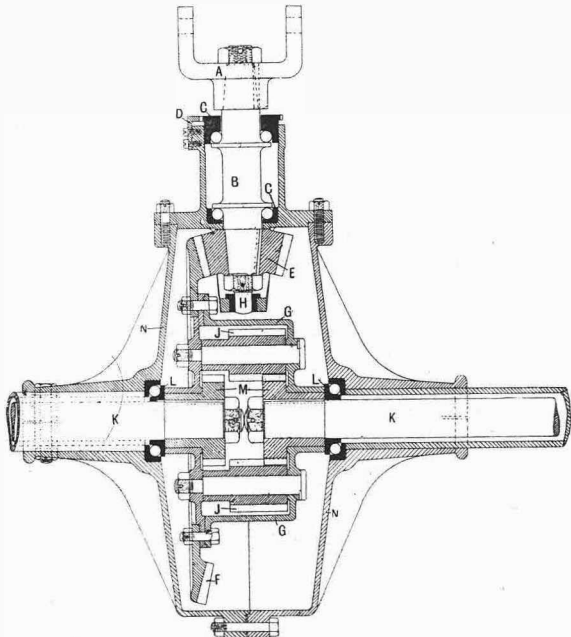


Fig. 4.—Section of bevel gear drive and differential.

- | | |
|-------------------------------|---|
| A, propeller-shaft connection | H, end bearing to B |
| B, bevel pinion shaft | J, J, star pinions to differential gear |
| C, C, ball bearings to B | K, K, divided live axle |
| D, adjustment for C C | L, L, ball bearings on K K |
| E, bevel pinion | M, star wheels on K K |
| F, bevel gear wheel | N, N, gear box |
| G, differential gear box | |

through the sliding sleeve C, which carries the gear wheels D E and F. The drive takes place through D and G, along the sleeve to H, thence to the wheel J, which is rigidly connected to the coupling, whence the drive is taken to the back axle by means of a propeller-shaft, universally jointed to the bevel pinion-shaft B (fig. 4), which communicates the drive to the large bevel mounted on the differential box in the back axle case. The power is thus transmitted to the road wheels. To get the next highest speed the sleeve C is slid along by means of the striking rod K, until E comes in mesh with L. The power is then taken from E to I, and along the sleeve to H and J, thence through the propeller-shaft. For the third highest speed the sleeve C is slid further along until F comes into mesh with M, the drive being thus taken along to H and J as before. For the top

speed the sleeve is slid still further, until the striking rod K, which carries a boss, comes in contact with the boss N. This moves a tongue piece O, engaging with a boss on the pinion H, until H is brought out of mesh with J, although it is still

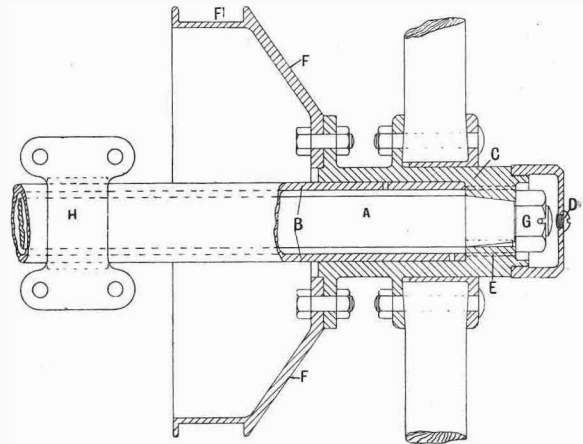


Fig. 5.—Section of rear hub bearing.

- | | |
|----------------------|---------------------------|
| A, end of live axle | F, F, band brake drum |
| B, tube enclosing A | F', groove for band brake |
| C, wheel hub | G, lock nut to axle A |
| D, hub cap oil screw | H, spring plate |
| E, oil ways | |

engaged by the jaw clutches P, with the sleeve carrying N. Thus, all wheels are thrown out of mesh, and any further movement of the rod K brings the jaws Q into mesh with the jaws R, and thus the shaft A is really made solid with the gear J, and a direct drive with all wheels out of mesh is the result, thus getting a most efficient through drive. To obtain the reverse, a third or auxiliary shaft S, mounted on bearings below the two main-

shafts, carries a sliding sleeve T, which has square jaw faces at one end and a pinion on the other, which pinion is brought into mesh with L, when the striking rod K moves this to the left. Of course, in the meantime the striking rod K has moved the gear pinion D out of mesh with G, and any further movement of the sleeve T brings the square jaw clutch on T into contact with the square jaw clutch

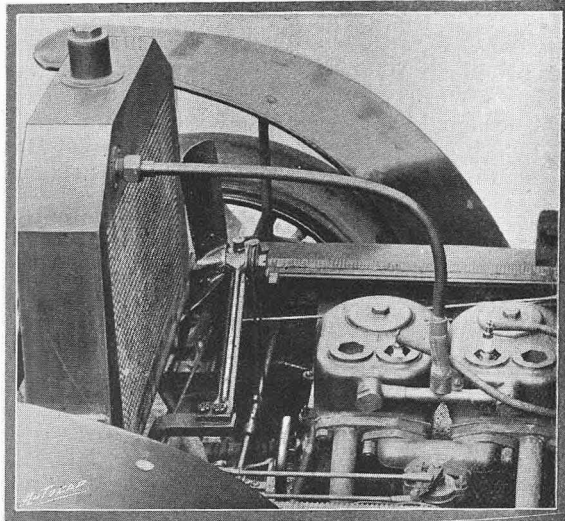


Fig. 6.—The two-cylinder Standard engine in position. This shows the accessibility of the motor and its relative height.

at U, thus meshing. At the same time the gear wheel E is brought into mesh with the gear wheel rigidly connected with U. Thus the reverse is obtained in a somewhat similar manner to that employed by the idle gear wheel when engaged in cutting a screw on the lathe. When reducing the gear from the top speed to the third, the jaws Q and R are first released from contact, and under the action of a spring shown at N, the pinion H is again restored into gear with the wheel J, and thus all is ready for the forward drive on the next lower speed. The gear case top is simply a cover having an inspection lid, so that the gear may be viewed without removing this cover, or oil and grease may be placed in the case in large quantities. The bearings are adjustable without interfering with the facing of the case, so that an oil or greasetight joint is always kept, this being an important factor in preserving the bearings when adjustment is required.

In the back axle hub bearing the bending stress is entirely removed from the driving shaft A (fig 5), and a bearing is formed on the outer diameter of the tubular axle B. The body of the back hub C is made of good bearing metal—phosphor bronze—and a long bearing is thus secured, which takes the weight direct from the road wheels. Lubrication is effected both by the grease working along from the bevel gear box in the centre of the axle, and also by oiling through the cap D, whence the lubricant works its way through the oil holes E. Thus very little attention is required in this direction. The brake drum F is mounted concentric with the hub, and is tightly held by bolts, as shown. The spring flaps are brought closely up to this brake drum, and support the brake brackets in a very strong and

rigid manner, so that absolutely no spring can take place in the application of the brakes, so very great braking power is exerted. The driving-shaft A is secured to the hub C by means of a tapered part, also by wide keys, and a lock nut G as shown.

The Live Axle.

The rear end of the propeller-shaft is attached to the coupling A (fig. 4), secured to the pinion-shaft B, which rotates in an easily adjustable ball bearing C C. This bearing very closely resembles that used in the ordinary bicycle, the details of which are sufficiently well known to make this piece of mechanism perfectly simple of being understood. The adjustment of the bearing is effected by an outside cap, which is secured in position by means of a catch D. On the inner end of B is carried a bevel pinion E, and this engages with the bevel gear wheel F, secured to the differential gear box G G. The inner extremity of the bevel pinion-shaft B, it will be seen, is supported by a plain bearing H. This is one of the very few instances in which the end of the bevel pinion-shaft is so supported, and it is very obvious that this must conduce to very steady running, as it equalises the amount of thrust exerted between the bevel pinion and its gear wheel. The differential gear box G G contains a star pattern gear, the pinions of which are shown by J J, so that this type dispenses entirely with the use of bevel wheels in connection with the differential gear. The two-piece live axle K K runs as to its inner ends on ball bearings, shown by L L. They carry on their extremities the star pinions M, which engage with the differential pinions J J. The whole of this gear is enclosed in a rigid castiron box N.

The silent running of the engine is largely contributed to by the dimensions of the silencer, which are 3ft. 6in. by 7in. Though large, the silencer is not at all obtrusive.

The Control.

The carburetter is fed by gravity, the petrol tank being located beneath the front seats.

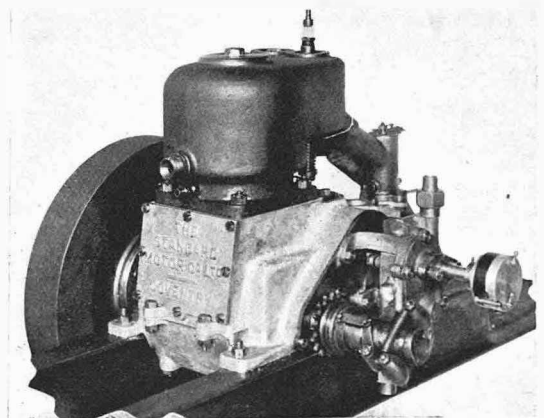


Fig. 7.—The Standard single cylinder governed engine.

A foot-brake operates expanding segments operating upon a drum directly attached to the hub. The side brakes operate bands acting upon the same drums.

All the speeds are actuated by one lever. There are four speeds forward and one reverse. The top

speed equals twenty-three and a half miles per hour with the engine running at normal speed. The road wheels are 32in. in diameter. The change-speed lever is locked by means of a square segment definitely engaging with slots cut in the sector.

It has already been stated that the speed of the engine is controlled by means of the throttle lever, which is most conveniently placed on the top of the steering wheel, the actuating mechanism running through the centre of the steering column. With a little practice and observation this lever can be placed in such a position that one can be certain as to the speed of the car when travelling on the level, and this speed may be maintained by opening or closing the throttle as required. Owing to the great flexibility of the engine and the gear ratios fully seventy-five per cent. of the running may be done on

the top gear; runs of great length have been accomplished without changing gear. Although four speeds are provided, the first is very seldom used, as the speed given is very slow indeed, and, unless starting on very steep hills, the second speed is used. It is very comforting, however, to know that the car has a gear which will enable it to surmount any hill, however steep, without having to shed its passengers.

Mr. A. Craig, consulting engineer, of Coventry, is responsible for the design of the Standard car, which cannot be said to contain any features of Mr. Craig's previous designs. As showing the diversity of this gentleman's work, we may mention that the Maudslay petrol locomotive, illustrations of which were given in *The Autocar* of November 14th, page 597, was designed by him.

OBJECTIONABLE CLAUSES IN INSURANCE POLICIES.

The London Chamber of Commerce, on the motion of the Society of Motor Manufacturers and Traders' representative, are taking active steps in connection with clauses proposed to be inserted (through the Fire Offices Committee) in all the tariff insurance companies' fire policies calculated to create considerable difficulty in connection with the use and storage, especially for commercial purposes, of motor vehicles. This has given rise to a discussion in the Chamber upon objectionable clauses in policies generally, and the society's representative—having instanced the case of a certain insurance company who, having had to pay damages

under their policy in respect of a motor waggon, forthwith gave notice to the insured that his policy would be cancelled in seventy-two hours, under a clause giving the insurance company power to that effect—has been nominated to a committee of the Chamber appointed to enquire into these matters.

The secretary will therefore be obliged if automobilists who have had practical experience of any objectionable clauses in any kind of insurance policies will at once communicate to him full particulars thereof at Norfolk House, Norfolk Street, Strand, W.C.



THE 12 H.P. DE DION. This car is a good example of the extended wheelbase type, which is now becoming so general. It permits entrance to the back seats from the side, and with the special front canopy and folding hood which, when up, makes a watertight junction with the back of the canopy, constitutes a most comfortable vehicle which is suitable for use in any weather. This particular landaulette is the property of M. Gailhard, Director of the Paris Opera, who is seated in the back of the car.

SUGGESTIONS FOR FUTURE TRIALS.

On Thursday, December 10th, Mr. E. H. Cozens-Hardy read before the members of the Automobile Club a paper containing his observations upon the speed trials held in Dublin and Southport, and the 1,000 miles reliability trials, and offered some criticisms and suggestions upon the organisation of these events, particularly with regard to the systems of marks awarded in the reliability trials. After some observations upon his own experiences in the speed trials, the author gave it as his opinion:

(1.) That in any short races on made roads, the use of a dust layer is almost essential.

(2.) That a 40ft. road is adequate for touring cars competing in pairs, but is somewhat risky for two large racers unless with the most experienced drivers.

(3.) That 400 yards is sufficient distance for racers to pull up in after crossing the line at eighty-five miles an hour.

(4.) That short races from a standing start are practically tests of the clutch and of the adhesion of the driving wheels, and pushing off should be forbidden. (In the case of a particularly light racer, having inadequate flywheel capacity, the attempt to get six mechanics to give a push off was made at Phoenix Park. When this was disallowed the driver twice stopped his engine with his clutch in attempting to start.)

(5.) That a telephone system is essential for marshalling purposes and for announcing results, and should be independent of any electrical timing arrangements. Mr. Orde has, I believe, worked out a system since the Southport races, and I hope we may hear his views.

(6.) That for races longer than at Phoenix Park—say, more than two miles—a special arrangement of electrical timing apparatus should be provided to prevent the serious delays which were found necessary with the Clough to Castlewellan races, where competitors had frequently to be detained on the starting line until the time of a vehicle which was expected at the finish had been recorded on the apparatus.

(7.) That the number of officials allowed on the course should be kept as small as possible, and that the duties of each should be very clearly set out. It should be laid down that any person who has undertaken official duties shall not wear his badge, or remain on the course, unless he is actually engaged at his proper duties.

(8.) That the last day for entries at the "late fee" rates should be at least fourteen days before the date of the trial, in order that competitors' instructions and timed programmes of events may reach the competitors a week before the event.

(9.) That if there is a large number of competitors, to eliminate them in heats of two requires only one less test than to time them individually; but if they be run against the clock, the prizes may be given to the shortest time, although the running is in pairs. To run the two shortest times in the final has the drawback that a mistake in timing, or a successful protest, may make the entire race void.

Dealing next with the reliability trials, of which, it will be remembered, Mr. Cozens-Hardy was one of the judges, he stated that he believed it to be the club's intention to give each item an importance in proportion to its maximum marks:

Reliability on the road, 3,000 marks.

Garage work, 1,500 marks.

Condition after trial and hill-climbing, 1,000 marks each.

Fuel consumption, dustiness, and track speed, 500 each.

Steering brakes, restarting on hills, noise, vibration, smoke, and accuracy of declared h.p., 250 marks each.

Cleanliness of motor, 125 marks.

The author admitted that the placing of the awards came as a great relief. As the calculations progressed they saw the awful possibilities of injustice being done, and in view of these facts, he produced some figures from the trials which form very interesting reading. Perhaps the most interesting of these tables is the one in which the average number of marks lost in each class is given. This table we reproduce in a condensed form, which shows the lowest and highest number of marks lost by the respective classes. A glance at this will show that the large car had the majority of points in its favour, while the smaller class of two-seated cars fares very badly by comparison. The

author bears out the statement which we have previously put forward—that it was most desirable to run light and cheap two-seated cars in equal competition with large high-powered vehicles. The above-mentioned table is as follows:

Heading.	Lowest average of marks lost.	Highest average of marks lost.
Reliability on road	Class D 39	Class A 172
Reliability in garage	" G 68	" A 148
Condition after test	" G 35	" B 300
Hill climbing	" G 247	" A 589
Fuel consumption	" E 249	" A 342
Speed	" E 30	" A 206
Dust raising	" A 129	" G 200
Brakes	" G 1	" A 35
Restarting	Classes F and G 0	" A 75
Noise	" D and G 94	" C 124
Vibration	Class E 29	" B 110
Smoke	" A 30	" E 54
Finish	" G 4	" A 60
Steering	" G 1	" A 51
Cheapness	" B 167	" G 235
Accuracy of declared h.p.	" G 26	" B 127
Cleanliness	" A 19	" F 51

Class A comprised vehicles declared at a selling price of £200 or less.

.. B between £200 and £300.

.. C .. £300 and £400.

.. D .. £400 and £550.

.. E .. £550 and £700.

.. F .. £700 and £900.

.. G more than £900.

In the publication of the above table we do not wish it to be inferred that we publish this in belittlement of the voiturette, but rather as an argument favouring the inclusion of the small car in competitive trials with the larger cars, as it is undoubtedly useful to users of voiturettes in emphasising those points to which attention should be given, and for this purpose no more useful data could possibly be produced.

There can be no question, said Mr. Cozens-Hardy, that the trials have secured a vast amount of information which should be invaluable in showing makers in what particulars their cars are open to improvement, as well as in securing accurate data as to current practice.

It has been suggested, with a considerable amount of truth, that trials of the kind just held are no test at all of the large cars, and are too severe for the small cars. It is obvious that a 5 h.p. car must be continuously working at high pressure if it is to keep up to the requisite speed, whereas under the same conditions a 25 h.p. car can hardly prevent its jacket water from freezing. For this reason, I think, the 1,000 miles trial of 1903 will be the last of its kind, and we shall have to find some other method of proving the qualities of various cars.

To my mind some more severe form of the quarterly trials would afford sufficient opportunity for testing the reliability of any new cars. A 200 miles non-stop run might be a suitable test for the larger cars, and 150 miles non-stop for the smaller ones. The annual competitive trials might then be confined to cars holding these non-stop reliability certificates, and might consist solely of tests of particular features, without any attempt to determine by an arbitrary standard which car has the best collection of features.

It would be of real value to have independent tests upon a large number of cars of the efficiency and easy running of the engines and of the transmission gear, tests of the carburettors and the range of engine speed, of the fuel consumption under varying loads, of the silencers and back pressure, of the radiators and the weight of water and power lost, and of other similar points upon which makers have now little more than experience of their own patterns to guide them. Such tests can be best undertaken by the club, but there is room for work of a more experimental nature, which is, perhaps, beyond the province of a Society of Encouragement. I, for one, feel the need of such research in connection with spirit engines, and, following the lead of Mr. Dugald Clerk, I hope shortly to begin a series of tests, with a view of throwing a little light on some of the obscure points in this interesting field.

THE 1,000 MILES RELIABILITY TRIALS.

A Summary of the Marks earned by each Competing Car.

LAST WEEK WE PUBLISHED THE JUDGES' AWARDS. THE MARKS EARNED BY EACH CAR UNDER EVERY ONE OF THE SEVENTEEN HEADINGS HAVE NOW BEEN FINALLY PASSED BY THE JUDGES AND ISSUED BY THE AUTOMOBILE CLUB.

WE need hardly remind our readers that the 1,000 miles trial of the Automobile Club, which took place last September, under the joint management of the Automobile Club and representatives of the industry, possessed a system of marking which was more elaborate than that in vogue for any previous reliability trial. The official document detailing the marks, which has now been issued by the Automobile Club, contains sixty-eight pages of tabulated matter, in which the full particulars are given of the marking for each of the one hundred and four cars which started in the trials. It is a most valuable work, and full of interest to the student of the performances of the participating vehicles. At the same time, we recognise that very few automobilists have the time or inclination to digest so detailed an account, and we have, therefore, compiled from the report a paragraphed summary of the main particulars of each competing car and what marks it earned under each of the seven-

teen headings, from *a* to *r*, the letter given before each total indicating that the marks are earned under that heading. Before proceeding, it would be well to recapitulate the headings under which the marks were gained.

- (a) Reliability (Rule 39).
- (b) Cleaning, replenishing, etc. (Rule 42).
- (c) Hill climbing (Rule 45).
- (d) Condition after trial (Rule 56).
- (e) Brakes (Rule 47).
- (f) Steering (Rule 49).
- (g) Absence of noise (Rule 54).
- (h) " vibration (Rule 54).
- (i) " vapour of smoke (Rule 54).
- (k) " dust raising (Rule 54).
- (l) Speed on track (Rule 51).
- (m) Re-starting on hill (Rule 53).
- (n) Finish and appearance (Rule 54).
- (o) General cleanliness of motor and gear (Rule 54).
- (p) Fuel consumption (Rule 50).
- (q) Accuracy of h.p. (Rule 48).
- (r) Cheapness (Rule 52).

A SUMMARY OF THE MARKING METHOD.

Reliability.

(a) Reliability (Rule 39), 3,000 marks.—The maximum number of marks which could be earned for reliability on the road in each of the eight days' runs was 375 per day, or 3,000 in all. A mark was deducted for every minute or part of a minute during which the car was stopped during the day's run, except for the three compulsory stops for refreshments. Only three cars succeeded in earning the highest possible number of marks by running right through without a stop, these being the 12 h.p. Wolseley, 9 h.p. Argyll, and 22 h.p. Daimler.

Cleaning, Replenishing, etc.

(b) Cleaning, replenishing, etc. (Rule 42).—187½ marks were awarded to each car per day, from which were deducted one mark for every minute during which the car was being adjusted, cleaned, lubricated, or replenished, either at the Crystal Palace or the compulsory stopping places. After the vehicles had been taken over by the judges before the trials, not even a nut could be tightened without losing marks, nor the petrol tank replenished. Consequently, not a single vehicle earned the highest impossible maximum of 1,500.

Hill-climbing.

(c) Hill-climbing (Rule 45), maximum marks 1,000.—Four hills were timed during the 1,019 miles covered in the eight daily runs, and the marks were awarded on the following formula:

$$\frac{C}{\text{Number of hills} + \frac{(6 + \text{number of passengers})}{(1,500 + \text{price in } \pounds)} + \text{average grade per cent.} + \text{speed in miles per hour.}}$$

Condition after Trials.

(d) Condition after trial (Rule 56).—1,000 was the highest total that could be earned for condition after trial. The machines were examined by the judges at the conclusion of the 1,000 miles, and those which showed undue signs of wear, or which had to have parts replaced by new ones, had marks deducted. Quite a large number of cars earned the highest possible.

Brakes.

(e) Brakes (Rule 47), maximum marks 250.—Special tests, as detailed in *The Autocar* of September 19th, were held by the judges before the daily trials commenced, and some surprise stops by signal were made on the road after the cars had been running some days.

Steering.

(f) Steering (Rule 49), maximum marks 250.—Marks were deducted for any inefficiency in the opinion of the judges found in the steering gear.

Absence of Noise.

(g) Absence of noise (Rule 54), maximum marks 250.

Absence of Vibration.

(h) Absence of vibration (Rule 54), maximum marks 250.

Absence of Vapour or Smoke.

(i) Absence of vapour or smoke (Rule 54), maximum marks 250.

Absence of Dust Raising.

(k) Absence of dust raising (Rule 54), maximum marks 500.—These (*g*, *h*, *i*, *k*) are self-explanatory, and require no special note from us.

Speed on Track.

(l) Speed on track (Rule 51), maximum marks 500.—A speed trial was held at Bexhill on the day of the run there, and marks were awarded by means of the following formula:

$$\frac{\text{Speed in miles per hour} \times (6 + \text{number of passengers})}{1,500 + \text{price of car in } \pounds} \times C.$$

Restarting on Hill.

(m) Restarting on hill (Rule 53), maximum marks 250.—This trial was conducted in the Palace grounds on a one in six grade, and each car was required to traverse fifteen yards in thirty seconds.

Finish and Appearance.

(n) Finish and appearance (Rule 54), maximum marks 250.

General Cleanliness of Motor and Gear.

(o) General cleanliness of motor and gear (Rule 54), maximum marks 125.—This heading and the one above it are almost self-explanatory, but it is well to point out that the cars which, so far as finish was concerned, were the smartest at the end of the trials showed that they were finished in the most durable manner. In other words, their painting, varnishing, and plating were of high quality, and consequently calculated to stand wear and tear. The general cleanliness referred particularly to absence of oil patches under the car when standing, while cars which did not throw oil from the mechanism on to various parts of the under carriage scored higher than those which had this vice.

Fuel Consumption.

(p) Fuel consumption (Rule 50), maximum marks 500.—The consumption was taken in pence per ton mile, and the car showing the least cost earned full marks, the others being marked in exact proportion.

Accuracy of Horse-power.

(q) Accuracy of horse-power (Rule 48), maximum marks 250.—The actual value of the horse-power performances of the cars, based upon the best individual performance of each car on any one of the four hills, was worked out by

a formula, and the vehicle in each class which showed that it had developed upon the hill a horse-power most nearly in accord with that claimed by its makers was awarded the highest total.

Cheapness.

(r) Cheapness (Rule 52), maximum marks 250.—Seven marks were awarded to vehicles for every £1 per cent. that the price was below the maximum price in the class, up to a maximum of 250 marks. In Class G (cars selling at more than £900), the price of the highest priced vehicle was taken as the maximum price in the class.

TABULATED SUMMARY OF THE MARKS.

Explanatory.

We have explained above the headings under which the marks were given and how they were apportioned. It will be understood that the letters before each set of marks below indicate that the marks were won under that particular heading. For instance, a 2,942 indicates that 2,942 marks were won for reliability, and so on. Where a discrepancy is found in the total of marks it will be understood that some have been deducted for excess of the permitted maximum of speed between the controls, the trial being one of reliability, and not speed.

CLASS A1.—Price £160 or under, and weighing less than 3 cwt.

No. 1, Century Tandem (SILVER MEDAL), Century Engineering and Motor Co., single cylinder, 84 mm. bore by 90 mm. stroke, 1,400 revolutions per minute, two seats, chain transmission; price, £125. a, 2,942; b, 1,414; c, 349; d, 500; e, 220; f, 250; g, 138; h, 175; i, 222; k, 476; l, 385; m, 0; n, 160; o, 87; p, 160; q, 156; r, 153. Total, 7,776.

No. 2, 6 h.p. Eagle Tandem, Eagle Engineering and Motor Co., Ltd., single cylinder, 90 mm. by 110 mm., 1,200 to 1,400 r.p.m., two seats, chain transmission; price, £160. a, 1,830; b, 898½; c, 310; q, 38; r, 0. Retired on sixth day, "driver refused to start."

No. 3, 3½ h.p. Rex Tricar, Rex Motor Manufacturing Co., single cylinder, 3½ in. by 3½ in., 1,500 r.p.m., two seats, belt transmission; price, £84. Retired on first day owing to clutch trouble at Chislehurst.

CLASS A.—£200 or less.

No. 4, 5 h.p. Baby Peugeot, Friswell, Ltd., single cylinder, 94 mm. bore by 100 mm. stroke, 900 r.p.m., two seats, gear transmission; price, £175. a, 2,973; b, 1,498; c, 531; d, 837; e, 220; f, 250; g, 127; h, 192; i, 230; k, 250; l, 317; m, 250; n, 200; o, 100; p, 204; q, 194; r, 87. Total, 6,370.

No. 5, 6 h.p. Regal, O. C. Selbach, single cylinder, 90 mm. by 110 mm., 950 r.p.m., two seats, gear transmission; price, £178 10s. a, 2,761; b, 1,301; c, 269; d, 330; e, 240; f, 140; g, 104; h, 168; i, 190; k, 500; l, 293; m, 84; n, 180; o, 90; p, 135; q, 61; r, 75. Total, 6,915.

No. 9, 6½ h.p. Vulcan, Vulcan Motor Co., single cylinder, 4 in. by 4 in., 1,200 r.p.m., two seats, gear transmission; price, £175. a, 729; b, 362; r, 87. Retired third day.

No. 11, Stanley steam car, J. Cockshott and Co., two cylinders, 2½ in. by 3½ in., two seats, gear transmission; price, £194 5s. a, 2,827; b, 1,241; c, 378; d, 500; e, 190; f, 150; g, 230; h, 220; i, 170; k, 292; l, 273; m, 230; n, 150; o, 112; p, 80; q, 250; r, 20. Fourteen marks deducted for excessive speed. Total, 7,419.

No. 12, 5 h.p. Coventry Humberette, Humber, Ltd., single cylinder, 3½ in. by 3½ in., 1,000 r.p.m., two seats; price, £131 5s. a, 1,811; b, 788½; c, 150; q, 41; l, 230; r, 240. Observer lost his book; no record for fifth day; retired seventh day, broke piston, gudgeon pin, and connecting rod near Guildford.

No. 14, 6½ h.p. Cadillac, Oldsmobile Co., single cylinder, 5 in. by 5 in., 750 r.p.m., three seats, chain transmission; price, £200. a, 2,979; b, 1,387; c, 461; d, 796; e, 230; f, 194; g, 147; h, 207; i, 237; k, 309; l, 332; m, 250; n, 170; o, 117; p, 151; q, 250; r, 0. Total, 8,217.

No. 15, Pony-Richard, Mann and Overton's, single cylinder, 90 mm. by 100 mm., two seats, belt transmission; price, £185. Retired first day at Sittingbourne, engine hot.

No. 16, 6 h.p. Relyante, Chief British Depot, single cylinder, 90 mm. by 110 mm., 1,500 r.p.m., two seats, gear transmission; price, £168. Retired first day in evening at Farningham owing to burst tube to cooler, etc.

No. 17, 5 h.p. Oldsmobile (SILVER MEDAL), Jarrott and Letts, one cylinder, 4½ in. by 6½ in., 500 r.p.m., two seats, chain transmission; price, £150. a, 2,957; b, 1,423; c, 485; d, 790; e, 235; f, 197; g, 188; h, 176; i, 214; k, 247; l, 296; m, 250; n, 166; o, 114; p, 181; q, 172; r, 175. Sixteen marks deducted for excessive speed. Total, 8,460.

No. 18, 6½ h.p. Clyde, Clyde Cycle and Motor Car Co., single cylinder, 88 mm. by 110 mm., 1,500 r.p.m., two seats, chain transmission; price, £175. a, 2,957; b, 1,378; c, 348; d, 898; e, 234; f, 210; g, 128; h, 145; i, 187; k, 257; l, 272; m, 0; n, 216; o, 117; p, 192; q, 85; r, 87. Total, 7,809.

No. 19, 6 h.p. Elswick, Burlington Carriage Co., single cylinder, 3½ in. by 4½ in.; 800 r.p.m., two seats, gear transmission; price, £200. a, 2,415; b, 1,274; c, 291; d, 518; e, 240; f, 159; g, 160; h, 173; i, 233; k, 460; l, 267; m, 166; n, 160; o, 90; p, 148; q, 74; r, 0. Total, 6,828.

No. 20, 6 h.p. De Dion, De Dion-Bouton, Ltd., single cylinder, 90 mm. by 110 mm., 1,500 r.p.m., two seats, gear transmission; price, £200. a, 2,938; b, 1,454; c, 458; d, 981; e, 200; f, 225; g, 129; h, 140; i, 237; k, 402; l, 322; m, 0; n, 248; o, 103; p, 153; q, 142; r, 0. Total, 8,129.

No. 21, 5 h.p. Oldsmobile (GOLD MEDAL), Jarrott and Letts, single cylinder, 4½ in. by 6 in., 400 r.p.m., two seats, chain transmission; price, £150. a, 2,945; b, 1,415; c, 429; d, 950; e, 208; f, 225; g, 203; h, 150; i, 244; k, 465; l, 331; m, 250; n, 217; o, 111; p, 166; q, 166; r, 175. Total, 8,650.

No. 23, 8 h.p. Achilles, B. Thompson and Co., single cylinder, 100 mm. by 110 mm., 1,500 r.p.m., two seats, gear transmission; price, £175. a, 2,571; b, 1,247; c, 459; d, 430; e, 147; f, 238; g, 111; h, 126; i, 231; k, 348; l, 233; m, 250; n, 198; o, 110; p, 166; q, 58; r, 87. Total, 7,010.

CLASS B.—£200 to £300.

No. 24, 6 h.p. Swift (SILVER MEDAL), Swift Motor Co., single cylinder, 90 mm. bore by 110 mm. stroke, 1,700 r.p.m., two seats, gear transmission; price, £220 10s. a, 2,974; b, 1,406; c, 493; d, 965; e, 235; f, 250; g, 149; h, 191; i, 240; k, 476; l, 251; m, 250; n, 249; o, 103; p, 163; q, 186; r, 185. Total, 8,763.

No. 25, 8-10 h.p. Regal, O. C. Selbach, two cylinders, 98 mm. bore by 125 mm. stroke, 1,000 r.p.m., five seats, gear transmission; price, £300. Retired first day at Faversham, gear trouble.

No. 28, 9 h.p. Beaufort Tonneau, Beaufort Motor Co., single cylinder, 110 mm. bore by 120 mm. stroke, 900 r.p.m., four seats, gear transmission; price, £295 16s. a, 2,851; b, 1,414; c, 506; d, 645; e, 235; f, 198; g, 154; h, 107; i, 198; k, 280; l, 399; m, 250; n, 231; o, 84; p, 267; q, 117; r, 9. Total, 7,940.

(a) Reliability (maximum 3,000); (b) cleaning, replenishing, etc. (1,500); (c) hill-climbing (1,000); (d) condition after trial (1,000); (e) brakes (250); (f) steering (250); (g) absence of noise (250); (h) absence of vibration (250); (i) absence of vapour or smoke (250); (k) absence of dust raising (500); (l) speed on track (500); (m) restarting on hill (250); (n) finish and appearance (250); (o) general cleanliness of motor and gear (125); (p) fuel consumption (500); (q) accuracy of h.p. (250); (r) cheapness (250).

No. 29, 9 h.p. Argyll, Hozier Engineering Co., single cylinder, 100 mm. bore by 120 mm. stroke, 1,200 r.p.m., four seats, gear transmission; price, £275. *a*, 2,984; *b*, 1,432; *c*, 514; *d*, 980; *e*, 237; *f*, 250; *g*, 127; *h*, 164; *i*, 240; *k*, 432; *l*, 365; *m*, 250; *n*, 239; *o*, 87; *p*, 266; *q*, 102; *r*, 58. Total, 8,727.

No. 34, 10 h.p. Georges-Richard, Mann and Overton's two cylinders, 100 mm. by 100 mm., 1,200 r.p.m., two seats, gear transmission; price, £300. *a*, 1,477; *b*, 721; *c*, 474; *g*, 107; *r*, 0. Retired on fifth day; ignition batteries ran out about 11.30 p.m. between Ashted and Epsom.

No. 35, 9 h.p. Eagle, Eagle Engineering and Motor Co., two cylinders, 85 mm. by 110 mm., 1,200 r.p.m., two seats, gear transmission; price, £235. *a*, 2,890; *b*, 1,438; *c*, 526; *d*, 221; *e*, 196; *f*, 150; *g*, 127; *h*, 164; *i*, 250; *k*, 284; *l*, 300; *m*, 250; *n*, 150; *o*, 109; *p*, 192; *q*, 81; *r*, 151. Total, 7,477.

No. 36, 10 h.p. Rex, Rex Motor Mfg. Co., single cylinder, 4½ in. by 4½ in., 1,200 r.p.m., four seats, gear transmission; price, £278 5s. *a*, 1,449; *b*, 702; *c*, 181; *g*, 32; *r*, 50. Retired on fifth day at Liphook with deranged differential.

No. 37, 4-7 h.p. Roots, Roots Oil Motor and Motor Car, Ltd., single cylinder, 4½ in. by 5 in., 750 r.p.m., two seats, chain transmission; price, £260. Retired first day at Ospringe through chain and exhaust valve trouble.

No. 38, 9 h.p. Mohawk Manon, Mohawk Motor Co., single cylinder, 100 mm. by 120 mm., 1,250 r.p.m., four seats, gear transmission; price, £210. *a*, 2,940; *b*, 1,401; *c*, 536; *d*, 400; *e*, 201; *f*, 200; *g*, 112; *h*, 0; *i*, 218; *k*, absent; *l*, 353; *m*, 250; *n*, 175; *o*, 95; *p*, 210; *q*, 154; *r*, 210. Total, 7,433.

No. 39, 8 h.p. M.M.C. (GOLD MEDAL), Motor Mfg. Co., single cylinder, 110 mm. by 130 mm., 1,300 r.p.m., four seats, gear transmission; price, £270. *a*, 2,999; *b*, 1,443; *c*, 519; *d*, 1,000; *e*, 225; *f*, 250; *g*, 137; *h*, 184; *i*, 224; *k*, 320; *l*, 410; *m*, 250; *n*, 250; *o*, 83; *p*, 287; *q*, 134; *r*, 70. Total, 8,785.

No. 40, 9 h.p. Darracq, A. Darracq and Co., two cylinders, 90 mm. by 100 mm., 1,400 r.p.m., four seats, gear transmission; price, £300. *a*, 2,937; *b*, 1,452; *c*, 371; *d*, 690; *e*, 240; *f*, 150; *g*, 127; *h*, 167; *i*, 102; *k*, 389; *l*, 308; *m*, 0; *n*, 218; *o*, 94; *p*, 212; *q*, 35; *r*, 0. Total, 7,491.

CLASS C—£300 to £400.

No. 41, 10 h.p. Gladiator (GOLD MEDAL), S. F. Edge, Ltd., two cylinders, 105 mm. bore by 130 mm. stroke, 1,900 r.p.m., four seats, chain transmission; price, £395. *a*, 2,962; *b*, 1,436; *c*, 722; *d*, 884; *e*, 242; *f*, 250; *g*, 147; *h*, 191; *i*, 233; *k*, 410; *l*, 452; *m*, 250; *n*, 250; *o*, 73; *p*, 344; *q*, 250; *r*, 8. Total, 9,102.

No. 42, 12 h.p. Albion, Albion Motor Car Co., two cylinders, 4½ in. by 5 in., 700 r.p.m., four seats, chain transmission; price, £363. *a*, 2,964; *b*, 1,428; *c*, 437; *d*, 1,000; *e*, 250; *f*, 250; *g*, 121; *h*, 177; *i*, 219; *k*, 298; *l*, 276; *m*, 250; *n*, 249; *o*, 110; *p*, 207; *q*, 78; *r*, 64. Total, 8,378.

No. 43, 10 h.p. Hallamshire, Durham, Churchill, and Co., two cylinders, 105 mm. by 120 mm., 800 r.p.m., four seats, gear transmission; price, £325. *a*, 2,719; *b*, 1,261; *c*, 396; *d*, 660; *e*, 233; *f*, 248; *g*, 83; *h*, 157; *i*, 150; *k*, 427; *l*, 290; *m*, 250; *n*, 213; *o*, 103; *p*, 155; *q*, 84; *r*, 131. Total, 7,560.

No. 47, 9 h.p. James and Browne, James and Browne, two cylinders, 4 in. by 6 in., 700 r.p.m., chain transmission; price, £400. *a*, 2,910; *b*, 1,361; *c*, 430; *d*, 893; *e*, 250; *f*, 250; *g*, 172; *h*, 147; *i*, 227; *k*, 200; *l*, 363; *m*, 250; *n*, 235; *o*, 70; *p*, 272; *q*, 144; *r*, 0. Total, 8,174.

No. 48, 10 h.p. Argyll, Hozier Engineering Co., two cylinders, 88 mm. by 120 mm., 1,100 r.p.m., four seats, gear transmission; price, £335. *a*, 3,000 (non-stop); *b*, 1,406; *c*, 541; *d*, 875; *e*, 215; *f*, 246; *g*, 166; *h*, 172; *i*, 214; *k*, 276; *l*, 395; *m*, 250; *n*, 243; *o*, 58; *p*, 280; *q*, 106; *r*, 113. Total, 8,553.

No. 49, 14 h.p. Argyll, Hozier Engineering Co., three cylinders, 90 mm. by 120 mm., 1,000 r.p.m., four seats, gear transmission; price, £400. *a*, 1,117; *b*, 527; *c*, 163; *g*, 122; *r*, 0. Retired first day at Charing; broken connecting rod.

No. 50, 10 h.p. Simms Welbeck, Simms Mfg. Co., two cylinders, 95 mm. by 110 mm., 1,000 r.p.m., four seats, gear transmission; price, £360. *a*, 1,780; *b*, 866; *c*, 188; *g*, 38; *r*, 70. Retired on the sixth day near Kipping's Cross; half-speed shaft gear wheel broken.

No. 51, 12 h.p. Wolseley, Wolseley Tool and Motor Car Co., Ltd., two cylinders, 4½ in. by 5 in., 800 r.p.m., four seats, chain transmission; price, £400. *a*, 3,000 (non-stop); *b*, 1,453; *c*, 700; *d*, 1,000; *e*, 245; *f*, 234; *g*, 144; *h*, 176; *i*, 217; *k*, 303; *l*, 446; *m*, 250; *n*, 250; *o*, 81; *p*, 258; *q*, 250; *r*, 0. Total, 9,002.

No. 52, 10 h.p. Wolseley, Wolseley Tool and Motor Car Co., two cylinders, 4½ in. by 5 in., 750 r.p.m., four seats, chain transmission; price, £380. *a*, 2,995; *b*, 1,464; *c*, 751; *d*, 921; *e*, 245; *f*, 241; *g*, 146; *h*, 150; *i*, 217; *k*, 246; *l*, 429; *m*, 250; *n*, 250; *o*, 48; *p*, 255; *q*, 250; *r*, 35. Total, 8,885.

No. 54, 12 h.p. Krupkar, Krupkar, Ltd., two cylinders, 115 mm. by 120 mm., 800 r.p.m., four seats, gear transmission; price, £400. *a*, 757; *b*, 487; *r*, 0. Retired on fourth day with broken cardan joint.

No. 56, 10 h.p. Horbick, Horsfall and Bickham, two cylinders, 4½ in. by 4½ in., 800 r.p.m., four seats, gear transmission; price, £399. *a*, 2,723; *b*, 1,299; *c*, 470; *d*, 938; *e*, 240; *f*, 221; *g*, 133; *h*, 135; *i*, 148; *k*, 270; *l*, 304; *m*, 250; *n*, 236; *o*, 90; *p*, 240; *q*, 113; *r*, 2. Eighteen marks deducted for excessive speed. Total, 7,794.

No. 57, 12 h.p. Georges-Richard, Mann and Overton's two cylinders, 104 mm. by 100 mm., 1,200 r.p.m., four seats, gear transmission; price, £385. *a*, 2,992; *b*, 1,442; *c*, 357; *d*, 1,000; *e*, 230; *f*, 250; *g*, 141; *h*, 132; *i*, 183; *k*, 470; *l*, 350; *m*, 250; *n*, 241; *o*, 78; *p*, 247; *q*, 52; *r*, 26. Total, 8,437.

No. 58, 12 h.p. Relyante, Chief British Depot, two cylinders, 100 mm. by 140 mm., four seats, chain transmission; price, £367 10s. *a*, 2,918; *b*, 1,428; *c*, 353; *d*, 330; *e*, 235; *f*, 249; *g*, 103; *h*, 170; *i*, 200; *k*, 253; *l*, 401; *m*, 250; *n*, 225; *o*, 100; *p*, 213; *q*, 68; *r*, 56. Total, 7,550.

No. 59, 13 h.p. Rex, Rex Motor Mfg. Co., two cylinders, 4½ in. by 4½ in., 1,000 r.p.m., four seats, gear transmission; price, £367 10s. *a*, 2,978; *b*, 1,393; *c*, 444; *d*, 750; *e*, 202; *f*, 200; *g*, 122; *h*, 141; *i*, 211; *k*, 392; *l*, 435; *m*, 0; *n*, 160; *o*, 100; *p*, 245; *q*, 162; *r*, 56. Twelve marks deducted for excessive speed. Total, 7,979.

No. 60, 10 h.p. Dechamps, International Automobile Mfg. Co., two cylinders, 100 mm. by 140 mm., 1,200 r.p.m., four seats, chain transmission; price, £375. *a*, 2,972; *b*, 1,255; *c*, 333; *d*, 900; *e*, 235; *f*, 201; *g*, 142; *h*, 130; *i*, 210; *k*, 371; *l*, 313; *m*, 250; *n*, 207; *o*, 80; *p*, 210; *q*, 100; *r*, 43. Total, 7,946.

No. 62, 7½ h.p. Wolseley (SILVER MEDAL), Mr. Oscar Thompson, two cylinders, 4 in. by 4 in., 900 r.p.m., four seats, chain transmission; price, 325. *a*, 2,989; *b*, 1,449; *c*, 605; *d*, 1,000; *e*, 245; *f*, 240; *g*, 135; *h*, 142; *i*, 198; *k*, 422; *l*, 442; *m*, 250; *n*, 250; *o*, 58; *p*, 222; *q*, 250; *r*, 131. Eighteen marks deducted for excessive speed. Total, 9,010.

No. 63, 10 h.p. Spyker, Mr. Albert House, two cylinders, 100 mm. by 120 mm., four seats, gear transmission; price, £330. *a*, 2,976; *b*, 1,367; *c*, 529; *d*, 911; *e*, 240; *f*, 236; *g*, 136; *h*, 145; *i*, 175; *k*, 340; *l*, 288; *m*, 250; *n*, 224; *o*, 87; *p*, 205; *q*, 126; *r*, 122. Total, 8,356.

No. 64, 12 h.p. Darracq, A. Darracq and Co., two cylinders, 100 mm. by 120 mm., four seats, gear transmission; price, £350. *a*, 2,973; *b*, 1,440; *c*, 551; *d*, 787; *e*, 237; *f*, 215; *g*, 104; *h*, 117; *i*, 161; *k*, 449; *l*, 388; *m*, 250; *n*, 203; *o*, 106; *p*, 184; *q*, 66; *r*, 87. Fifteen marks deducted for excessive speed. Total, 8,303.

(a) Reliability (maximum 3,000); (b) cleaning, replenishing, etc. (1,500); (c) hill-climbing (1,000); (d) condition after trial (1,000); (e) brakes (250); (f) steering (250); (g) absence of noise (250); (h) absence of vibration (250); (i) absence of vapour or smoke (250); (k) absence of dust-raising (500); (l) speed on track (500); (m) restarting on hill (250); (n) finish and appearance (250); (o) general cleanliness of motor and gear (125); (p) fuel consumption (500); (q) accuracy of h.p. (250); (r) cheapness (250).

CLASS D.—£400 to £550.

No. 65, 12 h.p. Sunbeam (SPECIAL SILVER MEDAL), John Marston, four cylinders, 80 mm. by 120 mm., 800 r.p.m., four seats, gear transmission; price, £525. *a*, 2,953; *b*, 1,460; *c*, 560; *d*, 1,000; *e*, 240; *f*, 250; *g*, 143; *h*, 207; *i*, 178; *k*, 205; *l*, 405; *m*, 250; *n*, 249; *o*, 83; *p*, 231; *q*, 159; *r*, 31. Total, 8,603.

No. 66, 12 h.p. Gladiator, S. F. Edge, Ltd., four cylinders, 88 mm. by 110 mm., 1,200 r.p.m., four seats, chain transmission; price, £540. *a*, 2,959; *b*, 1,403; *c*, 812; *d*, 853; *e*, 250; *f*, 249; *g*, 159; *h*, 189; *i*, 150; *k*, 399; *l*, 500; *m*, 250; *n*, 250; *o*, 62; *p*, 218; *q*, 250; *r*, 12. Total, 8,913.

No. 67, 12 h.p. Ariel, Ariel Motor Co., four cylinders, 3½ in. by 3½ in., 1,400 r.p.m., four seats, gear transmission; price, £550. Retired first day at Chislehurst with twisted axle through collision with another car.

No. 68, 14 h.p. Brooke, J. W. Brooke and Co., three cylinders, 3½ in. by 4½ in., 900 r.p.m., chain transmission; price, £500. *a*, 2,980; *b*, 1,442; *c*, 549; *d*, 998; *e*, 250; *f*, 244; *g*, 149; *h*, 191; *i*, 186; *k*, 455; *l*, 339; *m*, 250; *n*, 229; *o*, 100; *p*, 326; *q*, 77; *r*, 65. Fifteen marks deducted for excessive speed. Total, 8,813.

No. 70, 10 h.p. Thornycroft, Thornycroft Steam Wagon Co., two cylinders, 4 in. by 4½ in., 900 r.p.m., four seats, gear transmission; price, £440. *a*, 2,946; *b*, 1,321; *c*, 305; *d*, 656; *e*, 243; *f*, 196; *g*, 148; *h*, 182; *i*, 237; *k*, 394; *l*, 304; *m*, 0; *n*, 150; *o*, 120; *p*, 206; *q*, 70; *r*, 140. Total, 7,606.

No. 71, 10 h.p. Peugeot, Friswell, Ltd., two cylinders, 105 mm. by 105 mm., four seats, chain transmission; price, £450. *a*, 1,116; *b*, 536; *c*, 310; *d*, 508; *e*, 227; *f*, 234; *g*, 139; *h*, 202; *i*, 212; *k*, 230; *l*, 405; *m*, 84; *n*, 213; *o*, 100; *p*, 222; *q*, 160; *r*, 127. No marks are credited to this car after the third day's run for changing sprockets. This was due to a misunderstanding, so that the car is not disqualified.

No. 75, 8-10 h.p. Elswick, Burlington Carriage Co., two cylinders, 4 in. by 5 in., 800 r.p.m., five seats, gear transmission; price, £472 10s. *a*, 364; *b*, 186; *r*, 98. Retired on second day at Mayfield; no particulars available.

No. 77, 12 h.p. Star, Star Engineering Co., four cylinders, 3½ in. by 4½ in., 900 r.p.m., four seats, chain transmission; price, £550. *a*, 2,996; *b*, 1,443; *c*, 663; *d*, 783; *e*, 250; *f*, 243; *g*, 142; *h*, 197; *i*, 132; *k*, 307; *l*, 473; *m*, 250; *n*, 234; *o*, 25; *p*, 224; *q*, 250; *r*, 0. Total, 8,596.

No. 78, 14 h.p. Beaufort tonneau, Beaufort Motor Co., two cylinders, 110 mm. by 125 mm., 800 r.p.m., four seats, gear transmission; price, £417 15s. *a*, 368; *b*, 187; *r*, 168. Retired on second day with broken cardan joint.

No. 79, 16 h.p. Argyll, Hozier Eng. Co., four cylinders, 88 mm. by 110 mm., 1,000 r.p.m., four seats, gear transmission; price, £550. *a*, 2,877; *b*, 1,361; *c*, 450; *d*, 896; *e*, 170; *f*, 222; *g*, 141; *h*, 214; *i*, 237; *k*, 438; *l*, 413; *m*, 250; *n*, 235; *o*, 45; *p*, 181; *q*, 63; *r*, 0. Total, 8,170.

No. 80, 15 h.p. Belsize, Marshall and Co., two cylinders, 4 in. by 5 in., 1,350 r.p.m., four seats, gear transmission; price, £455. *a*, 711; *b*, 363; *c*, 303; *g*, 95; *r*, 120. Retired on third day at Kingsfold with broken connecting rod.

No. 82, 14 h.p. Brooke, F. F. Wellington, Ltd., three cylinders, 3½ in. by 4½ in., 900 r.p.m., four seats, gear transmission; price, £500. *a*, 2,378; *b*, 1,235; *c*, 296; *g*, 132; *l*, 402; *r*, 63. Retired on eighth day at Redhill; split pin fell into two to one gear, stripping teeth off wheel.

No. 83, 10 h.p. Relyante steamer, Chief British Depot, four cylinders, 2½ in. by 3 in., three seats, chain transmission; price, £472 10s. Retired on first day at Canterbury with bent connecting rod.

No. 84, 10 h.p. White steamer, White Steam Cars, two cylinders, 3 in. high pressure, 5 in. low pressure, stroke of both 3½ in., four seats, gear transmission; price, £420. *a*, 2,986; *b*, 1,228; *c*, 670; *d*, 1,000; *e*, 240; *f*, 245; *g*, 244; *h*, 250; *i*, 147; *k*, 416; *l*, 430; *m*, 250; *n*, 235; *o*, 92; *p*, 140; *q*, 250; *r*, 165. Total, 8,988.

No. 85, 12 h.p. Dennis, Dennis Bros., two cylinders, 105 mm. by 130 mm., 950 r.p.m., four seats, gear transmission; price, £420. *a*, 2,975; *b*, 1,433; *c*, 452; *d*, 895; *e*, 235; *f*, 224; *g*, 147; *h*, 208; *i*, 250; *k*, 246; *l*, 404; *m*, 250; *n*, 249; *o*, 90; *p*, 312; *q*, 166; *r*, 165. Total, 8,701.

No. 86, 12 h.p. Clement, British Automobile Commercial Syndicate, four cylinders, 75 mm. by 120 mm., four seats, gear transmission; price, £550. This is officially stated to have retired on the first day, but it will be remembered that the car made a non-stop run on the first day. The car was not allowed to start on the second morning on account of the driver having been disqualified for making a record run upon the road. Insufficient notice was given to enable a second driver to be appointed.

No. 87, 10 h.p. Lanchester, Lanchester Engine Co., two cylinders, 5½ in. by 5½ in., 920 r.p.m., four seats, worm gear; price, £525. *a*, 2,998; *b*, 1,439; *c*, 487; *d*, 692; *e*, 230; *f*, 209; *g*, 152; *h*, 244; *i*, 198; *k*, 429; *l*, 403; *m*, 250; *n*, 241; *o*, 77; *p*, 255; *q*, 235; *r*, 31. Total, 8,570.

No. 89, 14 h.p. Brush, Brush Electrical Engineering Co., four cylinders, 85 mm. by 118 mm., 800 r.p.m., four seats, gear transmission; price, £500. *a*, 2,964; *b*, 1,408; *c*, 642; *d*, 900; *e*, 225; *f*, 233; *g*, 151; *h*, 210; *i*, 240; *k*, 232; *l*, 388; *m*, 250; *n*, 206; *o*, 65; *p*, 210; *q*, 168; *r*, 63. Total, 8,551.

No. 90, 16 h.p. Maxim, London General Automobile Co., two cylinders, 110 mm. by 120 mm., 1,000 r.p.m., four seats, chain transmission; price, £472 10s. *a*, 2,911; *b*, 1,330; *c*, 619; *d*, 891; *e*, 240; *f*, 204; *g*, 132; *h*, 142; *i*, 224; *k*, 311; *l*, 375; *m*, 84; *n*, 246; *o*, 70; *p*, 247; *q*, 122; *r*, 98. Total, 8,242.

No. 91, 12 h.p. De Dion (SILVER MEDAL), De Dion-Bouton, Ltd., two cylinders, 100 mm. by 110 mm., 1,500 r.p.m., four seats, gear transmission; price, £420. *a*, 2,990; *b*, 1,453; *c*, 856; *d*, 1,000; *e*, 229; *f*, 250; *g*, 130; *h*, 140; *i*, 212; *k*, 215; *l*, 466; *m*, 250; *n*, 250; *o*, 106; *p*, 227; *q*, 250; *r*, 165. Total, 9,189.

No. 92, 12 h.p. New Orleans (GOLD MEDAL), New Orleans Motor Co., four cylinders, 95 mm. by 110 mm., 800 r.p.m., four seats, gear transmission; price, £500. *a*, 2,973; *b*, 1,452; *c*, 814; *d*, 942; *e*, 226; *f*, 250; *g*, 169; *h*, 222; *i*, 230; *k*, 449; *l*, 483; *m*, 250; *n*, 248; *o*, 106; *p*, 358; *q*, 250; *r*, 63. Total, 9,483.

No. 93, 10 h.p. Renault, Roadway Autocar Co., two cylinders, 100 mm. by 110 mm., 1,500 r.p.m., four seats, gear transmission; price, £437. *a*, 2,966; *b*, 1,463; *c*, 629; *d*, 942; *e*, 227; *f*, 250; *g*, 172; *h*, 222; *i*, 247; *k*, 312; *l*, 406; *m*, 250; *n*, 223; *o*, 70; *p*, 237; *q*, 250; *r*, 143. Total, 9,039.

CLASS E.—£550 to £700.

No. 94, 20 h.p. Thornycroft, Thornycroft Steam Wagon Co., four cylinders, 4 in. by 4½ in., 900 r.p.m., four seats, gear transmission; price, £640. *a*, 2,971; *b*, 1,413; *c*, 508; *d*, 840; *e*, 236; *f*, 250; *g*, 143; *h*, 219; *i*, 221; *k*, 364; *l*, 497; *m*, 84; *n*, 194; *o*, 100; *p*, 211; *q*, 87; *r*, 60. Fourteen marks deducted for excessive speed. Total, 8,384.

No. 95, 12 h.p. Chelmsford steamer, Clarkson, Ltd., two cylinders, 4 in. by 4 in., 600 r.p.m., six seats, chain transmission; price, £620. *a*, 2,878; *b*, 1,336; *c*, 480; *d*, 983; *e*, 192; *f*, 245; *g*, 216; *h*, 235; *i*, 227; *k*, 474; *l*, 444; *m*, 250; *n*, 206; *o*, 125; *p*, 500; *q*, 250; *r*, 80. Total, 9,117.

No. 96, 12 h.p. Germain, Capt. Masui, four cylinders, 95 mm. by 130 mm., 800 r.p.m., four seats, chain transmission; price, £700. *a*, 2,955; *b*, 1,431; *c*, 629; *d*, 841; *e*, 229; *f*, 250; *g*, 148; *h*, 216; *i*, 157; *k*, 303; *l*, 370; *m*, 250; *n*, 214; *o*, 100; *p*, 251; *q*, 178; *r*, 0. Total, 8,520.

No. 97, 15 h.p. New Orleans, New Orleans Motor Co., four cylinders, 100 mm. by 110 mm., 800 r.p.m., four seats, gear transmission; price, £561 15s. *a*, 2,973; *b*, 1,339; *c*, 807; *d*, 900; *e*, 225; *f*, 250; *g*, 129; *h*, 241; *i*, 230; *k*, 460; *l*, 483; *m*, 0; *n*, 249; *o*, 100; *p*, 297; *q*, 250; *r*, 138. Fifteen marks deducted for excessive speed. Total, 9,056.

(a) Reliability (maximum 3,000); (b) cleaning, replenishing, etc. (1,500); (c) hill-climbing (1,000); (d) condition after trial (1,000); (e) brakes (250); (f) steering (250); (g) absence of noise (250); (h) absence of vibration (250); (i) absence of vapour or smoke (250); (k) absence of dust-raising (500); (l) speed on track (500); (m) restarting on hill (250); (n) finish and appearance (250); (o) general cleanliness of motor and gear (125); (p) fuel consumption (500); (q) accuracy of h.p. (250); (r) cheapness (250).

No. 99, 18 h.p. Star, Star Engineering Co., four cylinders, 4in. by 4½in., 900 r.p.m., four seats, chain transmission; price, £600. *a*, 372; *b*, 186; *r*, 100. Retired on the second day at Uckfield with chain sprocket sheared from driving wheel.

No. 100, 18 h.p. James and Browne, James and Browne, four cylinders, 4in. by 6in., 700 r.p.m., four seats, chain transmission; price, £650. *a*, 2,994; *b*, 1,436; *c*, 790; *d*, 911; *e*, 249; *f*, 248; *g*, 164; *h*, 210; *i*, 210; *k*, 359; *l*, 461; *m*, 250; *n*, 241; *o*, 112; *p*, 194; *q*, 243; *r*, 50. Total, 9,182.

No. 102, 24 h.p. Wolsley, Wolsley Tool and Motor Car Co., four cylinders, 4½in. by 5in., 800 r.p.m., four seats, chain transmission; price, £650 5s. *a*, 2,997; *b*, 1,454; *c*, 919; *d*, 947; *e*, 245; *f*, 240; *g*, 152; *h*, 149; *i*, 250; *k*, 335; *l*, 470; *m*, 250; *n*, 250; *o*, 100; *p*, 118; *q*, 190; *r*, 49. Total, 9,172.

No. 104, 28 h.p. Winton, Oldsmobile Co. two cylinders, 5½in. by 6in., 800 r.p.m., five seats, chain transmission; price, £650. *a*, 1,325; *b*, 715; *c*, 173; *g*, 71; *r*, 50. Retired on fifth day at Carshalton with broken crankshaft.

No. 105, 10 h.p. Gardner-Serpollet (GOLD MEDAL), Speedwell Motor and Eng. Co., two cylinders, 75 mm. by 72 mm., 1,000 r.p.m., four seats, chain transmission; price, £687 10s. *a*, 2,999; *b*, 1,411; *c*, 1,000; *d*, 1,000; *e*, 250; *f*, 250; *g*, 204; *h*, 250; *i*, 153; *k*, 261; *l*, 482; *m*, 250; *n*, 233; *o*, 95; *p*, 355; *q*, 250; *r*, 12. Total, 9,454.

No. 106, 24 h.p. Georges-Richard, Mann and Overton, four cylinders, 104 mm. by 100 mm., 1,200 r.p.m., four seats, gear transmission; price, £650. *a*, 2,983; *b*, 1,355; *c*, 576; *d*, 1,000; *e*, 162; *f*, 250; *g*, 168; *h*, 210; *i*, 148; *k*, 399; *l*, 463; *m*, 250; *n*, 243; *o*, 66; *p*, 200; *q*, 73; *r*, 50. Sixteen marks deducted for excessive speed.

Total, 8,580.

No. 108, 16 h.p. Dennis, Dennis Bros., four cylinders, 88 mm. by 110 mm., 950 r.p.m., four seats, gear transmission; price, £577 10s. *a*, 2,991; *b*, 1,463; *c*, 781; *d*, 946; *e*, 210; *f*, 238; *g*, 153; *h*, 226; *i*, 185; *k*, 410; *l*, 438; *m*, 250; *n*, 243; *o*, 82; *p*, 275; *q*, 191; *r*, 122.

Total, 9,202.

No. 109, 16 h.p. Lanchester single tonneau, Lanchester Engine Co., two cylinders, 5½in. by 5½in., 720 r.p.m., four seats, worm gear; price, £700. *a*, 344; *b*, 145; *r*, 0. Retired on second day with engine overheated.

No. 111, 20 h.p. Spyker, Mr. Albert House, four cylinders, 100 mm. by 120 mm., 900 r.p.m., four seats, gear transmission; price, £650. Retired first day when close to Palace on return journey, gear out of order.

No. 113, 14 h.p. Renault, Roadway Autocar Co., four cylinders, 85 mm. by 105 mm., 1,100 r.p.m., four seats, gear transmission; price, £630. *a*, 2,869; *b*, 1,345; *c*, 703; *d*, 647; *e*, 156; *f*, 250; *g*, 149; *h*, 216; *i*, 215; *k*, 405; *l*, 429; *m*, 0; *n*, 217; *o*, 85; *p*, 174; *q*, 250; *r*, 70. Ten marks deducted for excessive speed. Total, 8,170.

No. 114, 14 h.p. Martini (GOLD MEDAL), Capt. Deasy, four cylinders, 100 mm. by 130 mm., four seats, gear transmission; price, £695. *a*, 2,996; *b*, 1,463; *c*, 921; *d*, 1,000; *e*, 240; *f*, 250; *g*, 176; *h*, 232; *i*, 199; *k*, 212; *l*, 473; *m*, 250; *n*, 250; *o*, 100; *p*, 228; *q*, 250; *r*, 5. Total, 9,249.

No. 116, 10 h.p. White Steam Car (SPECIAL SILVER MEDAL), Mr. Oliver Shiras, two cylinders, 3in. high pressure, 5in. low pressure by 3½in. stroke, four seats, gear transmission; price, £555. *a*, 2,995; *b*, 1,272; *c*, 692; *d*, 998; *e*, 240; *f*, 250; *g*, 242; *h*, 250; *i*, 134; *k*, 416; *l*, 348; *m*, 250; *n*, 226; *o*, 87; *p*, 191; *q*, 250; *r*, 145. Total, 8,986.

No. 117, 12 h.p. Humber, Humber, Ltd., four cylinders, 3½in. by 4in., four seats, gear transmission; price, £577. *a*, 374; *b*, 187; *r*, 123. Retired on second day at Mayfield with a stripped driving pinion.

No. 118, 24 h.p. Darracq, A. Darracq and Co., four cylinders, 112 mm. by 120 mm., 1,000 r.p.m., four seats, gear transmission; price, £665. *a*, 2,852; *b*, 1,377; *c*, 634; *d*, 720; *e*, 229; *f*, 245; *g*, 146; *h*, 217; *i*, 212; *k*, 374; *l*, 452; *m*, 250; *n*, 242; *o*, 95; *p*, 215; *q*, 91; *r*, 35. Total, 8,381.

Class F.—£700 to £900.

No. 119, 12 h.p. Peugeot, Friswell, Ltd., four cylinders, 85 mm. by 90 mm., four seats, gear transmission; price, £750. *a*, 2,973; *b*, 1,400; *c*, 581; *d*, 970; *e*, 246; *f*, 250; *g*, 117; *h*, 232; *i*, 141; *k*, 212; *l*, 433; *m*, 250; *n*, 218; *o*, 100; *p*, 241; *q*, 250; *r*, 116. Total, 8,729.

No. 120, 20 h.p. Germain, Capt. Masui, four cylinders, 105 mm. by 140 mm., 1,800 r.p.m., four seats, chain transmission; price, £900. *a*, 2,922; *b*, 1,357; *c*, 683; *d*, 705; *e*, 217; *f*, 200; *g*, 149; *h*, 197; *i*, 206; *k*, 364; *l*, 437; *m*, 250; *n*, 116; *o*, 110; *p*, 218; *q*, 156; *r*, 0. Total, 8,285.

No. 121, 20 h.p. Beaufort tonneau, Beaufort Motor Co., four cylinders, 95 mm. by 110 mm., 750 r.p.m., four seats, chain transmission; price, £745 15s. *a*, 2,738; *b*, 1,195; *c*, 544; *d*, 868; *e*, 237; *f*, 228; *g*, 98; *h*, 195; *i*, 191; *k*, 219; *l*, 399; *m*, 250; *n*, 198; *o*, 60; *p*, 194; *q*, 151; *r*, 120. Total, 7,875.

No. 122, 20 h.p. Humber, Humber, Ltd., four cylinders, 4½in. by 5½in., 900 r.p.m., four seats, gear transmission; price, £787 10s. *a*, 2,927; *b*, 1,387; *c*, 478; *d*, 830; *e*, 233; *f*, 250; *g*, 166; *h*, 212; *i*, 237; *k*, 359; *l*, 165; *m*, 250; *n*, 200; *o*, 53; *p*, 140; *q*, 151; *r*, 87. Total, 8,120.

No. 123, 12 h.p. Wilson-Pilcher, Wilson and Pilcher, four cylinders, 3½in. by 3½in., 900 r.p.m., four seats, gear transmission; price, £710. *r*, 147. Retired on first day at Wrotham with commutator and pump-shaft gear wheel adrift.

No. 125, 25 h.p. Maudslay, Maudslay Motor Co., three cylinders, 5in. by 5in., 800 r.p.m., four seats, chain transmission; price, £892 10s. *a*, 1,740; *b*, 830; *c*, 293; *g*, 35; *r*, 5. Retired on sixth day. No reason given in report, but it was due, as explained in *The Autocar* at the time, to the hidden fracture of the commutator wire.

No. 126, 16 h.p. De Dietrich, Jarrott and Letts, Ltd., four cylinders, 104 mm. by 120 mm., 700 r.p.m., four seats, chain transmission; price, £760. *a*, 2,996; *b*, 1,437; *c*, 722; *d*, 890; *e*, 250; *f*, 250; *g*, 144; *h*, 207; *i*, 222; *k*, 292; *l*, 433; *m*, 250; *n*, 233; *o*, 87; *p*, 148; *q*, 250; *r*, 108. Total, 8,919.

No. 127, 15 h.p. C.G.V. (SPECIAL SILVER MEDAL), Ewart-Hall, four cylinders, 90 mm. by 130 mm., 720 r.p.m., four seats, chain transmission; price, £890. *a*, 2,968; *b*, 1,377; *c*, 605; *d*, 871; *e*, 240; *f*, 250; *g*, 179; *h*, 220; *i*, 196; *k*, 446; *l*, 406; *m*, 250; *n*, 239; *o*, 80; *p*, 243; *q*, 250; *r*, 7. Total, 8,827.

No. 128, 18 h.p. Chenard-Walcker, Weston Motor Syndicate, four cylinders, 100 mm. by 130 mm., 900 r.p.m., four seats, gear transmission; price, £750. *a*, 367; *b*, 185; *r*, 116. Retired on second day, no reason given in report, but it will be remembered that the car was withdrawn because the new carburetter was not completed, and consequently it could not be driven with any satisfaction at the low speeds required by the trials regulations.

No. 129, 15 h.p. Pipe with magneto clutch, London Motor Garage, four cylinders, 100 mm. by 135 mm., 750 r.p.m., four seats, chain transmission; price, £760. *a*, 2,965; *b*, 1,372; *c*, 683; *d*, 937; *e*, 131; *f*, 250; *g*, 121; *h*, 212; *i*, 218; *k*, 422; *l*, 449; *m*, 250; *n*, 245; *o*, 40; *p*, 275; *q*, 250; *r*, 108. Total, 8,977.

No. 130, 16 h.p. Rochet-Schneider (GOLD MEDAL), Captain Deasy, four cylinders, 100 mm. by 150 mm., four seats, chain transmission; price, £850. *a*, 2,995; *b*, 1,414; *c*, 848; *d*, 992; *e*, 250; *f*, 249; *g*, 203; *h*, 240; *i*, 240; *k*, 237; *l*, 421; *m*, 250; *n*, 250; *o*, 50; *p*, 255; *q*, 250; *r*, 38. Total, 9,182.

No. 131, 18 h.p. Mors, Roadway Autocar Co., four cylinders, 106 mm. by 125 mm., 1,300 r.p.m., four seats, chain transmission; price, £900. *a*, 1,439; *b*, 638; *c*, 404; *g*, 94; *r*, 0. Retired on fifth day at Ewell, through colliding with gate in fog.

No. 132, 20 h.p. Holec, United Kingdom Inventions' Association, four cylinders, 4½in. by 5in., 900 r.p.m., five seats, gear transmission; price, £850. *r*, 38. Retired on first day through engine trouble and tyre puncture.

(a) Reliability (maximum 3,000); (b) cleaning, replenishing, etc. (1,500); (c) hill-climbing (1,000); (d) condition after trial (1,000); (e) brakes (250); (f) steering (250); (g) absence of noise (250); (h) absence of vibration (250); (i) absence of vapour or smoke (250); (k) absence of dust raising (500); (l) speed on track (500); (m) restarting on hill (250); (n) finish and appearance (250); (o) general cleanliness of motor and gear (125); (p) fuel consumption (500); (q) accuracy of h.p. (250); (r) cheapness (250).

No. 133, 20 h.p. M.M.C. (SILVER MEDAL), Motor Mfg. Co., four cylinders, 100 mm. by 130 mm., 1,100 r.p.m., four seats, chain transmission; price, £750. *a*, 2,942; *b*, 1,329; *c*, 846; *d*, 963; *e*, 207; *f*, 250; *g*, 119; *h*, 189; *i*, 142; *k*, 301; *l*, 487; *m*, 250; *n*, 250; *o*, 105; *p*, 282; *q*, 250; *r*, 116. Total, 9,028.

No. 134, 16 h.p. F.I.A.T. Motor Agency, four cylinders, 100 mm. by 110 mm., 1,000 r.p.m., four seats, chain transmission; price, £850. *a*, 2,960; *b*, 1,426; *c*, 715; *d*, 980; *e*, 250; *f*, 238; *g*, 145; *h*, 229; *i*, 203; *k*, 422; *l*, 426; *m*, 250; *n*, 244; *o*, 52; *p*, 175; *q*, 189; *r*, 38. Total, 8,962.

Class G.—Over £900.

No. 136, 22 h.p. Daimler (SPECIAL GOLD MEDAL), Daimler Motor Co., Ltd., four cylinders, 105 mm. by 130 mm. stroke, 720 r.p.m., ten seats, chain transmission; price, £1,000. *a*, 2,871; *b*, 1,421; *c*, 794; *d*, 933; *e*, 250; *f*, 250; *g*, 148; *h*, 185; *i*, 203; *k*, 325; *l*, 475; *m*, 250; *n*, 250; *o*, 100; *p*, 222; *q*, 250; *r*, 0. Total, 8,921.

No. 137, 22 h.p. Daimler (GOLD MEDAL), Daimler Motor Co., four cylinders, 105 mm. by 130 mm., 720 r.p.m., four seats, chain transmission; price, £975. *a*, 3,000 (non-stored); *b*, 1,421; *c*, 740; *d*, 1,000; *e*, 247; *f*, 250; *g*, 155; *h*, 219; *i*, 191; *k*, 232; *l*, 390; *m*, 250; *n*, 250; *o*, 90; *p*, 248; *q*, 240; *r*, 17. Total, 8,938.

No. 140, 24 h.p. De Dietrich, Jarrott and Letts, Ltd., four cylinders, 120 mm. by 120 mm., 700 r.p.m., four seats, chain transmission; price, £960. *a*, 2,988; *b*, 1,453; *c*, 735; *d*, 962; *e*, 250; *f*, 246; *g*, 166; *h*, 222; *i*, 200; *k*, 342; *l*, 420; *m*, 250; *n*, 238; *o*, 65; *p*, 144; *q*, 187; *r*, 28. Total, 8,894.

General Conclusions.

It is impossible in the short time available between the receipt of the report from the club and the publication of *The Autocar* to attempt any sort of criticism, as the volume of figures is so great that it would be impossible to attempt more than the summary we have given this week. The way in which the marks have been checked and counter-checked by the club officials and the judges is a testimony to the extreme care which has been taken to bring these trials above reproach. At the moment, we will not enter into the question as to whether the system is too complicated or not, though, as we have pointed out before, we have always regarded it as a mistake that marks should have been given for cheapness (*r*). This has introduced a misleading and unnecessary element into the trials which would have been better omitted.

We do not consider the questions of accuracy of horse-power and speed are sufficiently important to warrant the high marking which has been given them. It is also a question whether absence of noise and absence of vibration have been fairly measured. It should be understood we are not making any suggestion that there has been carelessness on the part of the judges; far otherwise, but we do not see how it is possible for noiselessness and freedom from vibration to be fairly compared by any human sense, and if no instrument or instruments can be obtained to register these virtues, they should have been omitted from the final results. On the other hand, these qualities are of importance to the user, and it is desirable that they should be measured in the most accurate manner possible. It will be understood that the medals have been awarded for the highest totals of marks, a car which made the best record on the road, and which required the least attention in the garage not necessarily winning the gold or silver medal in its class. One of the most satisfactory features of the trials is the large number of machines which passed the judges' examination at the conclusion of the trials, and earned the full 1,000 marks for excellence of condition of motor mechanism and working parts generally. Perhaps the most disappointing feature of the trials is the performance of the three-cylinder cars, but it will be found on looking into the matter that this was not in any way due to the number of cylinders, but to other causes. It will be understood, by reference to the gold and silver medal awards last week, that the special gold and silver medals given by the judges are not for the highest total of marks in any class, but for some specific features of the cars which earned the judges' special commendation, though, of course, it was necessary for the cars to do good performances before being awarded these distinctions. We leave further comment for subsequent issues. The record of more than one good car was entirely spoiled by poor driving and absolute lack of judgment. It is always assumed in these trials that a thoroughly good automobilist is in charge of the car; if otherwise, the public discredits the vehicle, and not in the majority of cases the man who drives it.

CLUB DOINGS.

Burnley and District A.C.

The first annual dinner of the above club was held on Tuesday night, the 8th inst., at the Bull Hotel, twenty-five members being present, with Mr. J. Watts presiding. After the toast "The King" had been given by the President, Mr. C. Atkinson, in proposing "The Club," referred to its formation eighteen months ago, and the assistance which the club, supported by the Motor Union, had been able to render one of its members. Mr. Smith-Lawson, the secretary, responded. Mr. P. H. Altham proposed "The Local Authorities." Mr. J. S. Altham responded. Mr. Harold Smith, of Colne, proposed "The Motor Industry." He was of opinion that the manufacturers had not yet made a suitable car for the man with moderate means, and thought that a two or three-seated car, with twin cylinders, and driven with a single chain, ought to come to the public at about £150. Mr. Clements responded. The concluding "free and easy," replete as it was with songs, and experiences of the early types of car, as told by Mr. P. L. Altham, Councillor Atkinson, and Councillor T. W. Hargreaves, brought to a close a most delightful and entertaining function.

Lincolnshire A.C.

The annual general meeting of the Lincolnshire A.C. was held at headquarters, the Saracen's Head Hotel, Lincoln, on Friday, the president, Sir H. B. Bacon, Bart., presiding. The report showed a most successful year. Several meets have been held; also a hill-climbing competition and a driving competition. The surveyors of the county were entertained to lunch by the members, and much good resulted. The committee has watched the various movements and tried to safeguard the welfare of the members.

It was decided that the club should be represented at the February conference, the Chairman, Captain J. A. Cole, and the honorary secretary, Mr. E. Cragg, M.D., being appointed as representatives. The scheme of affiliation sent out from the A.C.G.B.I. was discussed, and it was felt that there is a good prospect of a workable scheme being arranged. It was decided to alter the rule which bars anyone in the trade holding office or being on the committee. In future the honorary secretary will send out to the members desiring it a short *résumé* of the doings of the committee, so that they may know what is being

done. Captain E. Newsum, Mr. A. A. Padley, Mr. W. R. Pennell, Dr. Gilpin, Dr. Pim, and Mr. Benson, J.P., were re-elected on the committee, and Messrs. Glead, G. Godson, Dr. Hancock Stiel, and Mr. Godfrey Lowe were added. Captain Boothby, who has rejoined his regiment, and Mr. P. Wright resigned. Mr. C. W. Pennell, the first chairman, was made a vice-president, with a seat on the committee. The president and vice-presidents were re-elected.

Yorkshire Automobile Club.

As a memento of the recent annual dinner of this club, those who were present on the occasion signed their names upon an illuminated parchment containing a brief record of the function. This has been framed and presented to the club for the decoration of the club room by Messrs. Roslington and Routh, two of the guests.

On December 8th, Mr. Herbert A. Jones read a paper on "The New Motor Act and its Effects on Motorists" to a large muster of members. An interesting discussion followed, in which Messrs. Farnell, Winn, and others joined. Mr. E. Hepper was in the chair. A feature of the evening was the exhibition of sample lamps and other devices rendered necessary by the new Act sent in by manufacturers for the inspection of the members. Amongst the firms who sent sample lamps were Messrs. Salsbury; speedometers were sent by Messrs. Markt, Puffard, Staunton, and Dunhill; while Messrs. Elliott Bros. sent an interesting model, comprising a speedometer for fixing on the dashboard and actuated from one of the front steering wheels. This was driven by a small electric motor, and showed in a most graphic manner the use and action of the speedometer.

The Federation Question.

The official minutes of the conference held at the Inns of Court Hotel on December 2nd have been issued. Following up the report of the meeting, which we gave in *The Autocar* of December 5th (p. 703), we quote the following: "A committee was formed, consisting of one delegate from each club represented (with the exception of the Midland A.C., whose representative had left earlier), to consider upon what terms they would amalgamate with the A.C.G.B. and I., and after discussion the following resolutions, duly proposed and seconded, were carried *nem. con.*: (1.) That a committee be formed consisting of an equal number of members of the A.C.G.B. and I. and the affiliated clubs to decide upon all matters other than those purely domestic. (2.) That the affiliation fee be reduced. (3.) That each affiliated club have the uncontrolled management of its own affairs. (4.) That each affiliated club shall have all the advantages now offered by affiliation and membership of the Motor Union. (5.) That a representative of each club represented at this meeting be appointed to form a committee to meet the executive committee of the Automobile Club some time before the meeting in February, and that it be an instruction to that committee to base their requirements upon the resolutions passed this evening."

We are asked to state that at the meeting of representatives of provincial clubs to discuss the federation scheme, the Manchester Automobile Club was not represented.

The Norfolk Automobile and Launch Club.—Annual Dinner.—Mr. S. F. Edge on Motors.

The annual dinner of the above club was held on Saturday evening at Norwich. The toasts of "The King" and "The Prince of Wales" having been honoured, Mr. Roger Wallace, K.C., president of the A.C.G.B.I., proposed "Success to the Norfolk Automobile and Launch Club," expressing his conviction that motor cars would become great feeders of railways. He also complimented the Norfolk Club on the happy combination they had made of motor cars and launches. Lord Claud Hamilton, president of the club, in reply, said he looked upon motoring not so much as an amusement as an enterprise which would confer vast benefits upon the human race. As chairman of a railway company, he agreed that anything which tended to promote locomotion must benefit railways. Therefore, he felt that when he was honoured with the request to become president, it was due to him, if only with regard to the interests of railway shareholders, that he should show there was one railway chairman who did not fear, but rather welcomed, the advent of motor cars.

Mr. S. F. Edge read a paper on "The Past, Present,

and Future of Motor Cars and Motor Launches." After tracing the evolution of the motor car since 1896, with special reference to the Daimler and Benz type of engines, he said that to-day they really only had one serious firm supplying the best type of the horizontal engine car—the Wolseley. As was well-known, this type of car lent itself to cheapness of production, and should thus enable Britain to make a stand with a sound English car against cheap foreign cars. The development of the De Dion engine was also traced. To-day, continued Mr. Edge, the vertical engine was universal with practically the one exception referred to, but the number of cylinders was still in doubt. They had cars with from one to eight cylinders, but the increased number of parts consequent upon multiplying the number of cylinders did not seem to increase the number of breakdowns on the road. Along with this development a struggle was in progress between two parties, one trying to use a single or a twin cylinder engine and trying to combine with it a variable speed gear for gearing to the maximum without any steps, and the other party trying to reduce the gears to two or three by employing six or more cylinders to enable them to have great speed and power, flexibility in the engine, and so enable the change speed gear to be greatly reduced, if not entirely eliminated. As to which would be the eventual solution it was too early to say, but, personally, after experimenting in both directions, he leaned to multiplicity of cylinders and the elimination of change speed gears. At present the public wanted a car for about £100, which would be small, light, cheap to run, costing nothing for upkeep, almost improved by not being cleaned or oiled, that would be just right and comfortable for two, or six at a pinch, with room for a little luggage, a hood to keep off the dust or rain, and capable of being turned into a brougham if necessary. This was something of the ideal of the non-technical mind, and should be pushed before the manufacturers in all parts of the world, but he was afraid with present methods and engines it would not be realised. The future would, he thought, bring forth the one-cylinder car at £150 to £200, a four-cylinder car of two speeds at £400, and a four or six-cylinder speedy touring car with as many as four speeds at a higher figure. These seemed to him to be the eventual types that would come in the course of two years or so. They must, however, bear in mind that they might see the development of an engine on the turbine principle which would take the place of the reciprocating engine, but exactly what effect this would have on design he had not considered. As to the possibilities of electric traction, he outlined a state of affairs in the future when roads throughout the country would be equipped with overhead wires from which cars could draw their current. Still further ahead he saw a greater development of the system by collecting the power on some improved Marconi system. In regard to launches, he said an awakening was taking place, England at the present time having gained the supremacy by securing the two international cups for motor launch contests. For 1904 the competition would be very keen, but England was not idle, some very fast new boats being under construction, which, he thought, would be a revelation.

On the proposal of Mr. H. L. Clark, the health of Mr. Edge was drunk, and Mr. G. M. Chamberlain proposed the toast of "The Visitors," to which the Dean of Norwich, Mr. R. Wallace, K.C., the Sheriff of Norwich, and Mr. W. Rees Jeffreys responded.

"THE AUTOCAR" COLONIAL AND FOREIGN EDITION.

IN ADDITION TO THE USUAL EDITION OF "THE AUTOCAR," A SPECIAL THIN EDITION IS PUBLISHED EACH WEEK FOR CIRCULATION ABROAD. THE ENGLISH AND FOREIGN RATES WILL BE FOUND BELOW. ORDERS WITH REMITTANCE SHOULD BE ADDRESSED "THE AUTOCAR," CROYDREY.

The *Autocar* can be obtained abroad from the following:

AUSTRALIA: Phillips, Ormonde, and Co., 533, Collins Street, Melbourne
 NICE: Levant & Chevalier, 50, Quai St. Jean Baptiste.

UNITED STATES: The International News Agency, New York.

PARIS: Neal's English Library, 248, Rue Rivoli.

MELBOURNE, Victoria,

SYDNEY, N.S.W.,

BRISBANE, Q.L.D.,

PERTH, W.A.,

WELLINGTON, N.Z.,

CHRISTCHURCH, N.Z.,

CAPETOWN, S. Africa,

DURBAN, Natal, S. Africa.

Messrs. Gordon and Gotch

"THE AUTOCAR" SUBSCRIPTION RATES.

British Isles, 16s.; Foreign, 22s. 8d. per annum.