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 Arthur Turner (Leeds).
 Geo. Palmer.
 Fredk. W. Ruck
 (Maidstone).
 Llewellyn James
 (Brecknock).
 D. N. Dumaresq.

Letters forwarded to T. Elvins and W. Brock.

Our thanks are due to the following for items of news and various topics of interest which have been or will be dealt with: C. E. G., W. A. Turpin, H. H. Timberlake, W. F. Peare, B. Read, H. W. B., A. L. B., Hon. Leopold Cauning, G. T. Riches, J. Moore Brabazon, Alex. Riach, D. A. Irving, and W. Johnston.

We are interested to hear that Messrs. Gibson, Battle, and Co., the agents for the Locomobile Co. of Great Britain in Sydney, have already seven Locomobiles in use in New South Wales, and they soon expect to have more running. There are also six or seven De Dion voituresses and delivery vans at work; and taking motor bicycles, quads, and cars, there are between fifty and sixty motors now running in New South Wales. This, we think, is a very good record considering the comparative juvenility of the movement in the Antipodes.

Signs are not altogether lacking that the British public, which, however much they may be annoyed and inconvenienced at times, are imbued from top to toe with a sense of fair play, are beginning to resent and to aid in the nullification of the meannesses to which the police are now being hounded by the justices of this country. A few days since a well-known legal member of the Automobile Club was returning from Yorkshire on his 14 h.p. New Orleans, and was approaching the notorious mendacious trap near Alconbury Hill, between Stilton and Buckden, when the driver of a smart mare and dogcart approaching him was seen to be holding up his hand. The automobilist at once pulled up, and when the horse driver approached the car, without his animal evincing the slightest fear, asked for what reason he had been halted. "Your horse does not seem to mind the car a bit," said he. "Oh, no," replied the sportsman in the dogcart, "but I just pulled you up to warn you that half a mile farther on there is a policeman skulking in the hedge to collar you if you are going at any speed. I'm not an automobilist myself, and I can't say I'm very fond of them, as I am a horse dealer, but I do like fair play, and I think the way in which the police have been dealing with motor cars hereabouts lately is most *unfair*. They only stop those that are going at a reasonable pace; the scorchers get away."

NOTICES.

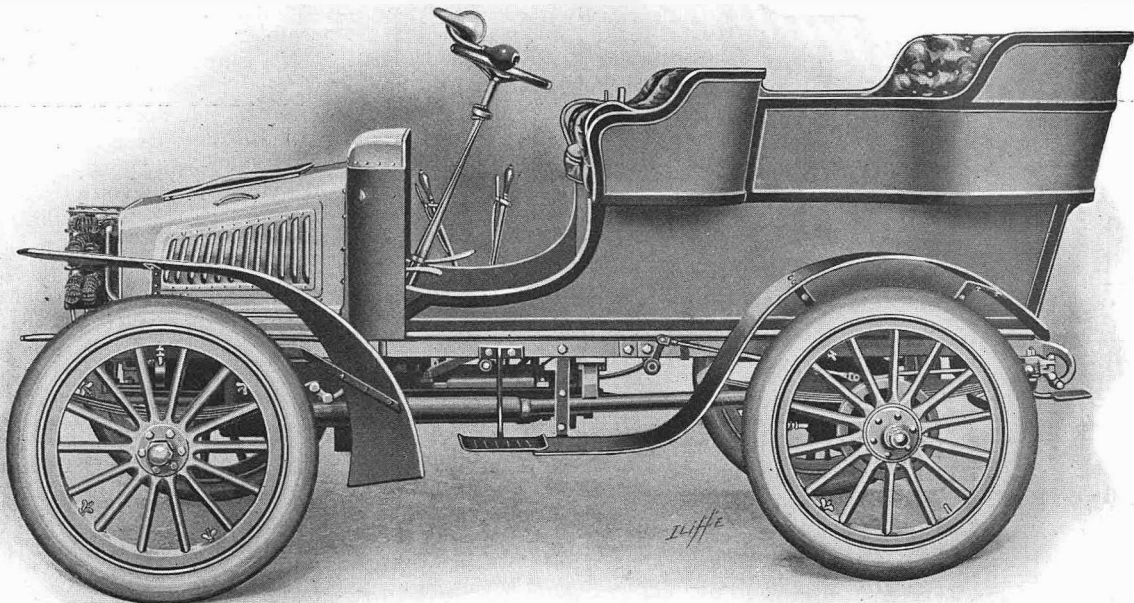
SUBSCRIPTIONS.

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THE NEW 14 H.P. TWO-CYLINDER REX.



THE AUTOCAR

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

EDITED BY H. WALTER STANER.

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CONTENTS.

	PAGE
NOTES: THE MAIDENHEAD BRIDGE TOLLS—THE CARRIAGE OF PETROL—THE FRENCH OFFICIAL KILOMETRE AND MILE—THE FUEL PROBLEM	437-439
A MILLER'S PETROL LORRY (illustrated)... ..	439
USEFUL HINTS AND TIPS	440
ENTRY OF STEAM CARS INTO FRANCE	441
THE CHAMEROY TYRE TREAD	441
THE VICEREGAL MOTOR TOUR (illustration)	441
THE MAUDSLAY 20 H.P. CAR (illustrated)... ..	442
ONE OF THE WAR OFFICE CARS (illustrated)	444
AN AMERICAN BUILT CAR (illustrated)	444
THE HYDROLEUM BURNER	445
CONTINENTAL NOTES AND NEWS—A TOUR IN ALGERIA—PARIS-MADRID RACE—THE HEAVY CAR CRITERIUM—THE HOY CLIMBING TRIALS—ELECTRIC TIMING—THE GORDON-BENNETT CUP	446-447
THE UNCONTROLLABLE HORSE	447
CORRESPONDENCE: THE RAILWAYS AND PETROL—THE NUMBERING OF CARS—A NEW GAME—THE RELIABILITY TRIALS—THE PICK CAR—FOR MEDICAL USE—AN INSURANCE POINT—ENGLISH COILS—EMERGENCY TYRE REPAIR—THE AUTOMOBILE VOLUNTEERS—TYRES	448-450
FLASHES (illustrated)	451-454
OIL MOTOR CARS OF 1902	455-458
THE SCOTTISH AUTOMOBILE CLUB (illustrated)	458
A TRAP THAT FAILED	459
THE AUTOMOBILE CLUB	459
THE PETROL QUESTION	460
DE DION BOUTON v. BROWN BROTHERS	460
AN ALLEGED INFRINGEMENT	460
POLICE TRAPS	461
NEW PATENTS	461
ANSWERS TO CORRESPONDENTS (QUERIES OF GENERAL INTEREST)	461
GRAUPLING WITH A GRADIENT (illustration)	462

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 ON THE LAST PAGE. ORDERS WITH REMITTANCE SHOULD BE ADDRESSED "THE AUTOCAR," COVENTRY.

The Autocar can be obtained abroad from the following:
 AUSTRALIA: Phillips, Ormonde, and Co., 333, Collins Street, Melbourne.
 FRANCE: Nice, Levant, and Chevalier, 50, Quai St. Jean Baptiste.
 UNITED STATES: The International News Agency, New York.

Notes.

The Maidenhead Bridge Tolls.

The agitation which has been in progress for some time past against the continued imposition by the Corporation of Maidenhead of tolls upon automobilists and others passing over the bridge which spans the Thames at this point has resulted in a public inquiry being instituted by the Charity Commissioners. This inquiry will be held at the Town Hall, Maidenhead, on Tuesday, November 18th. It will probably be remembered from previous references to the subject in *The Autocar* that the point at issue is that the Corporation claim to levy tolls as authorised in the original Act of Parliament under which the bridge was constructed, and they further claim the right to devote the money to the general expenses of the Corporation, notwithstanding the fact that it was specified in the first instance that the funds were to be devoted solely to paying for

the bridge and its maintenance. The contention of those who oppose the tolls is that when the old corporations were swept away by the Municipal Reform Act, the control of these revenues should have passed over to trustees appointed by the Charity Commissioners, and that the Corporation have therefore been illegally exacting them ever since the passing of the Municipal Reform Act referred to. The result of the inquiry will be awaited with interest by automobilists and other users of the bridge, who have been pretty heavily taxed towards the relief of the Maidenhead ratepayer, seeing that the bridge—erected in 1772—has long since been paid for, and that in 1836 a surplus of £3,600 from the bridge fund was invested in consols.

The Carriage of Petrol.

The position with regard to the carriage of petrol remains practically the same as last week. In those districts where petrol is brought by water, no inconvenience is felt, and in the majority of those less conveniently situated a good stock was already in hand before the new regulation of the railway companies came into force. Messrs. Carless, Capel, and Leonard have issued a circular which throws further light upon their unwillingness and that of the Anglo-American Co. not to sign the indemnity clause, as they consider that, although the clause clearly states that the indemnity against damage is only given in consequence of the regulations and conditions for the carriage of inflammable liquids being infringed or neglected, these regulations and conditions are so numerous and complicated that if the railway companies claim damages, the senders would have the utmost difficulty in proving that the spirit was properly packed. It seems that when they were informed of the new conditions, they wrote to the chief railway companies pointing out the difficulties, and suggesting that after the goods had once been delivered to and accepted by the railway companies the senders' loss should be limited to the value of the goods themselves, as is the case at present, or, rather, as was the case up to October 20th. If, however, the companies required something more, it was suggested that the senders, in case of proved non-compliance with the regulations, should make themselves liable, in the event of an accident, to a penalty of £20, or even £50, for each offence. They pointed out, in the case of gunpowder and other such explosives which are far more likely than petrol to cause an accident, the maximum penalty in case of non-compliance with the regulations was limited to £20. To these suggestions they received no reply, but a deputation representing the London railway companies called on them four days before the enforcement of the clause, and simply informed them that they would not receive any goods unless the indemnity

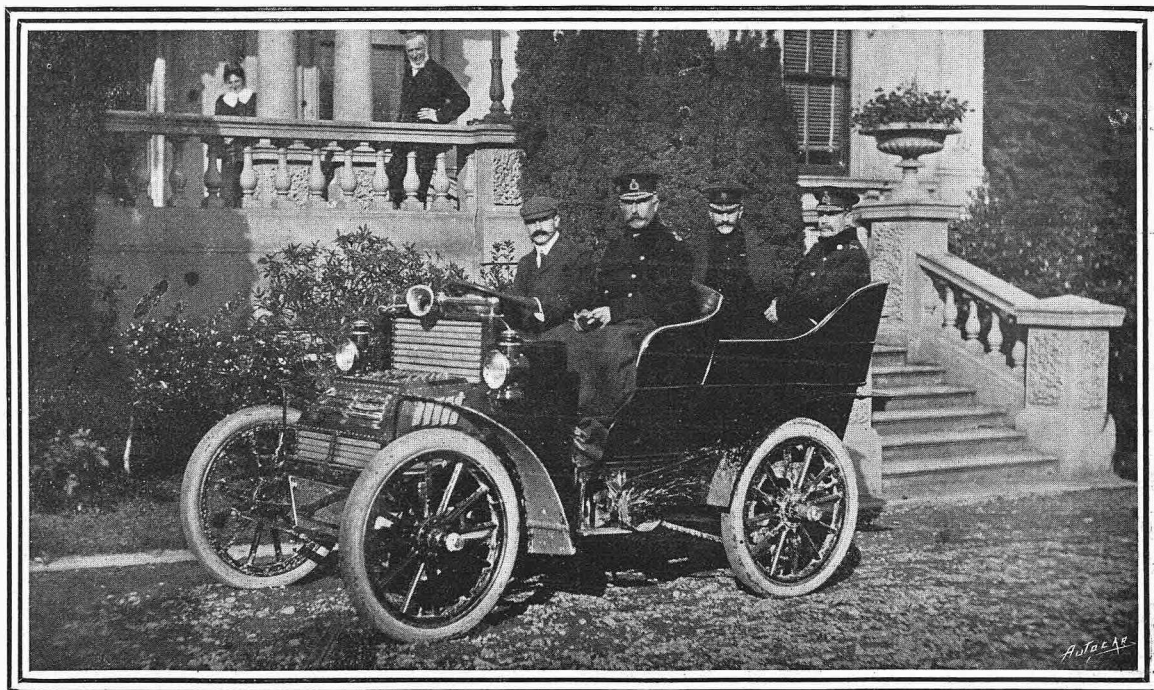
clause was signed with the others. They, like the Anglo-American Oil Co., absolutely declined to sign the clause, and, as we have already said, if the senders cannot do this it is out of the question to expect the receivers to do it, as they are absolutely unable to tell whether the conditions of packing, etc., are conformed to. A good bit has been made by critics of the acceptance of liability by the railway companies, if it can be proved that the injury or damage is due to the wilful neglect of the companies' servants, but we pass over this, as it is well known to be well-nigh a legal impossibility to prove this, though, on the other hand, it may be pointed out that if an accident were to occur with petrol it would be equally difficult to prove that it was due to improper packing, as such accident could only take the form of a fire or explosion due to leakage, and in that case all material evidence would either be blown or burned away. At any rate, the position seems to offer a good opportunity for enterprising and daring individuals in different districts to constitute themselves providers of motor spirit for the neighbourhood, if they will accept the risk of signing the indemnity form—a risk which may or may not exist. It appears to us that all the trouble is due to mystery. Neither the senders nor receivers can see why the railway companies should want the indemnity signed, and, although it is not clear what harm a company can do the signatory, it is felt that the action would not be taken without a motive, and no one is willing to risk a legal quarrel with a great corporation like a railway company, which never relinquishes its quest till the House of Lords has settled the matter either for or against it. The position also offers a brilliant opportunity for energetic insurance companies.

The French Official Kilometre and Mile.

Appropos of these official courses, selected by Monsieur Tampier, the official timekeeper to the Automobile Club of France, at the instance of that august body, reference to which appeared in our Continental Notes last week, English automobilists finding themselves upon the particular portion of the Paris-Bordeaux course chosen by the above-named official, may like such pointers as will enable them actually to identify the two distances. The four central and level kiloms. lie between the thirteenth and seventeenth kilom. stones between St. Arnoult and Dourdan, the actual speed kilom. starting from the 14,600 kilom. stone to the 15,600 kilom. stone (small stones mark each 100 metres), while the mile lies between the 14,200 kilom. stone and 15,800 stone, whereat it finishes. The official timekeeper has asked for the erection of distinctly marked distance posts at these four points. When these are up there should be no difficulty in determining the speed stretches with exactitude.

The Fuel Problem.

In considering the subject of a fuel for autocar internal combustion engines to replace oil or oil spirit, it has been suggested that coal gas might be used by compressing it in cylinders, such as are used for oxygen, and that it might be used in a similar manner to that gas. That is, the gas would be delivered by a reducing valve into a mixing chamber, whence the gas, mixed with its correct proportions of air, would be drawn into the engine. At first sight the idea, though not a new one, appears promising, as there would be little difficulty in adapting it to existing motors. That it is a fallacy is soon apparent, as a cylinder ten inches in diameter



Last week we referred to the good work which had been done by autocars at the recent military manoeuvres in Ireland. The photograph which we reproduce above was taken at Mallow, when the Duke of Connaught was using the Brooke three-cylinder car. Mr. Mawdsley Brooke, who drove the vehicle, will be seen by his side, and the occupants at the back are Major O. S. Nugent, D.S.O., the owner of the car, and General Wavell.

and thirty inches long—inside measurements—will only hold about nine and a quarter cubic feet of gas at a pressure of 1,000 lbs. to the square inch. As the average gas consumption of a small engine is about twenty-five cubic feet per b.h.p. per hour, it is very

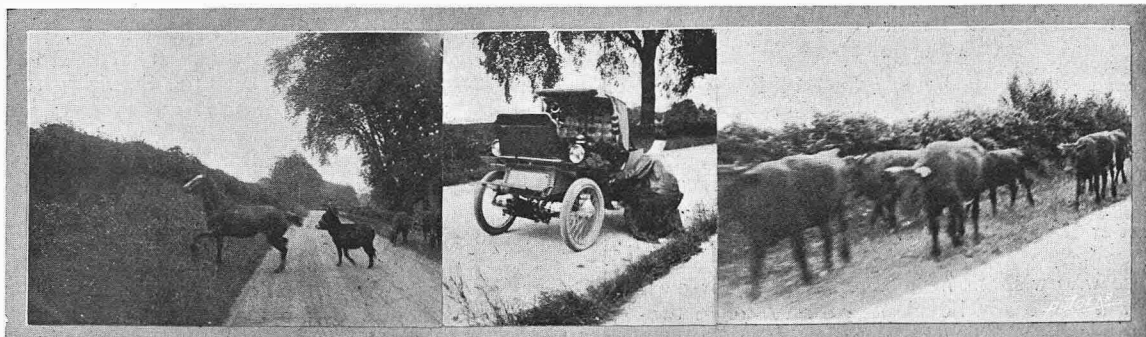
plainly seen that one would have to carry an impossibly large gas-holder in order to run any distance—in fact, the cylinders of compressed gas would weigh more than the accumulators of an electric car.

A MILLER'S PETROL LORRY.



At the present time lorries driven by internal combustion engines are not by any means common, and the photograph of the 24 b.h.p. Napier five-ton lorry which is in daily use by Messrs. J. Mark Mayhew, millers, of Battersea, S.W., is therefore of particular interest. The long runs which it can make without a stop for fuel or water have been found a great advantage, particularly as when compared with steam it is faster, as the tare weight of the lorry is under two tons. This lorry has been up Dashwood Hill with five and a half tons on board; in fact, before delivery was accepted this climb had to be made. Sand boxes are fitted to the driving wheels, so that driving grip can be obtained on greasy surfaces.

This van is another instance of the striking advance which has been made by the internal combustion engine in the last two or three years, as it was pretty generally admitted at that time that steam was unapproachable for heavy work. We have only to recall the sensation which was made by the big Cannstatt-Daimler van which was run in one of the club hundred miles trials a couple of years back. When intended for use in roadless, or practically roadless, country like South Africa, the Napier lorry is built with much larger wheels, so as to raise the vehicle higher off the ground to enable it to go through rivers and in and out of depressions without much difficulty.



Snap shots found in Mr. W. B. Jevons's camera after a run from Market Rasen to Cromer. Dr. Trumper, who accompanied Mr. Jevons, is responsible for the central item

USEFUL HINTS AND TIPS.

If, when changing speed, the gear misses, depress the clutch pedal again quickly and the gears will invariably come in at once without causing any jar upon them. When firmly in, the clutch should be let in gently to pick up the momentum the car has lost.

x x x x

When the electrolyte, or liquid, in an accumulator cell falls below the level of the plates by reason of evaporation, fill up with a little clean soft water, distilled if possible. Further additions of sulphuric acid are not required. Never allow the solution to get beyond a quarter of an inch below the top of the plates; it may cause them to buckle. If for any purpose the acid solution is emptied from the cells, fill them up with water to prevent the plates sulphating.

x x x x

To charge an accumulator from a 100 volt circuit, such as is usually provided for house lighting, two wires should be attached to a lamp socket by means of an extension plug—which may be obtained at any electricians—or a wall plug. Two 16 c.p. or one 32 c.p. lamp should be put into the circuit as a resistance by connecting one end of a wire to one terminal of the lamp socket, and carrying another wire from the other terminal for attachment to the accumulator. If two 16 c.p. lamps are used a short length of wire should connect the two lamps. Thus there are two wires, one direct from the source of the current and the other with the lamp or lamps interposed. The capacity of the lamp may be ascertained by the figures marked on the glass bulb. Thus 16-100 indicates that it gives a light of 16 candle-power, and is suitable for a 100 volt circuit; 32-100 denotes a 32 c.p. lamp for a similar circuit, and so on. The positive and negative poles may be ascertained by immersing the ends of the wire in a glass of acidulated water. Bubbles will rise quickly from one wire and slowly from the other. The former is the negative pole (—) and should be attached to the — terminal on the accumulator, and the other wire to the + terminal. Charging should be carried on to 4.6 volts.

On the 2nd November the Motor Cycling Club will run to Aylesbury, the start taking place from Marble Arch at 10.30. Members (and visitors, who will be heartily welcomed) who wish to join *en route* will meet at the top of Harrow Hill from 11 to 11.30.

* * *

A useful addition to the ever-growing price list of the United Motor Industries is a sheet dealing with the different types of Longuemare carbureters. In addition to the patterns we have illustrated, the new ones for alcohol and for two and four-cylinder engines are shown. For the two-cylinder engine the carburetter has a single jet. For the four-cylinder it has two jets, one for each pair of cylinders, though for those who wish to have a separate jet for each cylinder it can easily be adapted for use on a two-cylinder engine. The sizes in which the Longuemare is made vary from the motor bicycle size up to those with $2\frac{3}{16}$ in. mixture outlets.

A good solution, or electrolyte, for accumulators is made by mixing five ounces of brimstone sulphuric acid with twenty ounces of distilled water, which should register 25° Baume before charging and 27° when fully charged. Add the acid to the water, not the water to the acid.

x x x x

Users of solid-tyred vehicles should note that a gap of about an eighth of an inch between the ends of the tyre will always prevent trouble caused by the tyre coming out of the rim. The small gap allows the tyre to expand under the strain of traction without butting against its opposite end with sufficient force to dislodge the tyre. When the tyre has permanently expanded to such an extent that the ends are normally in contact, one end should be lifted from the rim and a slice cut off it to maintain the gap.

x x x x

Overheating in a motor is a serious circumstance, and every precaution should be taken to guard against it, as harm will result unless immediately attended to. The chief symptoms are a loss of power, accompanied by harsh running, steam rising from the cooling water, and premature ignition resulting in a knock in the motor. The causes of overheating may be any one of the following circumstances: (1.) Loss of cooling water. (2.) Want of oil or imperfect lubrication. (3.) Racing the motor for long periods. (4.) Continued driving on a low gear with the ignition forward and a large volume of mixture. This, of course, applies to motors without governors, and is equal to racing a governed engine. The remedies are to (1) see that the pump, if used, is working properly, and that no leakage is taking place at any part of the system, and that the water tank is filled and replenished as often as required; (2) fill up the lubricators and see they are working properly, and occasionally wash out the oil tank and pipes with paraffin; keep all the joints tight and free from leakages; (3) refrain from racing the motor unless it is absolutely necessary, such as, for instance, starting on a bad hill; (4) drive on the highest gear you conveniently can, with the throttle as little open as possible, and the sparking advanced. The result is economy in fuel, easy running, and a large reserve of power without changing speed.

We have an interesting account of a week-end run by Mr. Stuart Noakes, who recently invested in a $7\frac{1}{2}$ h.p. Germain, and it is useful as showing what can be done by one who is practically a novice. Starting from town in the afternoon, a run of 120 miles was made, finishing at Stratford-on-Avon, including the descent of the Sunrising road down Edge Hill, and that, too, on a very dark night. Next day the run was continued to Warwick and Rugby, where, after a stop at his old school, Mr. Noakes and his friend drove to Peterborough. Next day they left for King's Lynn and drove to Norwich. The last run of the tour was from Norwich to Seldon Park (Mr. Noakes's place), near Croydon. We think this run is an excellent demonstration of the reliability of a good modern car; the owner and his friend were practically novices, and they were not accompanied by a mechanic, and had no trouble whatever during the drive.

ENTRY OF STEAM CARS INTO FRANCE.

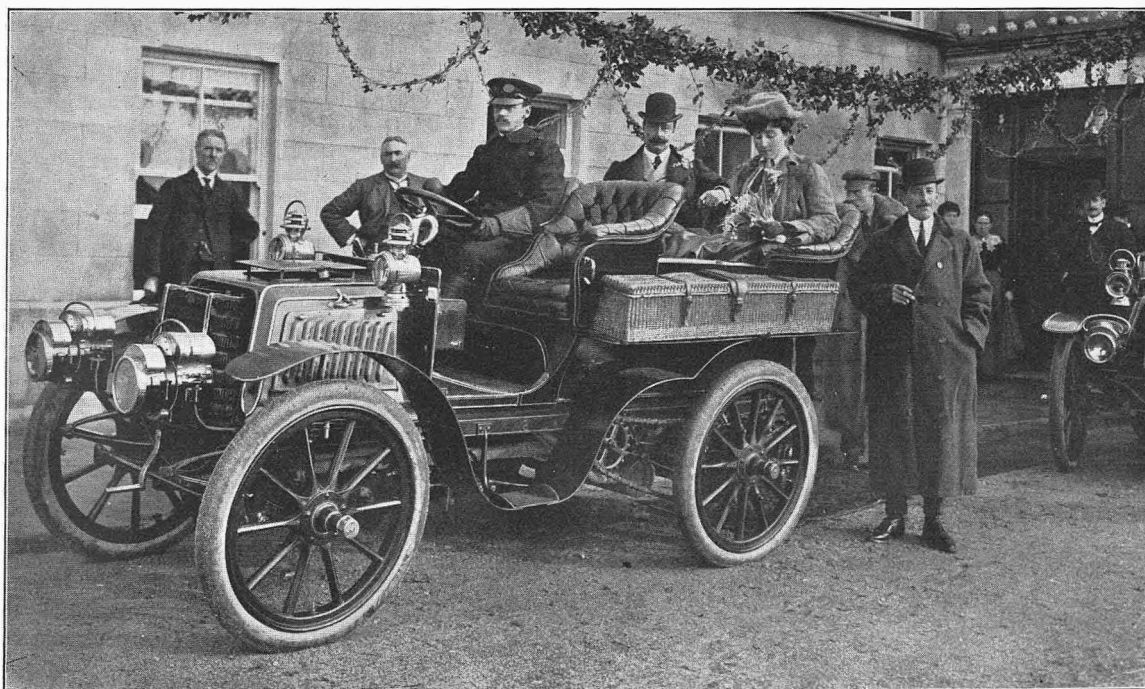
By the courtesy of Mr. Walter Gutmann, of Weston Motors, who has just equipped one of that firm's smart cars for a customer who desires to tour with it in France, we are able to give a list of the fitting and work necessary to be effected on a steam car before it will pass the *visé* of the French officials. Some months since we published particulars of the regulations as they then stood, but it will be seen that certain small additions have been made since:

- (1.) An extra brake, acting directly upon both wheels.
- (2.) Two water columns.
- (3.) Two safety valves.
- (4.) Boiler to be entirely stripped and tested to a pressure of twenty-four kilogs. per square centimetre for a safety valve set to blow off at eighteen kilogs. per square centimetre, that is, tested to about 341 lbs. for a blow off at 255 lbs. per square inch.
- (5.) A permanent connection to be provided below safety valve for fixing standard pressure gauge during official test.
- (6.) A line to be painted on water column to indicate minimum height at which water is to show.
- (7.) A red line on pressure gauge to show blow-off pressure allowed.
- (8.) A full description of car, engines, and boiler, with a certificate of maximum speed on the level, to be signed by maker or owner.
- (9.) A stamp to be affixed to boiler showing blowing off pressure. This stamp must be so fitted that it cannot be removed, and is, moreover, visible.
- (10.) Steam pressure gauge to be marked with kilogs. per square centimetre, the blowing-off point to be indicated with a red line, as mentioned above.

THE CHAMEROY TYRE TREAD.

This metallic non-slipping and puncture-preventing tread, which attracted much attention at the French automobile exhibition last year, and which is frequently seen fitted to both the pneumatic and solid tyres of automobiles in France, is now obtainable at the office and works of the Chameroiy Tyre Tread Co., 76, Little Britain, E.C. This tread consists of a flexible steel band formed of several turns of fine steel ribbon laid round the crown of the tread of the cover, and secured thereto by small specially made bolts, 4in. apart, fixed to the underside of the cover. The steel band is formed with rabbeted edges, and carries transverse segments of tempered steel, the edges of which are turned down and under at a reverse angle to form lips to engage under the rabbet of the band. The bolt heads within the cover are covered with rubbered cloth to avoid the abrasion of the inner tube. The steel segments are about half an inch in width, and though lying side by side across the tread are not attached to each other. The tread formed by these steel segments is quite flat and has sharp-edged corners. We have no experience of the behaviour or noisiness of this tread when running upon the road, but total immunity from sideslip and puncture, dust reduction without any loss of resilience, and increased life of the tyre equipped with it are claimed. We hope before very long to put these claims to the test, as if they are substantiated, they will undoubtedly mean a large use of the treads.

THE VICEREGAL MOTOR TOUR.



R. W. Simmons,

Photo, Galway.

This photograph was taken during the recent motor tour through Connemara, undertaken by the Lord Lieutenant of Ireland and Countess Dudley. The vehicle employed was a 12 h.p. Panhard.

THE MAUDSLAY 20 H.P. CAR.

(Concluded from page 394.)

The clutch is of the conical friction type, and contains such refinements in detail as conduce to smooth engagement, combined with a powerful drive. A longitudinal section of the clutch is shown in fig. 4, and a half transverse in fig. 5. The flywheel A, which forms the female cone of the clutch, is bolted to a coupling B formed on the end of the crank-

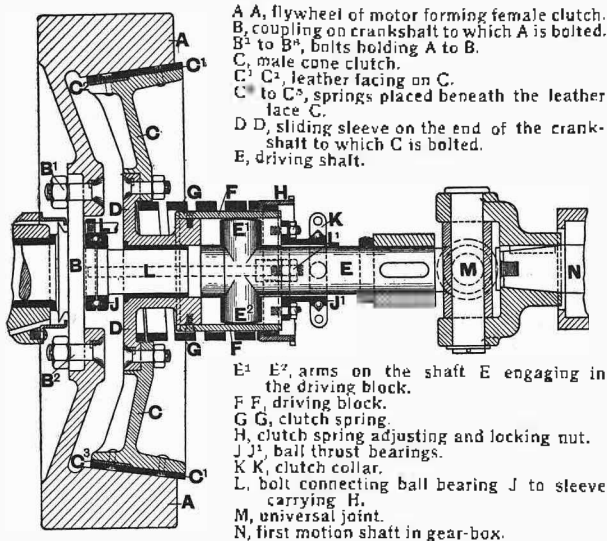


Fig. 4.—Longitudinal section of the clutch.

shaft. The crankshaft extends outwards beyond the coupling, and upon its end a sleeve D D, to which the male cone C is bolted, is free to slide. The male cone is normally kept in engagement with the female by the square section spring G G, whose tension is variable by means of the ring nut H. The thrust of the spring is taken by the ball thrust bearing J in the following manner: One of the ball races of J is provided with two lugs, into which two long studs, as shown by the dotted lines L, are fixed. This race slips over the end of the crankshaft so as to lie next to the coupling B, its opposite race being screwed on to a shoulder on the crankshaft. Both the studs run freely through the driving block F F, and on their outer ends carry a sleeve on to which the spring-adjusting nut H is screwed. The ring is held on to the studs by nuts, and is free on the ball thrust bearing sleeve K. On depressing the clutch pedal, the male cone is withdrawn by the sliding sleeve D moving outward, compressing the spring G G against the ring nut H, which is separately fixed.

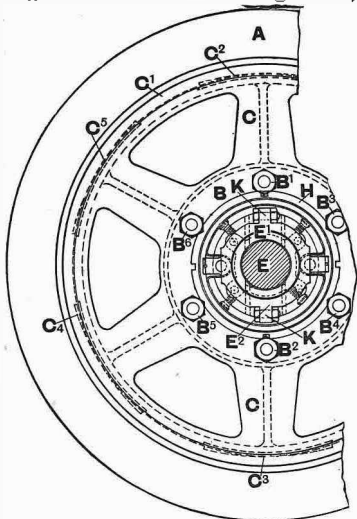


Fig. 5.—Half transverse section of clutch.

The whole thrust of the spring is now upon J through the bolt L. The driving block F, which is part of the male clutch, has a bronze lined slot across its face, with which the cross arms E¹ E² of the clutchshaft E engage, and through this the drive is conveyed to the joint M, so that a perfectly universal motion is obtained. The male cone is leather-faced C¹, and beneath the leather a series of flat springs, as at C² to C⁵, are inserted, through which the power is gradually applied, until the full face of the leather is in contact with the female cone. The application of the brake to the driving wheels automatically withdraws the clutch, so that the brakes cannot be used against power.

The change speed gear is on the sliding system, and gives four speeds forward and a reverse. The second motion-shaft D is placed directly above the first motion-shaft A, and drives the countershaft Q through a bevel pinion F³ and wheel R. The clutchshaft universal joint is connected to the coupling C on the first motion-shaft A. This shaft is of square section at its centre, as is seen in fig. 7, and has mounted upon it two sliding sleeves, one of which carries the first and second speed pinions, G and H respectively, the other the third J, and the fourth K speed pinion. The reverse speed pinion L is separately keyed to the shaft A. Changing speeds is effected by a side lever, which is connected to a toothed segment O¹, which engages with a pinion O, which is in connection with a cam. This cam is a circular disc having an irregular path, as indicated by M M M M (fig. 6) cut in its face. Laying in and on this path are two studs, which are connected to the sliding sleeves on the shaft A by collars running in grooves N N¹. When the cam disc is rotated, no movement is imparted to the sliding sleeves so long as the cam path is concentric, but directly it strikes an actuating angle the gear in action is first withdrawn, and a completion of the movement brings the next gear into action, and so on. For the reverse movement, an intermediate pinion I¹ is interposed between the pinion L and the first speed spur wheel G¹. The second motion-shaft D has two collars F F¹ forged upon it, to which the second and fourth speed spur wheels are fixed. The first speed spur wheel is bolted to the sleeve of the bevel pinion F³, which in turn is keyed to the second motion-shaft D. It will be noticed that this sleeve forms the journal running in the bearing E¹. The third speed spur wheel is bolted to a sleeve and collar F², which is keyed to D. Between the collar F² and the bearing E a ball thrust bearing is placed to take the end thrust placed on the shaft by the bevel pinion. For this purpose, a hardened steel ring is let into the bearing to form a ball race; similar races are also provided for the gear collar. Ample bearing surfaces are provided, and to accommodate roller bearings, if desired, the brasses are made of large diameter, but to prevent unnecessary weight in plain bearings channels are cut around them, as shown by B² and B³ on the first motion-shaft.

The countershaft is driven by a bevel pinion engaging in a bevel wheel fixed thereto. Within the bevel wheel is the differential gear, which has four pinions S, S¹, S², and S³ in its construction. The

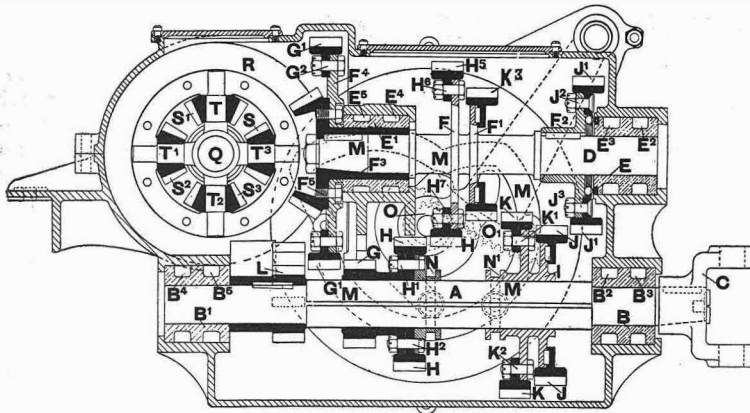


Fig. 6.—Longitudinal and vertical section of change speed gear.

A, first motion shaft with square section centre.
 B, B¹, bearings in which A runs.
 B² to B⁵, channels cut to lighten bearings.
 C, universal coupling to clutchshaft.
 D, second motion shaft.
 E, E¹, bearings in which D runs.
 E² to E⁵, channels cut to lighten bearings.
 F, F¹, gear discs forged on the shaft D.
 F², gear disc keyed to the shaft D.
 F³, steel bevel wheel keyed to D and running
 28/32 in E¹.
 F⁴, gear disc bolted to F².
 F⁵, bolts holding F³ to F⁴.
 G, first speed pinion.

G¹, first speed spur wheel.
 G² to G⁷, bolts holding G² to F⁴.
 H, second speed pinion bolted to G.
 H¹ to H⁴, bolts holding H to G.
 H⁵, second speed spur wheel.
 H⁶, H⁷, bolts holding H⁵ to F.
 I, sliding sleeve on the shaft A.
 J, third speed pinion bolted to the sleeve I.
 J¹, third speed spur wheel bolted to F².
 J², J³, bolts holding J to F².
 K, fourth speed pinion bolted to I.
 K¹, K², bolts holding K to I.
 K³, fourth speed spur wheel bolted to F¹.

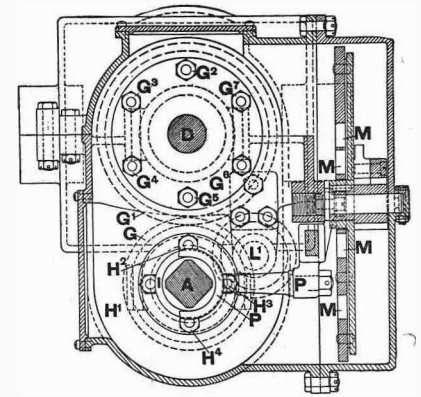


Fig. 7.—Vertical end section of change speed gear.

L, reverse motion pinion.
 L¹, intermediate reverse motion pinion.
 M (repeated), path of cam actuating the sliding
 gears.
 N N¹, grooves on the sliding sleeves for shifting
 collars.
 O, pinion on the speed changing cam.
 O¹, toothed segment engaging with O.
 P P, shifting collar and stud.
 Q, countershaft.
 R, bevel wheel on countershaft.
 S S¹ S² S³, bevel wheels of differential.
 T T¹ T² T³, bevel wheel spindles.

countershaft runs in four bearings, two of which are in the gear box, the end ones being fixed to the frame. The whole of the gearing runs in oil, as is usual, and is conveniently placed for inspection. The drive is continued from the countershaft to the road wheels by side chains running over sprockets on to the road wheels. Band brakes with water-cooled drums are fitted to the road-driving

drilled in either direction without materially affecting its ultimate strength. At the same time, the least possible number of holes are put through the frame. The use of tubing is extended to both the forward and rear axles; the wheel axles themselves are forged and machined from steel, and are pinned and brazed to a heavy gauge steel tube of large diameter. Complete axles of greater strength than a

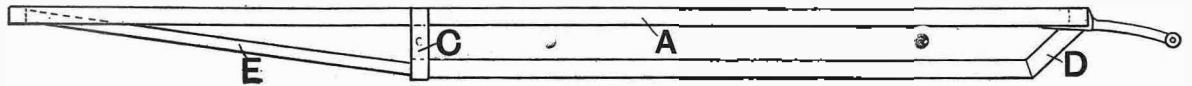


Fig. 8

A, main frame carrying carriage body.
 C, C, side members to lower frame.

D, front members to lower frame.

E, E, tubular stays between main and lower frame.

wheels and to the countershaft. The former are applied by a side lever and the latter by a pedal. The framework of the car to which the motor and gearing are attached shows originality in a design which is peculiar to the Maudslay car. A side and end elevation of the frame is shown in figs. 8 and 9, which show the general arrangement. The side and cross members of both upper and lower frames are constructed of square section steel tube, which is filled in with well seasoned ash, as is shown in the section, fig. 10. The joints in the frame are

solid axle of similar weight are thus obtained. It will be noticed in fig. 1, page 392, *The Autocar*, October 18th, that the springs which support the framework, etc., are particularly long. The steering is on the usual Ackerman principle, and is controlled by a hand wheel through a worm and segment. The controlling levers for ignition and hand throttle are above the steering column, and run through it. Naturally both levers are in a very accessible position under all circumstances.



Fig. 10. Section of the frame showing ash insertion.

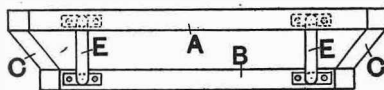


Fig. 9.—The same lettering applies to this as to fig. 8.

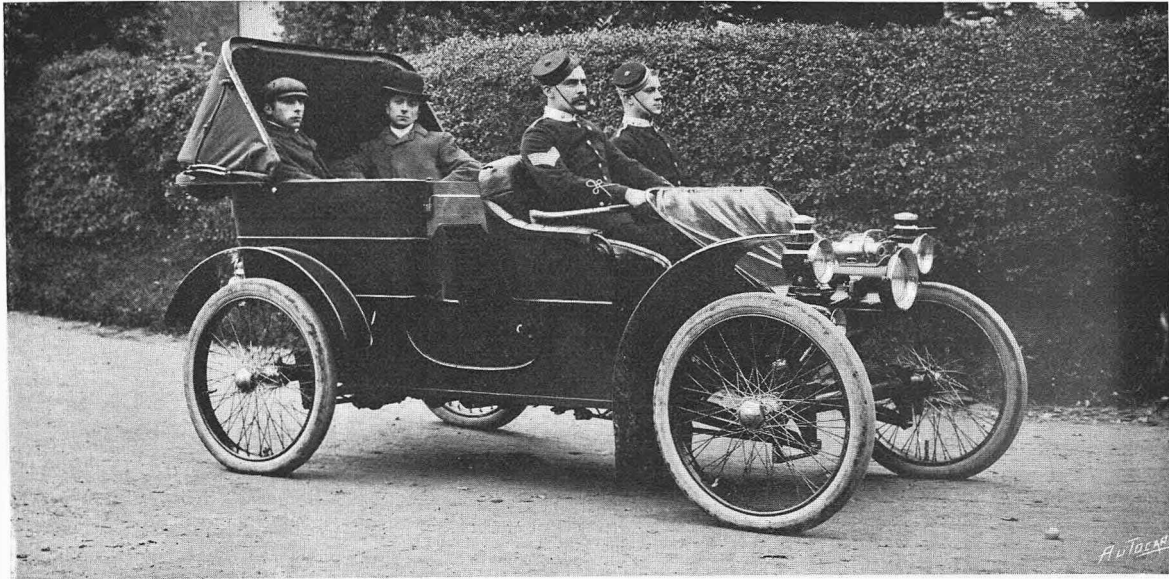
effected by reinforcing the ends of the tubes, which are then lapped around the member to which they are to be joined, and the whole is brazed up. The chief advantages of the frame are lightness combined with strength and the fact that whatever holes are necessary for fixing brackets, etc., to it may be

It is proposed that a steam motor fire-engine shall be purchased for Edinburgh.

* * *

We have letters addressed to "Weston-s-Mare" and "A Board of Trade Engineer," and will be pleased to forward them on receipt of postcard.

ONE OF THE WAR OFFICE CARS.



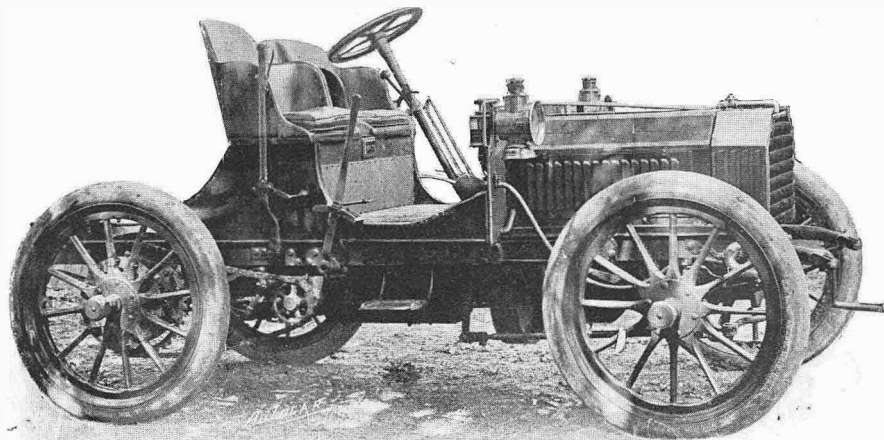
As we have already mentioned, the Lanchester Engine Co., Ltd., are making cars for the War Office, and one of these vehicles is shown in our illustration above. The car is a standard 10 h.p. carriage, but is painted khaki all over, and upholstered in deep maroon leather, with pigskin dashboard. It will be seen that it is fitted with a special type of hood. This hood is centrally hinged, and can be used either as a dust hood—that is to say, resting on the back of the tonneau so as to prevent the dust coming up from the wheels—or in driving

rain it can be swung the other way, with its rim resting on the front edge of the tonneau, so that all wet is kept from the occupants, but they are not unduly closed in, as the back of the hood in this case is, of course, open. The hood can also be half open in either position. It strikes us as being one of the most practical and simple forms of protection which has been designed for a tonneau. Before being accepted by the War Office each car has to go through a series of severe tests on the road with a representative of the War Office on board.

AN AMERICAN-BUILT CAR.

The smart-looking car illustrated is a vehicle built privately by Mr. James Macnaughten, a prominent member of the Automobile Club of America, who for a long time past has strongly advocated the principle of vertical multi-cylinder engines amongst the members of that club. Mr. Macnaughten informs us that he drives daily, and in defence of the opinions so stoutly availed by him in club circles, he built a car practically on Mercedes lines, as can be seen from the illustration, and this vehicle, he tells us, forms an undeniable reply to the arguments of all his opponents. The car was designed and built by Mr. John L. Schultz, formerly connected with one of the leading German automobile manufacturing firms, which doubtless fully accounts for the lines of the vehicle. The engine runs normally at 900 revolutions, and at that speed develops 24 h.p. Five other

members of the A.C.A. have formed a syndicate for the construction of five similar cars for their own use. The weight of the car is 1 ton 3 cwts.

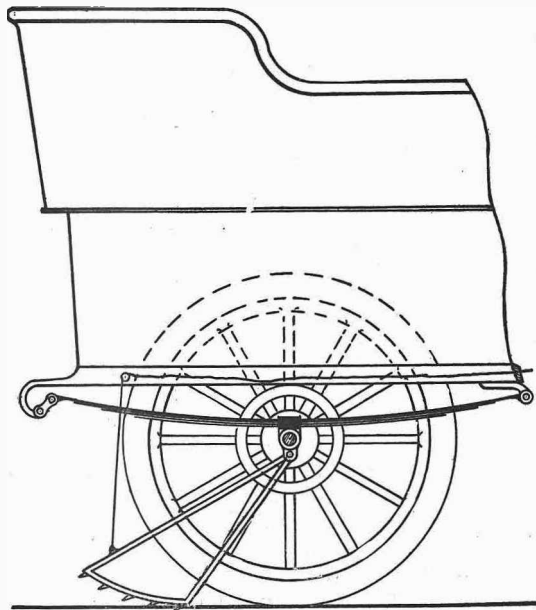


600 lbs., which, with all due deference to Mr. Schultz is from fifteen to twenty per cent. heavier than it should be, taking the body into consideration.

THE HYDROLEUM BURNER.

The Hydroleum Motor Co. are now comfortably settled in their most suitable factory in Hyde Road, Willesden Junction, and in a very short time will be able to undertake any number of conversions of the firing of steam cars, from the petrol to their own simpler and cheaper system. From the demonstration afforded us there on Tuesday last by Mr. Green, of the effect and manipulation of the Hydroleum burner, using the heavy oil known as Texas oil—the same, by the way, which was employed for the oiling of the experimental section of road at Farnborough—we shall be surprised if steam car users do not find fire management when the Hydroleum burner is used reduced to absolute simplicity. In the example afforded us, the burner was used to get up steam in a steam lorry capable of carrying a two-ton load, and but ten minutes or so were spent in obtaining 150 lbs. per square inch in the boiler. To test for odour in the burnt gases passing from the funnel, we held our face over the top of the latter, and could detect no suggestion of unpleasant odour. The burnt gases leaving the funnel smelled like hot air, and nothing else. When the Hydroleum system is fitted to a Locomobile type of boiler, the original burner is entirely removed, and nothing but a shallow metal pan covered at bottom and sides with a thickish lining of fireproof substance takes its place. A metal tube about 5 in. square, and also lined with fireproof material, leads into this pan, and the dual-nozzled Hydroleum burner points into the outer and open end of this tube. Starting with a boiler about one-third full of water, methylated spirit in a flat asbestos dish is placed in the fire pan and the spirit ignited. So

soon as the heat from the methylated spirit has generated steam pressure in the boiler sufficient to lift the gauge needle from its stop peg on the dial, steam and the heavy oil can be admitted to the burner. The latter is drawn through the centre nozzle by the induction of the steam issuing from the annular surrounding nozzle, and steam and atomised oil dash together on to the heated baffle brick forming the curved end of the square-lined tube above-mentioned. Here the aqueous oil vapour in combination with the air drawn into the tube by the action of the dual jet ignites, and a mass of flame of high temperature sweeps into the fire pan and up the fire tubes of the boiler to the up-take. The steam-raising power of the fire is entirely controlled by greater or less steam admission to the burner, and this is done by suitable means from the seat of the car. The greater the outrush of steam from the nozzle, the greater the quantity of oil drawn from the float feed chamber, and the fiercer the fire. An automatic cut-off for both oil and steam is fitted, and this comes into operation at any arranged steam pressure. There is no doubt that the advent of the Hydroleum burner is full of interest for steam car users, and we shall be surprised if it does not greatly increase the use of the light silent steam car. Mr. Worby Beaumont, M.I.M.E., is about to carry out comparative tests with a Locomobile, using first petrol and then the heavy oil with the Hydroleum burner, and the publication of his experiments will be awaited with interest. An illustrated description of the Hydroleum burner was given in *The Autocar* of May 3rd, page 478.



The above illustrates a new sprag, designed by the Automotor Accessories Co., of 23, Southampton Row. The curvature of the sole piece extending between the double arms of the sprag causes a gradually increasing resistance to the backward motion of the car. The result is that the car comes to a standstill without the sudden shock associated with the ordinary sprag. The curved sole piece gives a lift to the back of the car which actually assists in starting the car forward again. The sole piece is two inches wide, enabling the sprag to hold in soft ground. It strikes us as being one of the best sprags yet produced, and as its price is very moderate it should find a large number of users.

The Sporting Committee of the French Automobile Club have awarded the special cup offered by *L'Auto-Vélo* in the Paris-Vienna race for regularity and reliability of running in the motor tricycle and bicycle category to Messrs. Werner Frères, whose two bicycles finished first and second out of a field of sixteen.

* * *

The Edinburgh Cycle and Motor Show, to be held from February 6th to 14th inclusive, is, we understand from the secretary, Mr. Dempsey, an already assured success. Among the firms which will be represented are the Daimler, Motor Mfg., Wolseley, Ariel, De Dion, Stirling, and Caledonian Companies, who have already definitely booked their positions.

* * *

The 20 h.p. four-cylinder Humber, which will make its appearance next year, will be the same as the 12 h.p. four-cylinder car with the exception of the larger engine and proportionate strengthening of the gear and parts throughout. That is to say, it will retain the quiet and exceedingly sweet-running gear drive. The Humber was the first English-built car of any size to demonstrate conclusively that a gear drive could be constructed which was, to all intents and purposes, silent on all speeds. In fact, were it not for the demand for very high speed up hill, we should say that the Humber Co. were making a mistake in building an enlargement of the 12 h.p. car, which we consider fast enough for any reasonable purposes.

CONTINENTAL NOTES AND NEWS.

A Tour in Algeria.

The vogue for touring in North Africa during the winter seems to have been initiated by Baron J. de Crawhez, who for two years in succession has undertaken a long voyage in Algeria, and a twelvemonth ago a large caravan of automobilists traversed the African colony and penetrated for some distance into the desert. The novelty of journeying in a country which offers such mysterious attractions is appealing strongly to Belgian automobilists, who are just now organising a big party for the next winter tour. The principal organisers are Barons Pierre, Jean, and Joseph Crawhez, and they have already secured the adhesions of MM. Visard de Bocarmé, E. Pirmez, André, Calmyn, Ruys-Orban, H. T'Serstevens, Baron de Selys-Longchamps, Baron de Rozée, Comte de Levignan, Le Hardy de Beaulieu, Hautvast, Germaert, Paul Maskens, Braconier de Hemricourt, Chevalier A. de Thier, and Charles Craninckx. A large variety of cars will be driven by the excursionists, including Panhards, Germains, Mercedes, Delahayes, Pipes, Renaults, Déchamps, Piepers, Daimlers, and Gobron-Nagants. The start will probably take place from Brussels in the middle of January. The automobilists will travel by way of Namur, Dinant, Givet, Reims, Paris, Dijon, and Lyons, to Marseilles, where a specially-freighted boat will take them to Algeria. It is intended to organise excursions in the south of Algeria, and races, trials, and hill climbs will also probably be held. The Algerian tour, in fact, is becoming a big event in winter automobilism.

Paris-Madrid Race.

The series of international races which began with Paris-Amsterdam in 1898, and continued with Paris-Berlin and Paris-Vienna, is by no means yet at an end, for the Automobile Club of France has now under consideration a proposal to organise a contest to Madrid in 1903. Some influential people in Spain are anxious to see this project put into execution as a means of stimulating interest in automobilism in the Peninsula, and it is also hoped at the same time that this great demonstration will facilitate the creation of an automobile club in Madrid. The idea of the race is fully approved of by French automobilists, and there is little doubt but that the necessary permission will be obtained. The only thing to be considered is the state of the roads in Spain, which are notoriously bad for auto-car traffic, and high speeds in the land of the Cid appear to be out of the question altogether. It is said, however, that the Spanish authorities have offered to put the thoroughfares in order in time for the race. This is obviously an impossible task in so short a time, and the A.C. of France had better take the roads as they are, and not rely too much upon repairs, which will probably be no better than those which proved such a delusion in Austria last June. If it be found that high speeds are impracticable in Spain the vehicles will probably race from Paris to Bordeaux, or even to the frontier, and thence to Madrid the contest will be one of reliability, when each maker will be required to enter a certain number of cars, and points will be awarded for the aggregate distances covered and the speeds

attained. These and other suggestions, however, will only be considered after a report upon the state of the roads in Spain has been presented by M. Tampier, who has been requested to prospect the three roads from the frontier to Madrid. It is probable that the cars will race from Paris to Bordeaux, Bayonne, and Biarritz, and then proceed to Madrid by way of Irun, Vittoria, Burgos, Lerma, Fresnillo, Cavanillos, and Alcobendas.

The Heavy Car Criterium.

Encouraged by the success of the last Criterium of heavy cars, the French Automobile Club has decided upon organising another similar event in March next, though under conditions which are calculated to put the vehicles to a much severer test. On the previous occasion the cars were required to run from Paris to Monte Carlo in eleven days, and at that time it seemed very doubtful whether many of them would be able to stand the strain of running so many days consecutively over all sorts and conditions of roads, often through mountainous roads and flooded plains, with full loads, but each day's journey was accomplished by the majority of the cars in such good average time that the promoters have decided to increase greatly the length of the stages, some of which appear to be formidable for omnibuses and waggons. A different route has been selected, which brings the distance up to 680 miles, and this will be covered in eight days as follows: Paris to Fontainebleau, 50 miles; Fontainebleau to Nevers, 108 miles; Nevers to Clermont-Ferrand, 91 miles; Clermont-Ferrand to Le Puy, 82½ miles; Le Puy to Allais, 99 miles; Allais to Marseilles, 102½ miles; Marseilles to Nice, 128 miles; and, finally, a promenade from Nice to Monte Carlo. The promoters argue that with these long stages any mechanical derangement on the road will have much greater consequences on the final results than if competitors were able to devote plenty of time to repairs, and no vehicle can be expected to find a place in the list of awards unless it is able to go through the entire trials without serious trouble of any kind. In fact, it is essentially a test of reliability as well as of economy, and the vehicles will probably have to travel for most of the time at a much higher speed than they would be called upon to do in ordinary service.

The Huy Climbing Trials.

After Spa it is the turn of Huy, near Namur, where the hill-climbing tests on Sunday were well supported by the Belgian manufacturers and automobilists, and several thousands of spectators were present to witness the trials. The arrangements were carried out by a committee composed of Baron Pierre de Crawhez, Comte de Villegas, and MM. Coppée and Michaut. The Huy gradient has a length of 1,360 metres, with three easy turnings, and an average incline of nine per cent. The cars were sent off from a standing start on a seven per cent. gradient. The only big car competing was a Pipe, driven by Hautvast, whose time was 1m. 52¾s. The best performance was accomplished by Barbaroux on a light Clément in 1m. 19½s., followed in this category by Roland on a Gobron-Brillié-Nagant in 1m. 22¾s., and by Langlois on a

Vivinus in 2m. 57 $\frac{4}{5}$ s. The Cléments were also victorious in the tourist category, Baron J. de Crawhez driving one of these vehicles, with a load of three passengers, up the hill in 1m. 28 $\frac{3}{5}$ s., followed by Conrard on a Gobron-Brillié-Nagant in 1m. 57 $\frac{3}{5}$ s., and by Tart on a Clément in 2m. 17 $\frac{1}{5}$ s. In the voiturette category, Oury on a Clément won in 1m. 40 $\frac{1}{5}$ s., beating Vonlatum on the same type of vehicle by 16s. The only tricycle competing was a Korn with 7 h.p. Aster motor, ridden by De Joostens, whose time was 2m. 14 $\frac{2}{5}$ s. The Antoine bicycles showed up well by winning in both the heavy and light categories, Kinet on a light Antoine climbing the hill in 1m. 31 $\frac{1}{5}$ s., beating Deryn on a Clément by the narrow margin of $\frac{1}{5}$ s., and then followed King Spring (Red Star) in 1m. 40 $\frac{3}{5}$ s.; Prudhomme (Red Star), 1m. 44s.; and Rigau (Red Star), 1m. 52 $\frac{2}{5}$ s. An Antoine bicycle weighing more than 50 kilogs. was ridden up the hill by Van den Born in 1m. 59 $\frac{3}{5}$ s., beating Hoiley on his four-cylinder Clément, but in a record attempt after the trial Holley reduced the cycle times to 1m. 24s. In view of the success of the meeting, it has been decided to make it an annual event.

Electrical Timing.

It has been definitely decided that all records on the mile and kilom., to be officially recognised, must be made upon the road between Dourdan and Saint Arnould, to which we referred last week, and as this road is absolutely level and perfectly straight the fact of records being beaten on such a course is sufficient to place them beyond all possibility of their validity being questioned. The only chance of error lies in the timekeeping, which is becoming more and more difficult with the terrific speeds at which autocars travel, and it has been found necessary to split the seconds up into tenths. It is doubtful, however, whether the human clocker will ever be sufficiently expert to get absolutely accurate results within such small fractions, and the sporting commission of the A.C.F. has come to the con-

clusion that the only way of meeting the new conditions is to call in the aid of electricity, so that the vehicles will be timed at the start and finish by contacts, which will instantaneously stop the watches. Several ingenious systems of electrical timing have been devised, one of them being intended to record the time on a strip of paper; but the commission has given preference to an improvement in the Mors system which was successfully tried at Nice a couple of years back. A few days ago the timekeepers were officially notified that in future no records would be accepted unless they were timed with the new Mors apparatus, but, as this instrument is not yet finished, and automobilists who are anxious to profit from the fine weather to go for records may find themselves put to great inconvenience, the commission has since annulled the new regulation, and has intimated that records can be timed in the ordinary way until further notice. It is, of course, evident that a thoroughly reliable system of electrical timing must give absolutely accurate results; but it yet remains to be seen whether such a complicated instrument can be made reliable, and it would seem as if a lot of experiment is necessary before the ordinary method of timekeeping can be safely abandoned in favour of the electrical.

The Gordon-Bennett Cup.

As we intimated would be the case, the A.C.F. has changed its method of selecting teams to represent France in the competition for the Gordon-Bennett Cup, and, instead of choosing drivers, it has appointed vehicles, leaving the makers to select the drivers themselves. Two Panhard vehicles and one Mors car have been appointed, and one of each make is to be held in reserve. This is perfectly logical, for it is clear that the industry can only be properly represented by cars, and not by drivers who are at liberty to select what cars they please, with the result that there is always a danger of untried cars taking part in this important race.

THE UNCONTROLLABLE HORSE.

781 accidents in 60 days; 99 persons killed and 661 injured.

During the sixty days we have taken note of these accidents the uncontrollable horse has been responsible for 781 accidents, by which 99 persons have been killed, and injuries sustained by 661 others. No account is taken of injuries and deaths of horses themselves, or of damage to other property, but these items would amount to something considerable.

No. of Accidents.	Injured.	Killed.	No. of Accidents.	Injured.	Killed.
708 Brought forward from last week	615	91	6 accidents, causing injuries	7	
OCTOBER 17TH.					
1 accident, causing injuries	2		5 accidents—no personal injuries		
3 accidents—no personal injuries			OCTOBER 22ND.		
OCTOBER 18TH.					
1 fatal accident		1	1 fatal accident		1
5 accidents, causing injuries	5		4 accidents, causing injuries	5	
9 accidents—no personal injuries			4 accidents—no personal injuries		
OCTOBER 20TH.					
3 fatal accidents		3	OCTOBER 23RD.		
5 accidents, causing injuries	7		6 accidents, causing personal injuries	8	
1 accident—no personal injuries			6 accidents—no personal injuries		
OCTOBER 21ST.					
2 fatal accidents		2	OCTOBER 24TH.		
			1 fatal accident		1
			10 accidents, causing personal injuries	12	
			781	661	99

Correspondence.

THE RAILWAYS AND PETROL.

[2629].—Regarding the railway companies' new regulation as to motor spirit, surely it is possible for the large firms of Capel, Carless, and Leonard, and the Anglo-American Oil Co. to insure against any possible fire risk. The consumer or agent would simply sign a paper freeing the sender from liability on the petrol being handed over to the consumer, or agent, by the railway company. I am sure if I were an insurance company I should be very pleased to issue a policy at a very small premium. I do not see that the price of petrol ought to rise at all. The insurance rate would be very small, amounting possibly to a fraction of a farthing on each tin.

J. T. HEREFORD.

[2630].—In common with the rest of the trade, we have received the expected notices from the railway companies as to the new restrictions upon the carriage of petrol. Our immediate answer has been to call upon the company who have hitherto carried our cars, and to tell them explicitly that, unless they are prepared to carry our petrol as before, we shall take delivery of all our cars at the port at which they land and bring them to our depot by road. What they thus stand to lose may be gathered from the fact that we have paid to that company over £600 in the last eleven months for the carriage of cars. We shall also run a special car between Goole and Bradford for petrol only, so that the railway company, if they persist, will grasp at a shadow and lose two substances. I write to suggest that a general meeting of the trade be called to secure united action in the driving home of all cars brought into the country straight from the port of entry. We may thus bring the railway companies into a more reasonable state of mind.

For the BRADFORD M.C. CO.

ALBERT HOUSE, manager.

THE NUMBERING OF CARS.

[2631].—Those of us who are opposed to the numbering of cars need no better declaration of our views than that officially issued by the A.C.G.B. and I itself a short time ago.

In a circular manifesto to the county councils of England and Wales, the club in 1901 very wisely said:

THE PROPOSED COMPULSORY NUMBERING OF MOTOR VEHICLES.

(18.) English gentlemen have the greatest repugnance to having their private vehicles identified and disfigured by numbers, and this objection is equally strong whether their carriage are drawn by horses or propelled by motor power. The numbering of a gentleman's private carriage would be such a departure from the accepted conditions of life in this country that it would lead the public to believe that a man who prefers to use a vehicle propelled by an engine to one drawn by a horse is, in the eyes of the authorities, a person who is likely to misconduct himself. The stigma implied would prevent gentlemen from purchasing motor vehicles if the numbering were insisted upon.

(19.) The driver of a numbered motor vehicle would be subject to continual prosecution, since any idler or prejudiced person might, irrespective of the truth of the complaint, state, without warning or notice to the party informed against, that the vehicle was being driven at an excessive speed. It would rest with the driver of the motor vehicle, although taken unawares and thus prevented from obtaining witnesses, to prove to the contrary. In view of the opposition which has always existed in this country to the introduction of a new form of locomotion, the number of persons who are prejudiced against motor vehicles must for some time be considerable, and the continual oppression to which the driver of a motor vehicle would be subjected would probably lead him to abandon the use of motor vehicles for private passenger traffic upon highways.

(20.) There is no just reason why the proposed compulsory numbering should apply more to motor vehicles

than to dogcarts and other light vehicles drawn by horses, which are frequently driven at a speed of at least fifteen or sixteen miles an hour, and cannot be stopped or directed with the same facility as a motor vehicle.

(21.) Motor vehicles pay the Inland Revenue tax required of other vehicles, and owners of motor vehicles have a right to claim the same privacy in respect of their motor vehicles as is permitted in the case of other private vehicles.

(23.) The committee also have been informed by several intending purchasers of motor vehicles that, if their carriages are to be labelled with numbers, they will decline to adopt a method of transport which would be subject to such an unfair and offensive regulation. This is incontrovertible evidence of the damage which would be done, if this proposal were adopted, to what otherwise must be a valuable and important industry.

If we add that Scotchmen and Irishmen also agree with the sentiments above attributed to English gentlemen, then there seems no need for the opposition to say anything beyond asking the Club Committee why they have so suddenly eaten these very carefully weighed and very true utterances of last year.

The more one thinks of it and talks of it to fellow motorists, the more does it seem imperative that the whole thing should be left in peace till the rapid education of the whole people is completed, and then, perhaps two years hence, the Government and Parliament might take up the consideration of sane legislation dealing with the whole subject of road traffic, and this without imposing an ugly, degrading, and dangerous (from a police and J.P. persecution point of view) idea, such as compelling a private carriage to have a huge inscription, like *101,666* stuck on it, which is suggestive of evil and a career leased only on sufferance.

I am in favour of persons who drive at over, say, thirty miles an hour having a certificate of competency, if you like, of all and every vehicle having lights, and of other necessary laws—if carried out all round. But why we ourselves should ask to have number-plates, as if we were licensed beggars, is going to a very doubtful extreme which cannot be undone.

I have made enquiries among English lawyers, and I find it is the same as in Scotland—in any appeal in a criminal matter the Supreme Court will deal only with points of law; the facts are for the Court of first instance. And it could not be otherwise in justice. Hence, whether anything was done to the common danger or not rests with the views of the lower Court; and, therefore, no hope need be placed upon legislation as to appeals to take the place of the gradual education of those absurd Courts (of Justice?) which your English system of J.P.'s entails upon you.

Moreover, Parliament, in all commonsense, could never sanction a special law for one class of the community which would give it a direct or novel road to the Supreme Court.

I hope, therefore, that those who are opposed to numbering will not swallow the pill because coated with some doubtful matters about Appeal Courts, or that Parliament will not remove the speed limit without plaques. Let time do its usual work in bringing sense even to dull and prejudiced folk.

NORMAN D. MACDONALD.

A NEW GAME.

[2632].—I am joint owner of a fairly fast 12 h.p. car, and there are three partners. We have invented for our amusement a new game—a sort of gamble, in fact—and this is the way we play at it: For the past five week-ends we have made a run from Friday to Monday, and have chosen the most police-haunted roads we could hear or read of. We take it in turns to drive, and each man drives a certain pre-arranged time or distance, and is obliged to follow the route mutually chosen. He drives with care and due regard to traffic, condition of roads, etc., but he is obliged to average about fifteen miles an hour, or show good reason why he has not done so—otherwise he is fined. No. 2 sits by the driver, and his duty is to look out in front. The duty of No. 3 is to look out behind, and he, of course, occupies the hind seat, and the engineer also sits behind. He does not join in the game, but has a reward for spotting a police trap. The driver No. 1 has nothing to do but drive the car, and in case

of being stopped and convicted, No. 2 and No. 3 not only pay his fine and expenses, but also pay a penalty to him. On the other hand, the driver pays for every trap spotted during the time he is driving. When a trap is successfully passed we change drivers. I think we must have become very able police trap spotters, for we have never been caught, though we have sometimes located as many as three or four traps in a day's run.

The variety of traps is endless, but the most ingenious we have come across was situated between two signal boxes on the railway, alongside of which the road ran for about three-quarters of a mile; the communication is by telephone, and the men are concealed in the boxes. This trap would have caught us but for friendly warning on the road.

Our plan on spotting a trap is either to stop at the first man (often impossible, for one is past him before he makes signal), or to proceed literally at foot's pace to the second man; or if we do not see him we go and hunt for him behind hedges, hayricks, or in pigsties; then we have a chat with him, never referring to his occupation, but we enquire the time, and ask him for directions on the road. If a plain clothes man, we ask him if any police are on the look out for cars. We are always quite civil, but at the same time get as much fun out of it as possible.

Sometimes we know of other cars following us, in which case we often go back to warn them of the danger ahead.

It is generally the man looking back who spots the trap and sees the signal made, but often one may see a group of villagers watching the sport and looking at the approaching car.

So far the drivers in our game have had peculiarly the worst of it, for they pay for each police trap detected, but then a trap successfully passed calls for a change of drivers, so that money matters level themselves out wonderfully well.

We do not attempt to make a run or stop at any pre-arranged place, but merely go where the most sport is to be obtained. We have heard the Brighton district very highly spoken of. One driver is reported to have been stopped five times in six days. We are going there next week.

The game might not appeal to anybody else, but we have had a lot of fun out of it. To court success, keep a good look out, especially behind. Change your look-out man behind frequently, for it is very tiring, and never stop for a man out of uniform.

JOHNATHAN RALLYWOOD.

THE RELIABILITY TRIALS.

[2633.]—I have read with much interest and appreciation your very full and complete reports of the reliability trials of autocars, and I take the opportunity of complimenting you upon the excellence of the work. Nothing has ever appeared in the motoring journals of my own country that bears a comparison with what you have done. Nor have we ever had any trials of autocars worthy of comparison with those which you have so well described. Now for the first time we are put in possession of information of value in enabling us to select a car intelligently.

I have taken the pains to analyse your reports to a small extent, and I find some very curious results, which I will set before you at the risk of being intrusive. In the first place, I have divided all the cars which appear in your lists into classes according to their nationality. I make three classes, although I might make four, if in addition to French, British, and American cars, I admitted Belgian ones; the German, though built, I believe, purely on French lines, come from the domains of Leopold. I reject the German, then, from my list, and likewise the Gladiator, whose nationality I do not know.

First, taking up the matter of points lost in the regular runs, I find that the average number of marks lost was as follows: French cars (twelve), thirty marks each; British cars (eighteen), one hundred marks each; American cars (six), forty-three marks each.

This result is certainly remarkable and unexpected. That the small and cheap American steam buggies would ever take a place in advance of such competitors as appeared in these tests is certainly extraordinary. We might rather have expected them to show somewhat of superiority in hill-climbing, to which as steamers they

are adapted, but a trial of long duration, conducted under the very best auspices by a management which has always proved itself above the domination of manufacturers, whose interference has been the bane of trials in the country of their manufacture, makes us think if there be not "something in" the claims which have been so often made for this type of car. These vehicles are well understood here, being made and sold in immense and increasing numbers, but nobody thinks much of them except as a means of getting over short spaces of ground pretty fast. As for comfort, I think no one would claim anything of that for the steam car, short as it is and jerky to a degree. Besides, it is not safe at high speed, and there has been many an accident due to its shortness and height. But if the steamer has the quality of "getting there" so well developed, will it not be well for manufacturers, particularly those of Great Britain, to look well into its advantages and disadvantages, and produce something more suitable for ordinary use than the Americans have turned out—something saleable to people who want to travel with comfort, and not merely runabout waggons for doctors and the like?

The hill climbs figure out as follows: Up the River Hill the American cars went at the rate of 12.32 miles per hour, the French cars 11.47 miles per hour, and the English cars 8.58 miles. The rates on the Westerham Hill were: American cars 9.02, French 3.45, and British 6.88. I could wish that the victory—and it is unquestionably a victory—had been won by our modern American petrol cars, which are in a way of becoming the best in the world.

Oakland, California.

F. J. BULLEN.

[2634.]—The action of the judges in awarding a gold medal to the Locomobile cars (Nos. 9 and 10) in the recent competition strikes me as being rather curious. I think that as these cars failed so badly in the condition and brake tests—the judges' remarks *re* the latter being very uncomplimentary—the gold medal might have been withheld and a silver one awarded.

A faulty brake is a matter of life and death, and when one hears so much about autocars being able to pull up in a few feet, it seems necessary that the brakes should be reliable.

H. BRIGHT.

[It is necessary to remember that in a steam car there is no need for a clutch, and consequently the powerful braking effect of the reverse is always available.—ED.]

THE PICK CAR.

[2635.]—In reply to query as to Pick cars, I would advise no one to take a Pick car unless he is prepared to give personal attention to many important details and have them altered. The car is good in principle for its weight, but in my opinion, after carefully going into the various parts, is not good as turned out, unless the makers have altered many small details. In the car I examined and tried the engine seemed good, though very poorly finished. The water circulation is only moderate. Belt should do well, as it is boxed in. The connecting rods for steering are dreadfully crude, and only one $\frac{1}{2}$ in. split pin holds rods from dropping out, and the joints are very rough and of small bearing surfaces. The springs are too short, and in the car I tried locked themselves in their hanging links. One bad feature is the very crude manner of fixing of outside bearing and keeping in line of the engineshaft carrying the belt pulleys, as this is not self-contained or of stable design. The car seems to run well, and there is little vibration, but on the whole it is very crude in finish and workmanship, unless great improvement has been introduced lately. Of course, the price is low, but the car is a very cheap one to build. One of the worst features of fitting was the fixing of the engine to the cross tubes of frame by merely drilling through the tube and bolting with $\frac{1}{2}$ in. bolts, the tube being neither suited to compression by bolts nor to lateral stress, owing to the small bearing surface afforded by a thin tube.

N.F.

FOR MEDICAL USE.

[2636.]—I should be very much obliged if some of your medical correspondents could give me an idea of the actual running cost of a two-seated light car or voiturette for medical use.

M.D.

AN INSURANCE POINT.

[2637].—On an important point of insurance, I wrote to a well-known insurance company as follows: "If a client receives a claim for damages to a third party or private property, would the question of whether he was exceeding the speed limit enter into the payment of the claim?" The following is their answer to my letter.

ARCHIBALD FORD.

[COPY.]

We have your letter of the 4th inst. With regard to the point which you ask us to answer, we have to say that the question of whether the assured was exceeding the speed limit would certainly enter into the payment of the claim; that is to say, if the assured were driving a motor car at a speed which would be unreasonable, having regard to the particular circumstances and place in which it was being driven, that fact would enter into the payment of the claim.

FOR THE GENERAL ACCIDENT
ASSURANCE CORPORATION, LTD.

(Signed) F. Norrie-Müller (general manager).

ENGLISH COILS.

[2638].—I notice a letter (2575) from Mr. Edge on the above subject, in which he states he does not believe it is true that the Carpenter high-speed trembler induction coils can be obtained from Messrs. Van Raden that are made throughout in England.

A few weeks ago I had an invitation to go through the above firm's new factory in Coventry, and saw the whole process of manufacture, and can testify that they are now being made in England.

I was much struck with the extraordinary care that is being bestowed upon them in their manufacture.

Formerly, I was told, these coils were imported, but owing to great demand and uncertainty of delivery, Messrs. Van Raden decided to manufacture them under license for themselves. I have used several of these coils, and can guarantee that they will repeat fast enough for any speed that a motor can be made to run, and when used with a wipe spark all ignition adjustment worries are ended.

These coils are usually made for four and a half volts, so I would recommend Mr. Edge if he requires one for racing purposes—as it is usual then to carry a higher voltage—to have a coil specially wound, otherwise the probability is that the insulation not being sufficient for higher voltage, it would not stand, and the coil would get the blame. This might have had something to do with Mr. Edge's last English coil being unsatisfactory.

Persons"v. I think if a continuous current magneto was used in conjunction with one of these coils suitably wound for it, Mr. Edge would have no further trouble with his ignition. The ordinary high tension plug and make and break could be retained.

This system has been used on the Duryea car for a long time, and works well. I have no interest in the manufacture or sale of these coils, but believe in recommending a good thing when you find it.

MONTY.

EMERGENCY TYRE REPAIR.

[2639].—I have read with interest the paragraph in your recent issue, with sketch of a plan devised by one of your readers to bring him home when his tyre gave up.

As I have on more than one occasion gone through a similar difficulty, I did something the same; in my case, however, it was the rim or edge of my cover which gave up, and it was impossible to repair it, so I borrowed some rope and laid it round the wheel, and then lapped it with thin rope, as your correspondent describes. Some short time afterwards this same thing happened. I was near a cycle shop, so bought some rope, and did the same thing, but improved on it this time, as I got an old worn-out cycle tyre cover, and placed it over the rope, and then lashed it on, and it worked quite satisfactorily.

I was determined that this would not happen a third time without my being prepared for it, so I devised the following plan: I got a piece of 1½ in. rubber hosepipe; this measured about 1½ in. outside; I cut this the exact length to meet round the wheel rim. I then purchased a

length of soft rope as large as would with some pulling go through the hose pipe; once it was drawn through it formed a first-class solid tyre, and one which coils up into small space in the boot of my car, and with a small ball of strong tarred twine I am prepared for a mishap to my tyre without feeling any anxiety whatever, and, like the proverbial umbrella, since I carried it as part of my outfit I have never had use for it or the smallest tyre trouble, not even a puncture; therefore, I have never put it to an actual test, but if it acts as a preventative it is well worth carrying.

I may add, I have covered some 2,000 miles on some very rough Irish roads, and three out of the four tyres have hardly a mark on them. I found constant trouble at first with the tubes getting nipped with the edges of the covers; this I remedied by having a double strip of strong canvas solutioned on the inside of the tube where the nipping occurred, and since then I have had not a single nip with one of my covers. However, I have had all the trouble mentioned, and, to my mind, it is occasioned by the method used in putting on the rim of the cover. I merely mention this plan in hopes that it may help some fellow motorist who may be stranded in a like manner.

A still simpler method which since struck me was a short length of old ship's cable: this can be purchased at any old marine or ships' dealer; it is called 5 in. cable, that is, it is 5 in. or thereabouts in circumference; a length of this forms a soft pliable 2 in. tyre sufficient to keep the wheel rim well off the ground. It costs something like 2d. per pound, and as less than 7ft. will go round an ordinary wheel, it can be carried in small space, and is easily obtainable for a few pence. An old bicycle tyre carried with this to place over it and then lapped with tar cord would make a tyre fit for any stranded motorist, and bring him home in comfort.

T. PICTON BRADSHAW.

THE AUTOMOBILE VOLUNTEERS.

[2640].—If ever a man stands condemned by his own actions, Mr. Hy. Coony does.

Mr. Claude M. Vernon in *The Autocar* of October 18th states the case very clearly, and is rightly very severe in his letter.

I am of the opinion that Mr. Hy. Coony is obviously deficient of both patriotic and sportsmanlike qualities. For does not His Majesty the King rely utterly on those two qualities to fill his Navy and Army?

I hope most earnestly that Mr. Mark Mayhew, L.C.C., will be able to effectually prevent all undesirables from joining the automobile volunteers.

I have sent in my application for enrolment, and being both patriotic and sportsmanlike, I am fully prepared to undertake anything I am ordered to do.

MARTIN G. DUNCAN, A.C.G.B. and I.

TYRES.

[2641].—Can your readers kindly advise me in choice of tyres for driving wheels of a 9 h.p. Darracq for winter use? Those in use up to now have been Clipper-Michelin with Wilkinson treads, but the treads split to pieces at the end of six hundred miles, though while sound they certainly entirely prevented side-slip and puncture.

I think of using solid tyres, but wish to ask if anyone who has tried them on a Darracq can tell me if the jar is excessive. The car is chiefly used on Saturday and Sunday runs out of London, not exceeding about fifty miles at a time, and sometimes in a part of the country where flints and such like rubbish are used to repair the roads.

I should not mind if solid tyres mean slow running, but side-slip in winter is a serious matter, even in a small car on asphalt and wood. Can any of your readers tell me if Star tyres are satisfactory for motors? They are, I think, expensive, but last well; only side-slip may be a danger.

In the summer on good roads no doubt nothing is pleasanter than pneumatics. Any information from actual users of solid tyres on small cars will be most appreciated.

CAUTIOUS.

[A number of interesting letters are crowded out this week.—Ed.]

Flashes.

The Motor Mfg. Co., who have been so long at 48, Holborn Viaduct, are very shortly removing to West End premises, having taken No. 95, New Bond Street.

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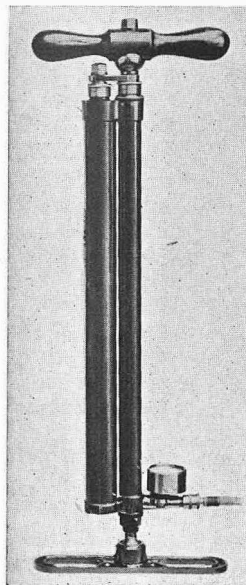
A fine specimen of a petrol engine for marine purposes is illustrated in No. 2 of *Page's Magazine*—a publication devoted to engineering and kindred subjects. The engine, which was constructed by the Wolsley Co. for Messrs. Vickers, Sons, and Maxim, is one of the five employed in the first submarines used by the British Navy. The engine has four cylinders, and develops from 130 to 190 h.p. at from 320 to 390 revolutions per minute. Its total weight is 11 cwt. 2 qrs. 12 lbs., length 9ft. 7in., and height 5ft. 6in.

* * *

An American concern, the Peerless Manufacturing Co., of Cleveland, recently patented a contact breaker with double tremblers, which contains points missed by other similar devices. The two tremblers are entirely independent of each other, and each has its separately adjustable platinum-pointed contact screw, both of which are mounted in the same brass pillar, which is in contact with "earth" of the circuit, the tremblers in this case being mounted upon an insulated block. Each trembler is operated by a separate cam, the contour of these being different. The first cam causes its trembler to be pushed hard up against its contact screw. The second cam causes its trembler to vibrate rapidly during the time that the other trembler is in firm contact. The resulting spark is similar to that obtained from a coil with magnetic trembler.

* * *

A saver of much labour is the "Compound" tyre pump of Messrs. H. S. Hunt and Co., of 29, College Street, Cannon Street, E.C.



fills the small barrel with compressed air, and is not made against the pressure in the tyre.

The pump has a pair of barrels of different diameter, the plungers being connected to the double handle through a link. Air is drawn into the larger barrel first, and is then compressed into the smaller one. From this the air is passed into the tyre, and as the area of the plunger is so small there is little surface against which the pressure acts. The result is that the work is lessened, and the volume of air delivered to the tyre is nearly doubled. It is a great improvement on the single-barrelled pump, and the up-stroke is not laborious, as it would be in the case of a double-acting pump, as it merely

In the case of a farmhouse fire near Nantwich, firemen were hurried to the scene on a motor car, their prompt appearance preventing the destruction of an extensive block of buildings.

* * *

The old "order" changeth. A wail from Walsall is to the effect that "sets of showy harness, oftentimes heavily mounted in gold or silver, are seldom ordered nowadays—gentlemen are going for the automobile."

* * *

The special prize of £25 offered by the Continental Tyre Co. to the driver of the gold medal car in the recent reliability trials whose Clipper-Continental tyres were in the best condition at the end of the trials, has been awarded to Mr. H. Prosser, of Glasgow, who drove his No. 41 in the 650 miles event. This car, by the way, is, we hear, still on view at Messrs. Rennie and Prosser's Glasgow place, but its owner is taking it away this week.

* * *

Two engineers who were sent by the Sultan of Morocco to survey the road between Fez and Mequinez, with the idea of laying down a track for his autocar, were stoned by Berbers, who also pulled up the red flags placed to mark the track. "A horse," they declared, "was good enough for the Sultan's father and grandfather, and what more does he want?" The gentle Berbers, by the way, have decided that the automobile is a special invention of the Evil One.

* * *

The Bell Odometer, an instrument made to register the number of miles travelled by an autocar, is being sold by the Automotor Accessories Co., 23, Southampton Row. It is made in several models, the most useful of which is A. This records up to 1,600 miles, and repeats. There are three indices on the dial. One registers every mile, at the end of which a bell is rung; another registers forty miles, with intermediaries; and the third by two hundreds up to 1,600. The price is under a sovereign.

* * *

This illustration is reproduced from a snap shot sent us by the Overman Automobile Co. of New York. It shows the accident at the one-mile straight-away speed contest on Staten Island, New York, when it will be remembered the Baker electric



torpedo crashed into a group of spectators who were standing on the wrong side of the track. Mr. F. Merryweather, the superintendent of the Overman Co., was standing opposite to this point and holding a camera. As he saw the torpedo making for the crowd he ran towards it, and at the same time snapped the camera.

An automobile agency has been opened at Waterford, Ireland, by Mr. W. F. Peare, who is in a position to execute repairs, etc.

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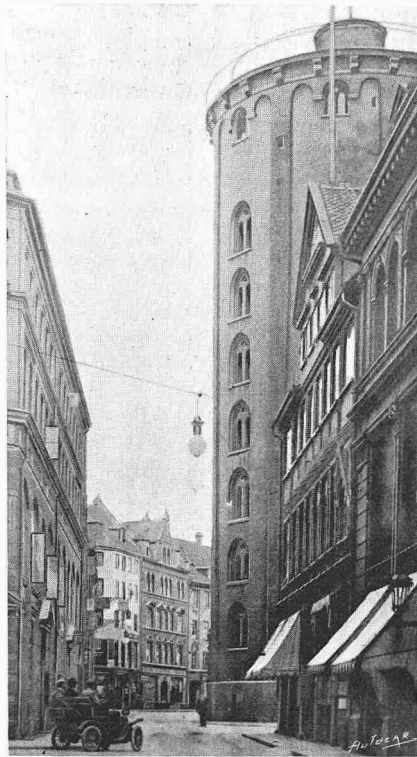
The Garrard Co., of Ryland Street, Birmingham, are making a special dubbin for the preservation of motor cycle belts. It has a good effect on the belt, and causes it to pull well, even when quite slack.

* * *

The *Blackpool Times* has opinions on motor cars. This is what it says: "If there was no hope of an improvement in these machines, it would be a good thing to sweep them off the public roads entirely. At present they are a mere aristocratic fad, and a dusty, noisy, smelly nuisance. As microbe raisers they have no equal. They are a terror to the horse and to human beings, and for unspeakable ugliness they are only matched by the hippopotamus." We wonder how the violently go-ahead Blackpool citizens tolerate such nonsense as this.

* * *

Mr. D. Hughes Morgan, of Brecon, speaks highly of T. and H. Rees, livery stable keepers, of St. Julian Street, Tenby, who stored his 10 h.p. Wolseley for five weeks at a nominal charge. Mr. Hughes Morgan strongly advises all who visit Tenby to make a trip to St. David's, *via* Haverfordwest and Solva. Not only is the scenery beautiful, but the road is of a character to thoroughly test the hill-climbing capacity of a car. The road is good, but from Haverfordwest to St. David's there are seventeen hills in sixteen miles. Our correspondent was told that he could never get to St. David's by that road, so he made up his mind to try with five passengers, and he accomplished the journey without a stop, although the return journey was made in the wet. This Wolseley, by the way, has travelled 5,000 miles without a single stop on the road for repairs of any kind, and Mr. Morgan attributes it to the fact that he always has it looked after at the finish of each day's run.



The Round Tower, Copenhagen.

We are always glad to hear of the proprietors of influential daily papers becoming automobilists. Among the latest is Mr. D. Duncan, who owns the *South Wales Daily News*, who is going in for a couple of 12 h.p. Daimlers.

* * *

The Singer chain-driven bicycle to which we referred last week is an additional pattern, and does not supersede the gear-driven type. It is merely produced to meet the views of those who prefer chain drive and free engine. Numbers of the gear-driven bicycles are still being made, and the direct driving will be retained on the tricycles, both single and tandem, and the tri-voiturettes.

* * *

Messrs. Shippey Bros. have secured the contract for the supply of Diamond tyres for the new Packard automobiles about to be placed on the English market. The tyres used by the Packard Co. on their standard type of vehicles are made extra stout—34 in. by 4 in.—the rear tyres being specially constructed with herring-bone threads, and the coverings from a selected rubber said to greatly reduce chemical action, thus prolonging the life of the tyres. Messrs. Shippey Bros. will stock various sizes of these tyres in London.



Recently Herr Lorenzen, when visiting Copenhagen, not finding a hill sufficiently steep to demonstrate the climbing powers of his Beaufort car, made up his mind to attempt the ascent of the Christian IV. tower, and this feat he successfully accomplished. The spiral gradient is as steep as one in four, and the car after climbing it was driven down without accident. The tower, which is over 100 feet high, was built as an astronomical observatory, and the feat naturally created considerable sensation in Copenhagen when it was known. The view above shows the exterior appearance of the tower. The Beaufort car is handled in this country by the Beaufort Motor Co.

The Bishop of Rochester fulfils Sunday engagements at widely-separated places by means of the autocar. To Sabbatarian objectors he replies that Sunday is his chief work-day, and that by motoring he avoids employing horses and coachman.

* * *

A balloon carrying dispatches will ascend from the Crystal Palace about mid-day on Monday, November 3rd, and a prize is offered to the member of the Automobile Volunteer Corps who follows it to its descent and captures the dispatches.

* * *

Further exhibition of Mr. Dan Albone's agricultural motor has been made in the neighbourhood of Biggleswade. It was attached to one of Messrs. Hornsby's two-furrow ploughs, and accomplished the work to the thorough satisfaction of the farmers present. It should be understood with regard to this machine that it is not made to take the place of existing agricultural implements, such as horse ploughs, reapers, or binders, but to perform the work of the horses which would haul these implements.

* * *

Last week's *Punch* possessed a very strong motor flavour indeed. In the first place, in an imaginary interview with the Premier, we were told about his 45 h.p. Q.F. Napier "snorting in its stall." Then there is an amusing item, Bill Sykes's address to the Earl of Onslow, also some verses on Mr. Holding's prophecies with regard to the garb of man, and last, but not least, a full page cartoon portraying a policeman who passes the scorching cyclist and the furious horse-driver, to pounce upon an unfortunate automobilist whose car has broken down and is being towed by a cart-horse.

* * *

The Nice week will last for nine days—from March 28th to April 6th. As contemplated at present, the programme will be arranged as follows: Saturday, March 28th, brake tests; Sunday, March 29th, automobile carnival; Monday, March 30th, Tuesday, March 31st, and Wednesday, April 1st, automobile races; Thursday, April 2nd, Nice-La Turbie hill-climbing competition and appearance competition at Monte Carlo; Friday, April 3rd, and Saturday, April 4th, exhibition; Sunday, April 5th, the mile (Rothschild Cup) and the kilom. speed contests; Monday, April 6th, Caters Cup competition. The value of the prizes in specie and *objets d'art* will amount to over £400.

* * *

In the American reliability trials, held under the auspices of the Automobile Club of America, from New York to Boston and back, a distance of five hundred miles, two of the Weston steam cars, manufactured by Messrs. Grout Bros., of Orange, Mass., came through without the loss of a single mark. These cars were of standard design, with no addition whatever, but, of course, special arrangements were made by the club for tank filling. In this competition there were eighty entries, fifty-nine being petrol cars, twenty steamers, and one an electric vehicle. The highest powered car was 24 h.p. Fifty-one out of the eighty were below 10 h.p. With the exception of seven French cars, all the cars were of American origin, and only five out of eighty entries failed to start.

A chauffeur named Clements, or rather the name and address of the gentleman who employs him, are wanted by the Speedwell Motor and Engineering Co., of 50, Albert Gate, S.W., as it seems they sent him a 6 h.p. Gardner-Serpollet safety valve in response to a wire, but letters addressed to the hotel where the valve was posted to have been returned marked "address unknown."

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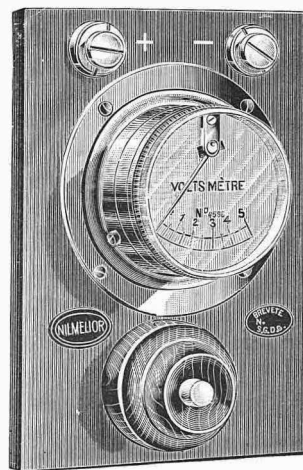
In lieu of taking thought how to crush out their automobile industry, the French authorities have recognised that the construction of fast, light automobiles driven by featherweight high speed explosion motors, has endowed their constructors with knowledge and qualities which are of the highest value when applied to other work of an important nature. Consequently the French Government authorities have commissioned MM. De Dion-Bouton to devote a portion of their works at Puteaux to the construction of a submarine of the Goubet type.

* * *

In discussing the pros and cons of direct driving on the top speed of gear-driven cars, it is often brought forward as an argument against the system that it is only suitable for racing cars, or cars which can, for the greater part of the time, be driven upon the top speed. There are a good many touring cars with four speeds which have a very high top speed which can only be used very occasionally, and therefore it would seem that a combination which gave the direct drive on the third speed, and the indirect or compound on the first, second, and fourth speeds, would be a good design for cars of this description, as with fair engine power in proportion to weight it may be taken as proved that the third speed is the one which is used for the greater part of the time, and it is therefore the one which should be most efficient.

* * *

A neat little voltmeter for attachment to the dashboard, made by Bassée and Michel, and to be obtained from the United Motor Industries in this country, is depicted in the accompanying illustration.



The instrument is mounted upon a polished baseboard, and is fitted with a push switch and terminals, the whole being screwed on to the dashboard. Separate wires lead from the accumulator to the terminals, and it is only necessary to remove a plated cap from the instrument and press the button to see at a glance the state of the accumulator. This may be done while the engine is running, without causing a misfire. For double sets of accumulators three terminals and two push switches are fitted; in this case the two negative wires are attached to the same terminal. The individual batteries are tested by pressing their respective buttons.

While the Expiring Laws Continuance Bill was being discussed at midnight in the House, Mr. O'Shee, presumably as an Irish joke, moved to omit the Locomotive Act that abolished the carrying of the red flag before the motor. This brought a pathetic appeal from the Attorney-General not to talk about autocars.

* * *

Lord Ebury recently acquired a specially-built 12 h.p. Century brougham. Mr. Courtenay Warner, M.P., has also bought a tonneau of the same make, and this week Mr. Fred Milburn, the well-known shipowner of Cardiff, will take delivery of his new 12 h.p., and drive it himself down to Cardiff. It must not be imagined that the attention of the company is being devoted entirely to light cars, as the little Century tandem is still as popular as ever.

* * *

In Perthshire a policeman who summoned an autocarist for furious driving stated to Sheriff Sym that on seeing the car pass he "procured" a bicycle and followed and caught up the car. Surely if the car had been going at a very furious rate it would have baffled the speed powers of an ordinary constable to keep up with it, let alone overtake it after having delayed his start to procure a bicycle. Yet the penalty was £3.

* * *

"Twelve Years—Twelve Duryeas" is the title of a smart little booklet issued by the Duryea Co. It is cleverly compiled, and gives illustrations of the Duryea car for every year from 1892 up to 1902. It is most interesting, as showing the evolution of the car, and many features are brought out which show how many of the ideas introduced by Duryea were before their time, though they are now generally adopted. For instance, bevel gear transmission and throttle governing were used in 1894.

* * *

A very big enterprise is being undertaken by Messrs. Friswell, Ltd. Mr. Friswell has taken the premises of the Albany Pantechnicon Co. opposite Portland Road Station, N.W. Here, he informs us, there is room for seven hundred cars. Storage will be free of cost, charge only being made for work done on cars or for material or sundries required for them. There will be a carriage department for making bodies, painting and finishing, and machinery for all kinds of repairs will be installed. The building is in three blocks, and the central block B will be devoted to the auctioneering branch of the undertaking, and the sales will be classified. For instance, one will be devoted to steam carriages alone, another to motor cycles, another to cars to sell at not over £150, and so on. There is a very large safe depository on the premises, which will be useful for automobilists going out of town, and which, one humorist suggested, could well be taken advantage of for the safe keeping of spares and tools which are apt to disappear mysteriously. A driving school will be conducted in the building. The yard is large enough for fifty cars to be washed simultaneously, and there is a lift in the central building powerful enough to take up several tons, and big enough, we are told, for four 70 h.p. Panhards.

A very full repair plant has now been put down by the British Automobile Commercial Syndicate, Ltd., at 97-98, Long Acre, W.C. In addition to carrying a large stock of parts, they are now prepared, if necessary, to make any part required.

* * *

Mr J. Paxton, of Liverpool, who has one of the new 9 h.p. Rex cars, sends us details of a run from Coventry to Liverpool on his new vehicle. It behaved splendidly, and only one involuntary stop was made for lubrication. While stopping at Lichfield the car was stored by Messrs. Jones and Co., Talbot House, of whose courtesy Mr. Paxton speaks in high terms.

* * *

On the night of October 27th, burglars entered the house of Mr. A. C. Davison, of 366, Camden Road, N., and stole two motor bicycles. They should be easily identified, as one, the Davison, was of a new pattern specially designed for the forthcoming Stanley Show. It has a novel frame, with double triangulated back part, while the bottom tube meets the diagonal about halfway, leaving room below for a Simms motor No. 554 with magneto. It has also glass gauges let into the sides of the petrol and oil tanks, while it possesses a sight-feed lubricator for the oil. The left grip works the exhaust lifter and the right the timing gear. The other machine—an Ormonde—is of the well-known pattern, with "Kelecom" motor fitted behind the diagonal, and has a Lucas valve added to the oil pipe. The enamel of the top tube has been damaged and touched up by hand, and the back mudguard has a large dent in it at the extreme back. A Lucas Acetylator lamp and one of Salsbury's latest pattern horns, which follows the shape of the handle-bar and of which only a few are about, were also taken. Any information which would lead to the recovery of the stolen property would be gratefully received by Mr. Davison.

* * *

Mr. J. Reginald Egerton recently suffered a very annoying experience. He was driving an 8 h.p. Gobron-Brillie from Ipswich to Bury with a friend. They were stopped by a man holding up his hand. Mr. Egerton's friend walked towards the horse to hold it, but the driver turned and went on in front of the car. When the car was again started and came up slowly behind, the driver again held up his hand. He then got down, opened a gate, and took his horse and cart into a field, and the car went on. Later in the day, Mr. Egerton was stopped by a policeman, who took his name and address, stating that the horse in question had run away in the field. This is a most unpleasant experience, for, while there is no doubt Mr. Egerton was in no way to blame, he will probably be put to the expense and waste of time of journeying back to defend himself. In the ordinary course of things, he would not have been traced, as it was only by chance that he stopped in the district, and he was quite unaware that the horse had bolted in the field. It shows at once what sort of annoyance numbers would provide, as if his car had been numbered he would have been identified in any case, whether he had stayed in the district or not, and, although blameless, put to the annoyance and expense of defending an unjustifiable charge.

OIL MOTOR CARS OF 1902.

(Extracts from a paper read before the Institute of Mechanical Engineers.)

BY CAPTAIN C. C. LONGRIDGE, M.I.MECH.E.

(Continued from page 429)

Carburetters and Carbureting.

These are roughly divisible into two systems—aspiration carburetters and positive-feed carburetters. Of the two, the latter, in the author's opinion, is unquestionably the better system. Most aspiration carburetters draw the petrol from a jet communicating with a constant level chamber or reservoir. The result is inaccurate and faulty petrol supply, since the force of the suction varies with the speed of the engine. Rich charges are thus obtained when the engine is racing, and poor charges when it is slowed down from over-load, the reverse of what ought to be. Makers are now recognising this defect, and are introducing devices more or less closely approaching positive measurement. There is no need to describe these latter, because the type is well known in heavy oil-engine work—for instance, the Crossley, the Weyman and Hitchcock, the Wells Bros., the Roots, and numbers of other patented devices. As instances of the introduction of positive fuel measurement in petrol motors may be cited the Koch pump, the Gobron-Brillie bucket measurer, the adjustable stop-jet in the Mercedes-Simplex of the Cannstatt Daimler Company, a similar device in the De Dion voiturette carburetter, etc. In America quite a number of petrol motors use positive measures, usually of the pump type—for instance, the Webster, White and Middleton, New Era, Pierce, Springfield, etc.

There is a good deal of evidence to show that the problem of carburation is at present eliciting the attention of inventors—a sign that something yet better is wanted. To take one among many, Messrs. E. F. Bradley and W. R. Pidgeon have recently published a new design of carburetter (fig. 1). They found by experiment, as might have been surmised *a priori*, that, to get the maximum

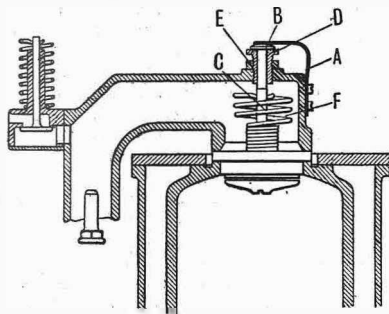


Fig. 1.—The Bradley-Pidgeon carburetter.

A, recoil spring to induction valve. D, adjustable guide for valve stem.
B, induction valve stem head. E, lock nut to D.
C, induction valve stem. F, ordinary induction spring.

power at any number of revolutions per minute, the jet of the carburetter must be larger for low speeds than for high ones; and as it is difficult to adjust so small a thing as the hole in the jet, they insert a small air spring valve in the air pipe between the carburetter and the induction valve. This auxiliary valve opens wider and wider as the engine speed increases, closing again as it decreases, thus decreasing or increasing the suction on the jet. At starting, as the jet is a large one, the petrol supply is also large, and the engine starts readily; then, as it speeds up, the air valve comes into action, and automatically letting in more air, reduces the mixture to and maintains it at the proper proportion. The idea of an auxiliary air supply for this purpose is not new, and is found in the 8 h.p. De Dion light car, the Darracq light car, the American Holyoke tonneau, etc. In the motors of the Société des Automobiles Cronan of Paris, the quantity and quality of the gas mixture are so automatically varied, according to the speed of the engine, that the force of the explosion increases as the speed diminishes; in other words, the greater force of the piston stroke tends to compensate for the loss in centrifugal power of the fly-wheel.

A number of recent devices on similar lines show that the tendency of the present motor is, and rightly so, towards discarding the crude action of the suction jet, pure and simple, in favour of positive measures, preferably under the control of the engine governor.

In connection with carburation, the author raises the point whether it be better to carburate the incoming air or to first introduce the air and then carburate it—that is, add the fuel at the end of the compression stroke. This latter method avoids all possibility of premature explosion, and thus enables higher compression to be used. On the other hand, it is urged that the charge will be imperfectly mixed, and give imperfect and irregular combustion. The author is doubtful whether for petrol there is anything in this objection, or whether, if there is anything, it is not more than discounted by the advantage to be gained. It is certain that a number of petrol motors run, and run successfully, by merely injecting the petrol into the cylinder, and letting the air and heat do the rest. An instance is the American Weber gasoline motor. The petrol is drawn from a tank, and supplied direct to the cylinder in a fluid state. No vaporiser is used, nor does the petrol come into contact with air until it reaches the combustion chamber. In the Otto gasoline motor, built by the American company of that name, no carburetter is used. The oil is pumped from an air-tight tank to a valve acted on by the governor. This admits a given quantity to the cylinder, when it is immediately pulverised by the incoming air, and rendered explosive. No air reaches the petrol on its passage from the tank to the cylinder. In the German Lützký petrol motor of the Maschinen Gesellschaft, Nuremberg, benzine is conveyed to the cylinder in a liquid state, and vaporised per stroke as needed. In fact, in many German petrol motors care is taken to exclude the air until the oil reaches the cylinder. This is the case even when a separate vaporiser is used. Thus in the oil motor of Dopp Bros., Berlin, each charge of oil is separately converted into vapour without any air, and highly superheated before it is admitted, in finely divided currents, to the combustion space, where it is mixed with air. Herr Dopp claims that this method ensures regularity and completeness of combustion, low oil consumption, and quiet regular working without vibration. In the Russian Kablitz motor car also naphtha is injected into a red-hot vaporiser open to the cylinder, and immediately vaporised by the compressed air. Injection of the fuel at the end of compression is adopted in the Diesel motor, but in rather a different way and with a different object. On the whole, the author thinks that, for petrol at least, a good deal more stress is laid on pre-mixing than need be, and that carburation at the end of the stroke, inasmuch as it admits the use of higher compressions, and has other important advantages, is probably as good if not better and more economical than the more ordinary method. It probably requires high compression.

The last point to be considered under the heading of carbureting is the use of heavy oils with a higher flash-point than the usual household lighting oils. It would be, if not in the near future a requirement on the score of price, at least a convenience in this country if motors were adapted to use such oils as well as petrol; for the Indian trade it is a *sine qua non*, since petrol cannot yet be obtained. This point has not been lost sight of, and quite a number of combination carburetters for the double purpose have lately appeared; but experience as to their efficiency is still wanting. With Russian oils there ought to be no difficulty, since these are sufficiently pure to require no more preparation than atomising and vaporisation, which are effected by an easy application of heat. Indeed, it appears doubtful whether even vaporisation is needed or whether mere spraying would not suffice. On this question Specification No. 7,538, 1895, of Mr. James Roots, furnishes some information. It states: "I have found by experiment when oil is sprayed into a working cylinder that the essential thing is ignition, as the oil has not time to be and is not vaporised, but is fired as oil spray, and that, once the ignition is commenced, the flame passes almost as rapidly through the particles of oil

as oil spray as through a completely vaporised and mixed charge or oil.

It does not appear that Mr. Roots has since found reason to alter this statement. For Russian refined oils, therefore, a combination carburettor presents no great difficulties. With American oils it might not be so easy to get satisfactory results without special vaporisers. These oils are "cut" differently, and contain waxy and resinous compounds which in long and continuous running form deposits on the walls and valves. The conditions for successful use would appear to be: Uniform delivery of minutely atomised oil in correct proportion, high cylinder temperature, no condensation by contact with cool surfaces, and sufficient time for combustion. For alcohol, similar conditions, with higher compression, appear best suited.

The Fuel.

The consideration of the fuel used is a very important portion of the subject, and a very great deal has yet to be learned. It seems to the author astonishing that petrol should have been so long in use, and yet so little known about it. He believes he is correct in stating that in this country at least neither the maximum explosion pressures of various petrol mixtures nor the times of attaining maximum pressure, nor the rates of cooling are yet ascertained. Under these circumstances makers, as far as carburation is concerned, must be working more or less in the dark.

A few years ago Dr. Boverton Redwood contributed some valuable information on the subject. The results of his experiments, tabulated in "Transport of Petroleum," are as follows:

"With seven volumes of the liquid (pentane and gasoline) to 100,000 volumes of air the combustion is a silent one, while with four times that proportion of liquid the mixture also burns without explosive violence. With between eight and nine volumes of liquid to 100,000 of air, there is a marked increase in the energy of the combustion, and when the quantity of liquid is augmented to 10.5 volumes, a sharp explosion occurs. When the proportion of liquid is increased beyond about seventeen volumes, there is a perceptible decrease in the violence of the explosion, with corresponding gain in the volume and duration of the flame, and with twenty-one volumes of liquid to 100,000 of air the explosion is as mild as with 8.4 volumes."

These results, adequate for Dr. Redwood's purpose, are not sufficiently comprehensive for the requirements of the motor manufacturer. For his purpose, estimation of the value of any explosive mixture involves knowledge not only of the maximum explosion pressure as one factor, but also of the rates of cooling as another factor. It is only from the faculty of producing pressure and the capacity of resisting cooling, that we arrive at the mean pressure which determines the true efficiency of the mixture. The determination of these factors is still wanting. It is, however, likely that the deficiency will soon be supplied, for the author is in a position to state that the necessary experiments are in progress. The results will be awaited with considerable interest, and there is little doubt that they will establish the value of petrol-measuring devices for carburettors when efficiency and economy are rigorously followed.

But there is another phase of this problem requiring even closer research. Besides the determination of the fact that different petrol mixtures have certain rates of cooling, there is the ascertaining of the intrinsic reason and the why and wherefore of the facts, the relation of effect to cause—that is, the true knowledge or science of the problem. Attention is directed to this incomplete knowledge of the process of cooling, because it will be referred to again in connection with an interesting problem.

Under the head of fuel, it may be noticed that the motor cars of to-day, more especially those of French makers, show a tendency to acquire greater range—that is, to be equally suited for the consumption of either petrol or alcohol. Is this a precursor of the supersession of the refined product of Nature by the purely artificial production? That is a question for the chemists to decide. There is, however, an interesting phenomenon which the trial of alcohol has made sufficiently prominent to merit attention. The point is clearly put in an article in *Engineering*, 10th January, 1902, on "French Spirit Motors": "In theory the consumption of spirits for an equal power is 1.8 times the consumption of petrol; in practice, however, the presence of water in the spirits increases the elasticity and

efficiency of the power, and the proportion is only as 1.25 to 1. . . . Spirit motors have more elasticity than petroleum motors, and work more softly; the pressure of the explosion can be increased without disadvantage to the machine, the expansion curve being very regular.

It has been asserted, from results of tests carried out in Germany, that the efficiency of spirit motors is twenty-three per cent., against fifteen per cent. for petroleum and thirteen per cent. for steam engines."

Why should the presence of water in the alcohol motor give this increased efficiency? Before attempting a reply, it may be stated that the same phenomenon has been observed in the petrol motor; for, if the published reports ("Zeitschrift des Vereins Deutscher Ingenieure," Bd. xlv., 1900) are to be credited, the addition of water to the charge in the Banki engine reduced the consumption to 0.45 pint per b.h.p. per hour. There again, in general terms, the advantages claimed were greater economy, greater elasticity, and smoother running.

In July of this year, Mr. C. Rainey, at the author's request, made some experiments with water injection in a petrol motor. Owing to want of appliances no very close work could be done, but the general results reported by Mr. Rainey are these:

(1.) That while maintaining the petrol supply constant, the addition of water gave increase of power and cooler running.

(2.) That this effect was maintained until the water reached a quantity equal to the amount of petrol.

(3.) That a larger quantity of water interfered with the sparking, and caused frequent failures of ignition, which after a short time failed altogether.

As far as the author is aware, no very complete explanation of these better results has so far been published. The advantages of water have been described as a contribution of mechanical energy in the form of steam, as a cooling agent obtaining increased charge volume and higher compression,* as an absorber of the violence of explosion, etc. To these explanations, the author will add another. During the recent testing with tube ignition of a petrol motor, in which the cylinder wall developed porosity, admitting moisture to the combustion chamber, a sudden advance in ignition was observed, together with an increase of exhaust temperature, leading to burning of the valves. The author considered the following to be the possible reason: Assuming the cylinder charge to be pentane, C_5H_{12} , the addition of water or aqueous vapour in contact with the incandescent tube might lead to partial decomposition, carbon combining with carbon monoxide, hydrogen being liberated. In other words, water-gas would be formed. The advance in ignition would be due to the greater inflammability of the gas, and may be illustrated thus: The molecular weight of pentane being 72, 256 of oxygen would be required for its perfect combustion. On the other hand, the molecular weight of the water-gas, $CO + H_2$, being 32, the oxygen needed for complete combustion would be 48. One part by weight of pentane, therefore, would require 3.5 O, and one part of water-gas 1.5 O. This at once shows why the ignition is advanced, the greater inflammability of the water-gas being due to the lesser amount of oxygen wanted for combustion. The increased temperature of exhaust might be accounted for by assuming that the nascent water-gas, burnt with a fierce heat and acting as an extended flame carrier, produced more rapid and complete combustion of the charge. Unfortunately, the testing department in question is entirely destitute of any laboratory or appliances for following up questions of research, and the author was unable to analyse the exhaust gases, and thus determine whether the hypothesis of more complete combustion was correct. The above is not an isolated case, nor is it confined to one size or type of motor nor to tube ignition only, the same facts being observed when electric ignition is in use. It has been suggested that earlier ignition is due to the explosion gas entering the water-jacket, and, by driving the water from the cylinder walls, increasing the heat of the combustion chamber. But there are a number of arguments against

* Patents No. 15109—G. Schimmung. "In all gas engines," says the specification, "the fall of temperature actually utilised is from 2000° C. to 800° or 600° C., whereas by the expansion of the gases and combustion products generated through the water injection the fall of temperature available for useful work is from 2000° C. to about 40° C.—No. 1230623, R. Diesel. Reduction of the volume of the compressed air, and therefore heavier charge, by injection of water spray."

this suggestion, and the phenomena of earlier ignition and hotter exhaust when a little water is present, with increase of power and cooler running when a large and regular supply is added, need another explanation.

Treated mathematically as a purely thermal problem of profit and loss, it can no doubt be shown that, whatever be the physical condition of the water at the beginning of the compression stroke, and whatever be the laws of specific heat, the addition of water to the charge is an entry on the wrong side of the balance sheet of an explosion motor, and that the advantage of water injection can lie only in the possibility it gives of employing much higher compression without risk of premature ignition, of obtaining heavier charges, and of reducing heat loss through the cylinder walls. But does this academical statement meet the whole case? Does it explain the phenomena above? Does it satisfactorily explain the increase of power without the increase of compression to which Professor Meyer attributes the results of the Banki motor? And does it explain the remarkably high and maintained mean pressure of that engine when water is used?

Several arguments might be advanced for the entry of an additional factor into the problem—the possible improvement of combustion by the presence of water vapour. The idea is not new. The more perfect combustion by

this question, Mr. H. J. Bult, F.C.S., wrote: "The decomposition of petrol in the presence of water might take the form you suggest, and could be explained by the equation: C_5H_{12} (pentane) + $H_2O = C_2H_6$ (ethane) + $CO + C_2H_4$ (ethylene) + H_2 . But he expressed an opinion that the reaction might rather be more in accordance with $C_7H_{16} + H_2O = C_2H_6 + CO + H_2$."

Another reason for attributing the phenomena possibly to decomposition is, as Mr. Bult proceeded to add, that it is well known when petroleum compounds, especially those belonging to the paraffin series, are superheated, they partially decompose into olefines and gases, at the same time leaving a deposit of carbon. This is shown by the equation: C_7H_{16} (heptane) = C_4H_{10} (tetraene) + C_2H_4 (ethylene) + $H_2 + C$, or $C_7H_{16} = C_2H_6 + C + 2H_2$. The author's suggestion, therefore, is that the presence of water vapour at a certain temperature may disturb the chemical equilibrium of the oil at the critical point, hastening and promoting its decomposition. That a hydrocarbon, even without the presence of water, would in the combustion chamber decompose into light and heavy constituents seems very probable—the result being combustion and heat evolution more or less of an irregularly progressive nature.

With the object of studying the problem of combustion in oil engines, the author compiled tables 1 and 2.

TABLE 1.—Gas Engines.

No.	Description of Engine	Compression in lbs.	Maximum Pressure in lbs.	Ratio of Maximum Pressure to Compression.	Mean Pressure in lbs.	Ratio of Mean to Maximum Pressure.	Ratio of Mean Pressure to Compression.
1	4 n.h.p. Crossley.	87.5	275	3.1 to 1	100	.36	1.1 to 1
2	6 "	31	126	4.0 to 1	57	.45	1.8 to 1
3	9 "	38	133	3.5 to 1	58.4	.44	1.5 to 1
4	9 "	48	200	4.1 to 1	81.5	.40	1.7 to 1
5	30 "	75	318	4.2 to 1	113.5	.35	1.5 to 1
6	9 " Stockport.	60	244	4.0 to 1			
7	9 "	90	272	3.0 to 1			
8	9 " Barker.	50	195	3.9 to 1	67	.34	1.8 to 1
9	12 "	55	244	4.4 to 1	76	.31	1.4 to 1
10	12 "	51	250	4.9 to 1	76	.30	1.5 to 1
11	35 " Tangye's.	73	220	3.0 to 1	89	.40	1.2 to 1

TABLE 2.—Oil Engines.

No.	Description of Engine.	Compression in lbs.	Maximum Pressure in lbs.	Ratio of Maximum Pressure to Compression.	Mean Pressure in lbs.	Ratio of Mean to Maximum Pressure.	Ratio of Mean Pressure to Compression.
12	7 n.h.p. Crossley.	80	240	3.0 to 1	64	.26	0.8 to 1
13	8 "	50	240	4.8 to 1	54	.22	1.08 to 1
14	4 " "						
15	7 " "	45	210	4.6 to 1	65	.31	1.4 to 1
16	10 " "						
17	10 " "	67	250	3.7 to 1	62	.25	0.92 to 1
18	7 " Tangye's.	40 mean.	200	5.0 to 1	58	.29	1.4 to 1

Grouping and comparing Nos. 14, 15, 16, 18 with No. 4, the oil engines, with an average 4 lbs. lower compression, gives 7 lbs. higher maximum pressure, but 19 lbs. lower mean pressure; or taking No. 17 with No. 11, the oil engine, with 6 lbs. lower compression, gives 30 lbs. higher maximum pressure, but 27 lbs. lower mean pressure.

simultaneously evaporating water and vaporising oil is ascribed by Altmann to an oxidising action of the water vapour. Under the influences of high temperature, the close contact of compression with the physical and chemical disturbances of explosion, it does not seem impossible that water vapour may cease to be inert, and under certain conditions may promote the splitting of a hydrocarbon into light gases, olefines, hydrogen, burning at lower temperatures (1,124° F.), and into heavier residues, carbon monoxide, etc., requiring a higher temperature (1,200° F. to 1,350° F.) for their combination with oxygen. Earlier ignition might be due to the presence of these light gases, while the hotter exhaust might be attributable to the later, and probably better, combustion of the heavier products, by reason of the rapid and extended initial inflammation. Communicating with the author on

Diagrams for Nos. 1-12 are published in Mr. Dugald Clerk's work, "The Gas and Oil Engine"; the rest were supplied by the makers. The fuel in the case of the gas engines was coal-gas; that in the oil motors was Royal Daylight.

Comparing the oil with the gas engines, using similar compressions, it will be noticed that the ratios of maximum pressure to compression in the oil motors are if anything higher than those in the gas engines, while the ratios of mean pressure to maximum pressure are much lower. May it not be legitimate to attribute the high initial pressures of the oil motor to the rapid inflammation of volatile gases, and the low mean pressures to the slower and imperfect combustion of the residual products of the decomposition.

There are, however, strange things in Nature, and it

is quite possible that a very different explanation may be the right one.

It is claimed that the addition of either hot or cold air to steam serves to lower the point of condensation. In Lindley's patent, No. 24,949, of 1894, this is fully described, and is utilised to cover the use of steam, working expansively, considerably beyond the point where steam alone, at the same temperature, would have become condensed. The explanation offered is in accordance with the rule that generally if two fluids with different boiling points are mixed, the boiling point of the mixture is intermediate between that of the components. Thus the boiling point of air being more than 200° F. below zero, a comparatively small proportion of air mixed with steam reduces very materially the temperature at which condensation takes place. It is further stated that, by raising the air to an equality of pressure with the steam, the temperature of the air may be increased by the development of the latent heat therein, so as to exceed the temperature of the steam. Thus the temperature of the whole is raised, and practically the steam is superheated. Now, is it possible that some analogous action takes place when water vapour is mixed with the explosion gases? Is there a development of latent heat? Is there a marked retardation in the rate of cooling, and, therefore, a higher exhaust temperature? Is there a retarding effect on dissociation and so the attainment of a higher initial temperature? or is there an acceleration in recombination after dissociation, and so the maintenance of a higher mean temperature? Who knows? But, as Mr. Clark puts it, without exception the actual pressure of explosion falls far short of the calculated pressure; in some manner the heat is suppressed or lost. For some reason nearly one-half of the heat present, as inflammable gas, in any explosive mixture, true or dilute, is kept back, and prevented from causing the increase of pressure to be expected from it. There is, therefore, a very wide margin for greater initial heat development, and it may be that the presence of water vapour, true or decomposed, has some developing action on this latent potentiality. The whole question is obscure, and automobilists must not conceive the idea that, even if water is proved to be a useful addition to the charge, the problem is at once solved. Probably correct employment of water will demand certain conditions that have yet to be studied, and may require a change in the motor design. Anticipating the objection likely to be

(To be continued.)

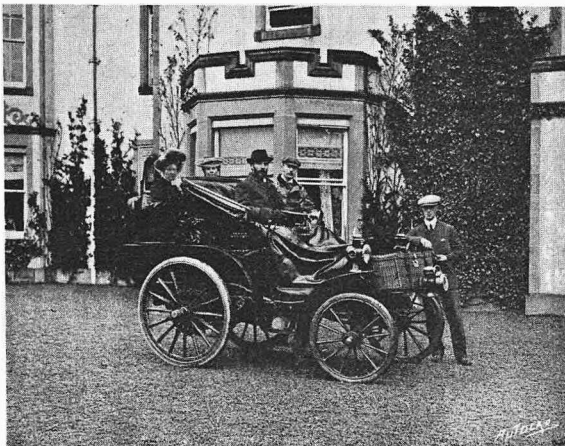
raised—that water will corrode the valves and cylinder—the author replies that this does not appear to be the case. With alcohol, containing water, it has been found that where the curve of the motor was regular, indicating perfect combustion, the condensation liquid of the exhaust was neutral, and there was no attack of the valves and cylinder walls. Three years of experience with the Banki oil and benzine motors show no corrosion from the use of water. Nor is it likely that so experienced a firm as Priestman Brothers would have adopted water-injection if corrosion was to be feared.

In another direction also, and this time with more definite knowledge and purpose, improvements in fuel are under consideration. These lie in chemical additions of explosive nature, as petrol enrichers. The idea is not new, and frequently recurs in past patents. There is no theoretical difficulty in chemically increasing the explosive power of petrol. But there are difficulties of a practical character which consist in finding an enricher that fulfils the two conditions—of not increasing the cost of the fuel per horse-power and of not introducing any element of danger in its use.

Picric acid has been experimented with, but it is manifestly dangerous to handle, and is said to leave a highly explosive deposit in the exhaust pipe and silencer. Bisulphide of carbon has been frequently suggested, but it will certainly need to be deodorised. Curiously enough, salt also has been recommended. The effect of this ingredient, if any, would be due to the formation of chloride of nitrogen and hydrochloric acid, quite prohibiting its use. There are, however, other possible means of enriching petrol; and the author, in conjunction with Mr. H. J. Bult, is now considering one of a promising nature.

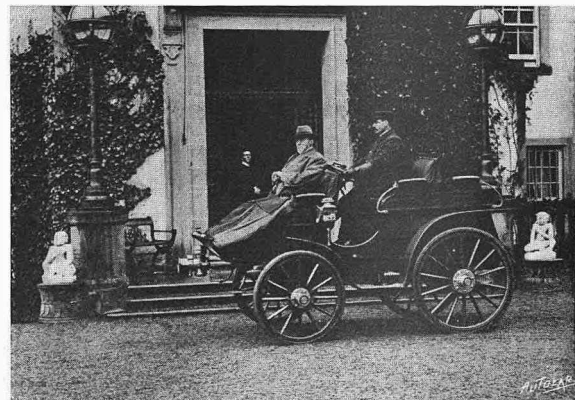
Among the fads relating to fuel improvements may be mentioned various proposals for increasing oxygen in the air charge. In Patent No. 6,573, of 1896, H. J. Dowsing describes an ozonizing apparatus, while a paragraph lately published states that Professor Carl Linde suggests the employment of liquid air instead of drawing in ordinary atmospheric air, considering this would possibly render cooling water superfluous and materially increasing the motor output, as the air would be got in a highly-condensed form; and, owing to the cooling effect a much higher compression could be used, thus increasing efficiency as well as output. The suggestion is ingenious, but scarcely practical.

THE SCOTTISH AUTOMOBILE CLUB.



Professor Dawson Turner (vice-president of the club) driving Mr. Norman Macdonald (chairman). Mr. George Macmillan (hon secretary Eastern District) is standing by the car.

The Scottish Automobile Club held its concluding run of the season to Philiphaugh, Selkirk, on Saturday last. Unfortunately, owing to the lateness of the season, the members of the Western Section



Mr. W. Strong Steel, of Philiphaugh, on his 12 h p. Arrol-Johnson car.

could not take part, and only the members of the Eastern Section, together with an Aberdeen motorist, accepted the hospitality of Mr. Steel at his historical residence. The weather was good, but the roads, particularly in the Heriot and Stow districts, were somewhat heavy, owing to the overnight rain.

A TRAP THAT FAILED.

Notwithstanding the undeniable fact that cyclists suffer considerably at times from the thoughtless and selfish driving of a small section of automobilists, there is undoubtedly much sympathy felt by them for automobile drivers who may be subjected to police persecution. That sympathy it is which prompts cyclists to give warning of any meanly-prepared police traps they may discover on the road, and we suggest that in return for such kindly thoughtfulness and consideration car drivers should exercise the greatest forbearance towards the wheel folk, and cause them as little inconvenience upon the road as possible. Tidings of most signal service rendered to a large number of automobilists a few Sundays back reached us lately, and in order to show the manner in which cyclists are at pains to serve the car driver it is well to detail them. A well-known London road riding club left town early for a long spin into the country, and when approaching Slough on the Bath Road happened upon a little posse of police, thirteen in number, ten being in uniform and three in plain clothes. So extraordinary a sight moved these knights of the wheel to keep observation on the constabulary party, and having watched them measure off 440 yards on a nice straight falling grade, post one of the plain clothes men at the London end of the length, and the other two—one handling a stop watch and the other a pair of field glasses—at the far end, while the uniformed officers hid themselves in drains, ditches, and behind fences and bushes a hundred yards or so further on, these observant cyclists realised that they had unwittingly assisted at the setting of a motor trap. So they travelled a few hundred yards nearer London, and there settled themselves down to warn every approaching automobilist—and scores passed that way before dusk—of the fate awaiting him farther on. They did their self-appointed work well, for of all the cars that travelled westward on that police-wasted Sabbath day not one passed over the fateful quarter mile at a greater speed than six miles per hour. And so the police plans were thwarted, and when dusk fell those thirteen tired, hungry, thirsty, and most annoyed constables returned whence they came without having scored a single car. But they were so chagrined and irritated at their check that later on they paid a visit to a refreshment house close by much affected by the cyclists who had foiled them, and, although the landlord thereof had not quitted his premises, and had in no way assisted the cyclists, they suggested to the poor man that he had been an accessory before the fact of their undoing, and that, having broken some Act of Parliament, he would find his poor little licenses for non-intoxicating refreshments and tobacco opposed when next he applied for their renewal. It is probably only a policeman who would suggest criminality in an act that prevented people from breaking the law. But to appreciate the policeman's view, it would, we opine, be necessary to have spent the whole of a long Sunday in the bottom of a ditch without avail. We may add, in conclusion, that the threat to take away this little caterer's livelihood—for that is what police opposition to his license actually means—will be made

known in quarters whence action unexpected by the opponents to the application will assuredly be taken at the proper time.

THE AUTOMOBILE CLUB.

Important Announcements.

THE ANNUAL DINNER of the club will take place at the Trocadéro Restaurant, Shaftesbury Avenue, W., on Friday next, November 7th, at 7.45. Invitations are being sent out by the club to distinguished people, and it is expected that a large and representative gathering will be present.

THE ANNIVERSARY RUN, as already announced, is to be held next Saturday, November 8th. This run is held to commemorate the passing of the Light Locomotives on Highways Act of 1896. The first commemoration run was to Brighton, but this was not held under the auspices of the club. With the exception of the run to Richmond, a drive to the seaside has always been made, but this year it has been decided to make Oxford the objective. The main Bath Road *via* Reading will be followed, and the run is open to all automobilists, whether members of the club and Motor Union or not. Non-stop certificates will be issued, and lunch will be taken at Reading. As the entries close next Wednesday, November 5th, those who intend taking part in the run should send in their names to the secretary, 119, Piccadilly, at once. The entry fee for a non-stop certificate, including cards of identification, timing cards, and storage at Oxford, is 10s. It is 5s. for cards of identification and storage at Oxford. This is for those who do not want to go for non-stop certificates, while those who require neither certificates nor storage at Oxford pay an entry fee of 2s. 6d. per vehicle for cards of identification. Claimants for non-stop certificates must lodge their claims in writing, together with time cards, at the Automobile Club, not later than eight p.m. on Monday, November 10th. The cars will be identified by names, and the owners can select their own so long as they do not consist of more than ten letters. The start will be made from Grosvenor Place at 9.30, and the run will take place, wet or fine. The club has made special arrangements at Oxford for hotel accommodation, and full particulars can be obtained from the secretary. Reading is thirty-eight miles from Hyde Park Corner, and Oxford twenty-seven miles from Reading. Last year over two hundred cars took part, and this year it is probable that the number will be exceeded, and, further, that the gathering at the end of the run will be much larger, as Oxford is more convenient for Northern automobilists than is South-sea or Brighton.

THE DISCUSSION ON LEGISLATION which was to have taken place at the club on Thursday next, November 6th, has been postponed in consequence of the statement recently made in the House of Commons by the President of the Local Government Board, to the effect that it was improbable that amended legislation affecting motor vehicles would be introduced during the present session; also on account of the fact that the alterations and decorations to the new club premises in Piccadilly have taken longer than was anticipated.

THE PETROL QUESTION.

Views of Motor Manufacturers.

Coventry being as far removed from the seaboard as any town in England, is perhaps more seriously affected by the new conditions for the carriage of petrol than most other places. We therefore took the opportunity of enquiring of several Midland firms what would be the effect upon them, and what steps they were taking to meet the necessities of the situation.

The Daimler Co., like all other firms affected, are considering the position, and their desire is to co-operate with others in order to render themselves independent of the railway companies. Practical effect was given to this desire by Mr. E. M. Instone introducing the question at a meeting of the council of the Society of Motor Manufacturers and Traders on Wednesday. The Daimler Co. took the precaution to get in a fairly good supply of petrol to carry them over the period during which other arrangements are being made. Mr. Instone, on behalf of the company, has approached Lloyds to ascertain whether they would be prepared to cover the new risk, but has not received any reply.

Mr. George Iden, manager of the Motor Manufacturing Co., says that, finding he cannot get a supply of petrol in the ordinary course, he is determined to make his own arrangements, adopt his own means of transport, and get out of the difficulty himself. What he meant to say was that he should fit up a motor car to bring petrol by road until such time as he could get something like satisfactory results from the railway companies. He was quite open to co-operate with others, but in the meantime he must keep going.

Mr. A. Craig, manager of the Maudslay Motor Co., said he could easily arrange to get his petrol by road without troubling the railway companies; but the way in which the motor trade would be most injuriously affected would be the limitation of the supply to private users. It would be a somewhat difficult task to organise an efficient means of distribution to outlying districts, and unless such a scheme could be inaugurated the industry would be considerably crippled for some time to come. He suggested that some road-carrying company should take the matter in hand.

The Singer Cycle Co., makers of the Singer motor cycles, having had their supply cut off from the petrol firms, have been able to obtain spirit through a local dealer who does not hesitate or object to accept the new conditions laid down by the railway companies. Their only inconvenience is that they have to pay a higher price than formerly.

Messrs. Bayliss, Thomas, and Co., Ltd., makers of the Excelsior motor bicycles, are working up their old stock and awaiting the development of events.

The Swift Motor Co. have a fair stock in hand—sufficient, as they suppose, to carry them over the interval pending the making of other arrangements. Mr. George Du Cros has the matter in hand, and will doubtless make satisfactory arrangements.

At Birmingham the Wolseley Tool and Motor Co. and the Lanchester Engine Co. have so far experienced no difficulty in obtaining petrol. They

get it by canal at the present time, but should any trouble arise they will make arrangements for bringing it from the nearest depots of the supplying companies by road. The Star Engineering Co., of Wolverhampton, are also prepared to take similar steps.

Messrs. J. Fulbrook and Co., of Slough, inform us that they have arranged for an ample supply of petrol and motor spirit to be delivered to them by road, so that no users of the Bath Road need fear their supply giving out. Spare parts are kept and repairs are also undertaken.

It will be seen from the above that the large consumers of spirit are little inconvenienced. The people who may experience trouble are private users who live many miles away from the centres of population.

A Meeting of the Makers.

A meeting of the council of the Society of Motor Manufacturers was held at Norfolk House, W.C., on 29th October, to consider the action of the railway companies with regard to the transport of petrol. The automobile trade was very largely represented, and Mr. Harris, of the Anglo-American Co., and Mr. Leonard, of Carless, Capel, and Leonard, were also present. Mr. Leonard put the serious aspect of the matter before the meeting, and pointed out that his firm had carried on this business for the last forty years without accident. Mr. Harris mentioned that a famine was already in existence, and that petrol was four shillings per gallon on the south coast already. The action of the railway companies was stifling industries giving employment to thousands upon thousands of hands. Mr. Instone instanced the serious position of Coventry with regard to petrol. After a lengthy discussion, a committee was formed to draught a protest against the action of the railway companies to present to the meeting of railway managers to be held on Tuesday next. It was resolved to take further steps with regard to the formulation of a protest of the whole trade. The committee nominated were Messrs. Edge, Buckea, Simms, Letts, and Swindley.

DE DION BOUTON V. BROWN BROS.

In the Chancery Division of the High Courts of Justice, London, on Friday, Mr. Justice Kekewich, on the motion of Mr. Kerby, granted a consent order to stay proceedings in this action on terms agreed to by the parties.

AN ALLEGED INFRINGEMENT.

In the Chancery Division of the High Court on Monday, before Mr. Justice Farwell, Mr. Upjohn, K.C., stated that in the case of the Law Accident Insurance Society, Ltd., v. General Accident Insurance Corporation, Ltd., the parties had come to terms. The motion by the plaintiffs was for an injunction to restrain the General Accident Insurance Corporation, Ltd., from publishing, issuing, or circulating altered copies of plaintiffs' prospectus relating to motor car policies in infringement of plaintiffs' copyright. Counsel said it was a burning subject at the present time. However, defendants submitted to a perpetual injunction, to treat the motion as the trial, to destroy the copies complained of, and to pay the costs of the action.

His Lordship entered judgment accordingly by consent. Mr. Ford appeared for the defendants.

POLICE TRAPS.

Automobilists are warned of the existence of police traps in the localities mentioned below :

- Usk road, near Caerleon, Monmouthshire.
- Worthing.—On east of town from Half Brick to Old College.
- Worthing.—North of Railway Bridge.
- Worthing.—West, in Taming South Street.
- Broadwater.—North side of the green from north-west corner to the Maltsters' Arms.
- Findon.—Near Worthing, stretch of road south of the village.
- Findon.—North of the village from the well.
- On the Dicker at Chiddingfold.
- Between Comrie and Crieff, Perthshire.
- Between Sandford and Nuneham on the Henley-Oxford Road.
- Between Boldremere and Guildford on the Portsmouth Road.
- Ripley, approaches to.

New Patents.

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

The following specifications were published on 23rd October, 1902. All notices of opposition to the granting of patents on the several applications should be filed not later than 8th December, 1902:

1901.

- 19,240.—E. L. Leman. Motor cycle having the engine built into the frame. The improvements relate to a variety of features.
- 19,414.—La Société A. Vilain Frères. Carburetter with bellows action feeding device.
- 19,862.—H. E. Irwin. Pneumatic tyre with beaded edges engaging a single groove in the rim.
- 22,548.—W. J. Lloyd and Wm. Priest. Velocipedes and motor cycles; principally double front steering rear driving motor tricycle.

1902.

- 14,638.—J. J. H. Sturmev (C. E. Duryea). Two-speed and reversing epicyclic gears.
- 16,574.—H. M. McCall. In an electric car the motor is swung forwards or backwards to correspond with the direction of travel.
- 17,398.—E. Falconnet and M. Perodeaud. A solid or hollow distance piece is arranged between the beaded edges of a pneumatic tyre.

Answers to Correspondents.

**QUERIES OF GENERAL INTEREST.
PREMATURE FIRING.**

Q.—Can you inform me why my engine gives a sort of kick when running slowly? It is a 5½ to 6 h.p. one. Has it anything to do with the exhaust not freeing itself soon enough? Any hint suggesting a remedy will be appreciated by PUZZLED.

A.—You have evidently got the ignition too far advanced, with the result that the charge becomes ignited before the piston has reached the top of its stroke when running slowly, hence the kick. Always retard the ignition as the engine slows down, and open the throttle to increase the power of the working stroke. You will find this overcome the difficulty, which should not be allowed to recur, as it has a detrimental effect upon the crank-pin and bearings.

THE EFFICIENCIES OF SOLID AND PNEUMATIC TYRES.

Q.—A purchaser is ordering a car, say to hold four, and weighing with occupants 25 cwt. What he desires to know is, assuming an effective horse-power of twelve, what would be the loss of power in horse-power between solid tyres on all four wheels or pneumatic tyres on all four wheels; or, secondly, solids on the driving wheels as against pneumatics on driving wheels? In order to arrive at a decision the purchaser would also take into consideration the difference of initial expense between the two varieties of tyres, the lesser life, and therefore greater cost of pneumatics, and also the greater expense, not only of renewing but of repairing them.—R. G. F.

A.—There are, unfortunately, no statistics upon the difference of tractive power required for solid rubber and pneumatic tyres until the British Association publish the results of the experiments they are now conducting. M. Michelin's experiments show that 2.29 h.p. is required to propel a vehicle one ton in weight at a speed of ten miles per hour with iron tyres. With pneumatics the same conditions require 1.72 h.p. Solid rubber tyres are not dealt with in this experiment, but by taking a line through other results they appear to lie between the two, somewhere about 1.5 h.p. The tractive resistance of solids, taking pneumatics as 100, is 129.8. With regard to solids on back and pneumatics on front wheels, the matter is likely to remain unsettled for some time. It does not follow that it is half the difference between four solids and four pneumatics, as the efficiency of the pneumatic as a driving tyre, as compared with a solid, is not known, and, so far as we are aware, the British Association instruments are only made to test tyres as weight carriers, and not as transmitters of power. For this an entirely different apparatus would be required. The initial expense would be less with solids than pneumatics; they have a longer life, as a rule, and are therefore less costly in upkeep. Stronger springs are, however, required, as they have more work to do with solids.

TO CORRESPONDENTS.

This week the following correspondents have been, or will be, replied to by post:

- | | |
|-----------------------------|------------------|
| F. Woodward (St. Helens). | F. Platt. |
| Reginald O. Scott. | P. R. Blunt. |
| Herbert Ruston. | F. J. Townley. |
| Geo. Smith. | C.R. (Oxford). |
| W. E. Williams (Aberdovey). | H. Reimers. |
| Fred Williamson (Kew) | J. Asquith. |
| Larry De Lisle (Sandhurst). | H. Greenfield. |
| P. G. Orton. | W. H. Wells. |
| R. Stevens. | W. C. Wilson. |
| W. Waller. | H. T. Musker. |
| Maryon Thompson. | A. Devereux. |
| A. G. Young (Edinburgh). | H. G. Morgan. |
| Thos. Messenger (Molesey). | J.T.S. (Oakham). |
| Fred Thompson. | E.S.M. |
| Ernest E. Lake (Plymouth). | J. A. Graham. |
| F. A. Lascelles. | A. T. Tyler. |
| Roy Thompson. | W. Ward. |
| | G. Bros. |
| | W. R. McT. |
| | J. Fletcher. |
| | Subscriber. |
| | M.E. and Co. |
| | W. J. Lee. |

J. and C. Moore Brabazon (Trinity College, Camb.)
 H. Bright (Rochdale) Empress.
 E. Roberts.
 W. E. Clark.
 R. C. Lewis.
 E. Cornet.
 G. Freestone.
 W. Adams.
 W. D. W.

Our thanks are due to the following for items of news and various topics of interest which have been or will be dealt with: E. B. B., H. E. Yarrow, H. S. Streatfield, J. B. Champion Coles, H. G. Walker, F. G. Barton, C. A. Smith, A. Marcel, C. H. Gameson, the Overman Automobile Co., E. P. Glynn, F. Fullbrook, and N. T. Beach.

Letters forwarded to G. P. H. de Freville and W. Munnion.

NOTICES.

SUBSCRIPTIONS.

"THE AUTOCAR" is published every Friday morning in Town and Country, and may be obtained of all News-venders and Book stalls, or delivered first post on Friday, at the following rates:

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GRAPPLING WITH A GRADIENT.

Visitors to Richmond Park will recognise in the illustration the rough and particularly steep path which forms a short cut to the summit of the well-known "Test Hill." When out driving with Mr. Packham lately on an Oldsmobile, the 1 in 7.8 grade of the road proper was not stiff enough, and so he put his gallant and uncomplaining little carriage at the steep shown. Our camera opened fire on him at the apogee of his climb, which is just the steepest part, and which the car would certainly have climbed had not the rawhide pinion teeth stripped. The ground rises about 1 in 4 where the car is seen.

The automobilist is becoming legion at race meetings, and quite a numerous and varied contingent was on the course at Esher on Friday last week.



"THE AUTOCAR" LIBRARY

"WHERE TO OBTAIN MOTOR SPIRIT."—This book, as its name implies, contains a directory of agents throughout the country who sell motor spirit. It also gives a list of firms undertaking repairs and the names of depots, etc., where cars may be stored.

Price 1/- net. Post free 1/2.

"MOTOR CYCLES AND HOW TO MANAGE THEM." By A. J. Wilson.—This book deals with motor cycles in non-technical language. All parts are described and illustrated, and the motor cyclist is therefore able to obtain an intelligent understanding of the machine he is driving. Special chapters deal with troubles likely to arise upon the road, and their remedies—written from actual experience. Chapters are also devoted to the management of motor bicycles.

Price 2/6 net. Post free 2/8.

"ON AN AUTOCAR THROUGH THE LENGTH AND BREADTH OF THE LAND." By Henry Sturmev.—This book gives an account of the first long ride taken upon an autocar in this country. It deals with a journey made from Land's End to John-o'-Groats, and is illustrated with numerous photographs. This volume has now historic interest, and only a few copies are remaining. Bound in green cloth.

Price 4/8 net. Post free 4/8.

"HORSELESS VEHICLES, AUTOMOBILES AND MOTOR CYCLES." With 316 illustrations and detail drawings. By Gardner D. Hiscox, M.E.

Price 14/- Post free 14/6.

"THE MOTOR BICYCLE."—Its mechanism and how to manage it. By R. J. Macredy.

Price 1/- net. Post free 1/1.

"MOTOR VEHICLES AND MOTORS," their design, construction, and working, by steam, oil, and electricity. Profusely illustrated. Detail drawings, tables, etc., etc. By W. Worby Beaumont, M.I.C.E., M.I.M.E., M.I.E.E.

New edition. Price 42/- net. Post free 43/-

"LIGHT MOTOR CARS AND VOITURETTES." By J. Henry Knight.—New edition, just out. Cloth bound.

Price 3/6 net. Post free 3/8.

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"THE DE DION VOITURETTE."—Its mechanism and how to drive it. Second edition. By R. J. Macredy.

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"STEAM LOCOMOTION ON COMMON ROADS." By Wm. Fletcher, M.E. Cloth bound. Illustrated.

Price, 8/- net. Post free 8/4.

"THE AUTOMOBILE" its construction and management. By Gerard Laverenc. Revised and edited by Paul N. Hasluck. With 536 illustrations. Cloth bound.

Price 10/6. Post free 11/2.

All the above books may be obtained by post if ordered (with remittance) from "THE AUTOCAR" OFFICE, 3, St. Bride Street, Ludgate Circus, London, E.C.

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CONTENTS.

	PAGE
NOTES: THE SUPPLEMENT—OIL MOTOR CARS OF 1902—THE AMERICAN RELIABILITY TRIALS—CARRIAGE OF PETROL IN FRANCE	463-464
THE MEDICAL MOTORISTS OF FOURMOUTH (Illustrated)	465
LORD SHREWSBURY'S LATEST CAR (Illustrated)	466
USEFUL HINTS AND TIPS	469
THE 12 H.P. CHELMSFORD STEAM CAR	470
A ROTARY VALVE FOR INTERNAL COMBUSTION ENGINES (Illustrated)	471
A SMART MOTOR BUS BODY (Illustrated)	472
CONTINENTAL NOTES AND NEWS: THE CONTROL OF PACING—ALCOHOL FOR AUTOCARS—A RACE IN PORTUGAL—DEATH OF M. BUCHET	473-474
CORRESPONDENCE: THE PICK CAR—MECHANICALLY OPERATED INLET VALVES—THE FUEL PROBLEM—FLOODING CARBURETTOR—GEAR HANGING IN THE DARK—THE WHITE CAR—HEAVY TYRES—THE WILKINSON TAYLORS PARAFFIN BURNERS FOR STEAM CARS—PARAFFIN CARBURETTORS—FOR MEDICAL USE—DUST SCREENS—THE CARRIAGE OF PETROL	475-476
FLASHES (Illustrated)	477-480
OIL MOTOR CARS OF 1902 (Illustrated)	481
AUTOCAR V. BALLOON (Illustrated)	482
THE AFRO CLUB	483
THE 4,000 MILES TYRE TRIALS	484
THE SUPPLY OF PETROL	485
A NEW MOTOR FACTORY (Illustrated)	486
POLICE TRAPS	487
ALBANY TUBE EXPANDER (Illustrated)	488
THE ANNIVERSARY RUN	489
THE LIVERPOOL SELF-PROPELLED TRAFFIC ASSOCIATION	490
NEW PATENTS	491
ANSWERS TO CORRESPONDENTS' QUERIES OF GENERAL INTEREST	492

With every copy of this number is issued a supplement, "The 16 h.p. Napier Car." Readers are requested to notify the publishers should they not receive it.

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 ON THE LAST PAGE. ORDERS WITH REMITTANCE SHOULD BE ADDRESSED "THE AUTOCAR," COVENTRY.

The Autocar can be obtained abroad from the following:
AUSTRALIA: Phillips, Oxmond, and Co., 533, Collins Street, Melbourne.
FRANCE: Nice, Levant, and Chevalier, 50, Quai St. Jean Baptiste.
UNITED STATES: The International News Agency, New York.

Notes.

Carriage of Petrol in France.

At the present moment there is probably no country where so much petroleum spirit is being carried over the railways as France, and in view of the attitude of the English companies, it may be interesting to see under what conditions the French railway concerns transport such a huge amount of petrol, with every satisfaction to their customers, and, apparently, without the slightest danger to themselves. The companies in France are not altogether autonomous, and perhaps this accounts in a large measure for the liberal treatment meted out to the public. As the railways are under the control of the State, who guarantee the interest on

debentures, the companies cannot impose new tariffs or modify existing ones, or change anything in their arrangements for the carriage of passengers and goods, without such changes being approved of by the Minister of Public Works, and the Minister can himself impose upon the companies anything which he may think will be to the interest and convenience of the public. Under these circumstances, the tariffs and regulations are drawn up as much for the public as for the companies, and they apparently give entire satisfaction to both. In the carriage of petrol there is nothing to differentiate this product from other goods, except the precautions taken in packing. Transported in barrels, there are no precautions at all except that the bottom of each barrel must bear in large letters the word "inflammable," and in the case of petrol in hermetically-sealed cans these latter must be securely packed in boxes or crates with the same inscription, though in all cases the receptacles must not be entirely full. Subject to these conditions being observed—and they are always verified by the company's servants before the petrol is accepted—the sender has no responsibility whatever, and once out of his hands the company is entirely liable for its safe transport. As regards charges, it was only to be expected that they should be higher than for perishable goods that require no precaution or care in handling, but the rates are by no means excessive, and the cost of transporting 1,000 kilograms (nearly equivalent to the English ton) of petrol, for example, from Paris to Amiens—a distance of about eighty miles—is 34s. So far as we are aware, there has never been any accident due to the inflammable character of petrol, and certainly the companies have never considered the risks serious enough to warrant their seeking any special protection, either in the way of throwing the liability on the customer or in imposing higher rates. It is true that if they tried, they would probably find some difficulty in convincing the Minister, who represents the public interest, that a carrying company can decline to be responsible for the goods committed to its care.

Oil Motor Cars of 1902.

There was a general feeling of disappointment among the large audience of members and visitors which attended the Institution of Mechanical Engineers on the evening of the 31st ult. to hear the continuation of the discussion on Captain Longridge's paper. The procedure of the Institution with regard to ordinary discussions is probably satisfactory, as many of the subjects dealt with in the various papers read before the Institution are necessarily of interest to a comparatively small section of the membership, and only a few of the audience desire to discuss the matter. However, it has