MOTOR NOTES FOR MEDICAL MEN.

By H. MASSAC BUIST.

THE OVERHEAD VALVE ENGINE AND THE PRIVATE MOTORIST.

DESPITE the fact that the Grand Prix race of the Automobile Club de France was for machines with engines of moderate size, coming within the six-guinea tax, otherwise 274½ cubic inches cylinder volume, and that the winning speed over perfect roads, with a minimum of hill-climbing, was only 65½ miles an hour, there was little enough in the event at Lyons to interest the medical motorist. It was again a race between multi-valve motors of very high compression, wherein the overhead setting was used, with its present disadvantages of noise and inaccessibility. If the side-set touring form of mushroom valve ordinarily used goes wrong, it is generally possible to attend to it on the high road. In any case, it is not necessary to break up the engine. But the Grand Prix, like the Tourist Trophy race, showed that when anything goes wrong with the overhead form of mushroom valve, there is no option but to consider the car quite out of the running and to stay by the roadside until somebody comes to tow it home, for it is not possible to get at the valve without dismantling the engine.

If we are looking to the future of motor design, we may of course assume that presently we shall find out enough from racing to be able to construct overhead valves so that they will be at least as reliable as the sort set at the side of the engine. But design will have to be improved besides if overhead valves are ever to come into general use, because there are occasions when side valves go wrong, even to-day, after the many years of experience of them. Therefore it will be necessary to find out how to employ overhead valves so set that in the event of their failure, however rare, it will not do considerable damage to the engine, as we have seen happen so very often in connexion with this year's racing. Further, apart from the matter of damage done in the event of failure, we must consider the question of accessibility. There is no more reason why either of these points should prove insurmountable difficulties when enough experience of the business has been gained than there is that we should not find out how adequately to silence engines with overhead valves.

ECONOMY OF FUEL.

To the question Why should we trouble to develop a new system of valve operation at present attended with such obvious disadvantage? the answer is—Chiefly because it was demonstrated in the Grand Prix race of 1913, run on a fuel consumption limit, that the overhead valve engine gives better results for the amount of petrol used, and last year's Coupe de L'Auto race for 3 litre cars, this year's Tourist Trophy race for 3.31 litre cars, and this year's Grand Prix race for 4½ litre cars, have all shown that the highest efficiency so far obtainable is got with overhead valve engines.

Thus we have the almost picturesque situation that the overhead valve engine, which perhaps comes into most prominence through this business of racing would be obviously the most suitable type for the commercial motor vehicle, for example, which is nevertheless in other respects the antithesis of the racing proposition. Maybe for touring purposes we shall first come to the use of the overhead valve engine, in a general sense, through its gradual exploitation for commercial motor vehicles, where the question of quiet running is not of so much importance as it is to the private motorist. Roughly, by the use of the overhead valve motor, it should be possible to save anything up to 20 per cent. on the fuel consumption, so that under this heading alone there is something worth striving for in pursuing the problem of the overhead valve motor to a stage further.

Of course, the overhead valve has not been unknown to touring car practice in standardized form for a long period, as instance notably the Bedford-Buick car. But in it there is no attempt to exploit the business in its most complicated form, as in racing cars, where the majority are using two inlet and two exhaust valves per cylinder.

PHASES OF THE PETROL PROBLEM.

Though there are only enough supplies of crude oil above ground at the moment to run the world for six months, it is quite possible the price of fuel may be further reduced at no distant date. This is not, according to popular error, because the profit on selling petrol is much higher than the profit on selling crude oil. On the contrary, the chief reason that petrol costs as much as it does is that the demand for it is out of proportion to the demand for the residuary product after the process of distillation. Therefore, when a gallon of petrol is bought in the circumstances which are and have been obtaining, the purchaser has also to pay for a considerable amount of crude material which is simply wasted. Create a demand for those residuary products, and the petrol purchasers would no longer have to pay for them; hence the price of fuel could be lowered. It is largely through the rapidly increasing use of liquid fuel for ships that a demand is arising for residuary products, apart from which it is fortunate that the world supplies of the raw material are being opened up at an enormous rate. Had they not been developed thus rapidly, the expansion of the motor movement would have received a sudden check. As it is, we have merely seen high prices ruling for fuel.

There is some talk that the co-operative and other organizations to which the public has been invited to subscribe in face of the high price of motor fuel are the causes of the price being brought down. This, however, is wildly inaccurate. Of the many proposals that have been put forward under this head, the majority have not been practical propositions. Only a handful have materialized into producers; some of those that are giving delivery buy their supplies in the open market, so that the business is not on a sound basis. There is, nevertheless, a residue of genuine enterprise to relieve the situation. But it is proportionately so small in regard to the total requirements of the country that it figures only as a drop in the ocean, and has no effect whatever on controlling the market. For example, what could any enterprise producing five million gallons of fuel in a year do in the way of causing a lowering of price in a country that requires over a hundred million gallons of petrol per annum?

The chief factors that control the present and future price of the motorist's fuel are the ratio of expansion of the world's supplies to that of the motoring movement. If we are arrived at the point when the former is about to outgo the latter, then the price of fuel must become cheaper. An investigation of the world's motor trade at the moment suggests that, as regards private vehicles of the middle and the large sort, the possible rate of expansion has reached something like a fixed quantity. Therefore, as far as these are concerned, fuel production is either going ahead or is about to go ahead of demand.

On the other hand, we are only beginning to develop the light car and the commercial motor vehicle. The latter would upset all calculations were it not certain that it will soon either be run on other fuel than petrol or on much cruder spirit than is used for the pleasure car, therefore creating a demand for the residuary product and so making for cheapness all round. But the light car, which is perhaps the vastest field we are about to enter, will call for the use of the highest grade spirit. The situation of supply and demand would look grave were it not for the fact that the average light car is extremely economical of fuel; a vast number of these machines can be brought into use without making any heavy additional demand by comparison with the increased consumption of fuel when big batches of large cars are brought into use. Add, therefore, to these facts the all-important one that the requirements of shipping service are all the time creating a demand for residuary products, and it is seen plainly that the price of fuel will probably not rise, but on the contrary come down somewhat in the near future, particularly in face of the fact that the next year or two will see some ambitious projects materializing for producing fuels alternatively to petrol. These, however, are scarcely likely to be used in any appreciable quantities by the private motorist for years to come. They are more suitable for agricultural motor work and for service where unpleasant odours, and so forth, are matters of indifference.

FRONT WHEEL BRAKES AND THE GRAND PRIX.

Anybody who watched the Grand Prix race being run on the Lyons circuit could not have failed to be struck by two things. A few years ago, when British inventors introduced the detachable wheel, the Automobile Club of France forbade the use of it in racing, on the ground that it was dangerous. A fortnight ago in the biggest international road race yet organized, not a single competitor started without detachable wire wheels either of the Rudge-Whitworth sort or those of its licensees in the various countries.

The other point was that front wheel brakes—which were first brought into use in this country, standardized in many cases too hastily by those who had not mastered the principles, and therefore withdrawn after much trouble had been experienced, save in such a singular case as that of Argylls, who have mastered the underlying principles—were adapted from touring-car practice to racing practice by the French champions, Peugeot and Delage; were used by the Swiss Piccard-Pictet, and by sundry Italians, including Fiat; but not by the Germans, in whose country the invention has not been developed yet; nor by the British, in whose country there has been accumulated more experience concerning front wheel brakes than anywhere else in the world.

The race was over roads of the billiard-table variety as regards surface, compared with what one meets with when motoring out in the world, say in the colonies, where there are tracks instead of roads, or in Russia or Sweden. It was possible to race two cars abreast all round the course. Only a couple of miles of it presented the semblance of hill-climbing work. On the outward legs of the course, however, the route abounded in turns. This fact made the motor engineers who designed the competing machines pay more attention to qualities of acceleration than ever. Those who put on their thinking-caps also realized that it is no less important to economize time in reducing speed than it is to save it when gaining speed. Hence they harked back to touring-car practice by distributing the braking effort over four instead of two wheels.

We were told before the race that disaster could only attend such a policy, that the tyres would be destroyed in a hair-raising manner, and so forth. None of these things occurred. On the contrary, front wheel brakes, of course, proved a saving of tyres in relation to the actual amount of braking work done. To judge this it should be known that those who had front wheel brakes would rush up to the corners with the accelerator pedal full down for anything from fifty to seventy yards after those with brakes working on the back wheels only had applied them to those wheels. Therefore the total amount of braking effort on the cars with four wheel brakes was of course vastly in excess of those with two, because the machines were slowed in about half the distance. In the words of one mechanic on board one of the racers: "When they put the brakes on all four wheels, it is like going into butter."

WHERE THE SAVING OCCURS.

This was certainly worth a minimum of a minute a lap in time saving, therefore the total amount of tyre wear per car must have been greater in the machines with four wheel brakes than on those with two. Nevertheless the result was no more extravagant because, to do the best with brakes on two wheels only represents, let us say, straining the two tyres 100 per cent., whereas to do 50 per cent. better by using brakes on four wheels represents straining each of those tyres only 75 per cent. Of course, it is the last 25 per cent. that spells the ruin. Stress anything well below its limit, and you can go on wearing it for a great length of time without any appreciable deterioration. Let it be had in mind, moreover, that the front wheel brake men did not all quite understand their business, as is proved by the fact that some of them used smaller tyres on the front wheels than on the back ones.

Moreover, this must not be considered a full test of the possibilities of front wheel braking, because the majority of the competitors so designed their brakes that they could not be used on the front wheels while steering round corners; whereas it is a point of the principle behind the Argyll system that when going round the corner the steering is rather assisted than impeded by the braking action.

Nevertheless, such as it was, the demonstration of the use of front wheel brakes was remarkable. The Peugeot cars were not as fast as the Mercédès, but by reason of the French vehicles having front wheel brakes they could take shelter from pursuit, and delay the inevitable overhauling whenever they came to a series of corners or bends. This difference in the powers of decreasing speed, contrasting as it did with the different powers to increase it, made the race as a spectacle fresh and unprecedented.

It should be appreciated that the moment braking is applied to the front wheels the result is to throw weight forward on to those wheels, thereby increasing their power of adhesion to the road surface, and accordingly preventing the wheels locking and skidding. It is skidding that destroys tyres and that reduces braking effort to its least possible value. We see, therefore, that a natural physical law assists those who desire to employ the principle of brakes on all four wheels. One result of the race will be to give a big impetus to the employment of front wheel brakes for touring cars. But the medical man must be warned that it is one thing to want to have brakes on the front wheels and quite another so to scheme them that they shall prove a blessing instead of a bane. In this country we have already seen very numerous examples of how not to employ front wheel brakes. We may be sure that if there is any sudden demand for the motor manufacturers to employ the system, a number of them will rush into the business without realizing the difficulties ahead. Argylls and some Italians are, so far, about the only folk who have mastered even the rudiments of the matter.

LARGE-SIZED TYRES.

Another feature of the race was that the winning Mercédès cars used proportionately larger Continental tyres than their rivals; also they employed plain treaded ones from the start to the finish of the race. What the larger-sized tyres took off in speed was more than saved by what was gained in their extra wearing qualities; there was in those tyres more material to be worn away before the time came to change. Translated into terms of the private motorist's position, this means also that, within reason, it is more gainful to use large than small tyres. On the other hand, when employing large section tyres on small rims, the motorist must be careful to keep an eye on his pneumatics. Thus if he allows them to get slack he has that amount more twisting action of the walls when taking corners, and that extra liability temporarily to displace the bead, which in flying back may perchance nip the tube. On the other hand, he must not go to the other extreme of keeping tyres too hard in summer weather. Many motorists remember to their cost the hot summer of two or three seasons ago when tyres burst wholesale about the country through being kept at too high pressure in hot weather. We are still at the period when the individual motorist has as much to gain from carefully studying his own case as regards tyres as he has as regards carburation, electric lighting, or engine starting gear. Pneumatics have been so vastly improved of recent years that it is easy to fall into the habit of comparatively neglecting them; but it pays to take the opposite course. No general rule applies equally to all sorts of vehicles, from heavy, high-powered ones to the lighter sort, unless it be such an obvious thing as that it is foolish to run on slack tyres, to neglect ugly cuts, to leave nails or horse shoes stuck in treads, and so forth. Provided corners are not taken too fast, large section tyres which are now made by Dunlops, as well as by the Continental Company, have many advantages.

THE *American Medicine* gold medal for 1914 has been awarded to Dr. George W. Crile, of Cleveland, Ohio, as the American physician who, in the judgement of the trustees, has performed the most conspicuous and noteworthy service in the domain of medicine and surgery during the past year.

THE Royal Academy of Medicine of Turin announces that the thirteenth competition for the Riberi Prize, of the value of £800, is open. The prize will be awarded for scientific researches in medical science. Competitors may enter their names up to December 31st, 1916. Forms to be filled up may be obtained from Dr. V. Oliva, the secretary of the Royal Academy of Medicine, 18, Via Po, Turin.