MOTOR NOTES FOR MEDICAL MEN.

By H. MASSAC BUIST.

POSSIBILITIES OF RELIEVING THE FUEL SITUATION.

According to Mr. Harcourt, the medical profession and veterinary surgeons have between them been allotted a total of 418,750 gallons of petrol a month, against 700,000 gallons for all users of private cars in the country and 2,087,500 gallons for all the cabs, omnibuses, and so forth. It is nevertheless a fact that many medical men have been allotted quantities of petrol quite inadequate to suffice for the total amount of professional work they have to do.

Where allotments have obviously been made in error, some relief will be received on the fact being established, though under this head we must not overlook the major facts, which are:

First, that a greater amount of petrol has been allocated by the aggregate of licences than the total quantity that it is anticipated will be available for civilian needs in these islands during the next six months.

Secondly, that whereas in the first six months of 1915 more than twice as many gallons of fuel were imported from the United States as in 1914, nevertheless the first six months of this year have witnessed a severe drop in such imports when compared with the corresponding period of last year, the fall from 32,260,000 gallons to 23,290,000 gallons being due to want of tank vessels.

Thirdly, that the needs of our army in respect of motor fuel will increase continuously from now on because we feed the guns and men engaged in the great offensive by motor transport, which we need more and more in measure as we advance over broken ground, the railway systems of which have been obliterated for the time being; and because in the warm summer days consumption attains its maximum efficiency, whereas in the cold winter weather much of the heat of burning petrol in the cylinders of an engine is wasted by the cooling effect of the atmospheric temperature, apart altogether from the heavier road conditions that generally obtain. One estimate of consumption for the services is to the effect that it will rise to 1,000,000 gallons a day, or thrice the entire petrol consumption of the country the year before war broke out.

Fourthly, because our increasing industrial activities to produce the requisites for carrying on the war will necessitate ever-increasing allotments of fuel for motor transport under this head, especially in view of the increasing curtailment of our horse supplies as the war proceeds.

Fifthly, because, on the average, the industrial allotments of petrol have been inadequate to a greater degree than the allotments to the medical profession; hence the early intimation of the Ministry of Munitions to the effect that wherever the allotments made were inadequate to those concerned with Government work, the fact should be notified to that department, which would see to it that there was no restriction of enterprise due to lack of motor transport. Therefore we may expect that relief to be granted under this head will absorb more than the total amount of extra fuel that may come to hand, or that might by any chance be left on the market owing to individual private motorists finding their allotments so inadequate that they prefer to lay up their cars.

THE OFFER TO AUGMENT IMPORTS BY 66 PER CENT.

Next as to possible sources of relief in these days of submarine enterprise and so forth, and when there is ever an increasing field for petrol in South America and other countries at a safe distance from the European conflict. These safer and no less profitable markets are being preferentially exploited by neutrals. The prime need of the nation is for tank vessels. Our maximum efforts in this connexion can barely keep pace with the growing demands of the services. Consequently we need only consider prospects of obtaining extra supplies of motor fuel for civilian use when those supplies form part of schemes that embrace the production from overseas sources of the tank vessels whereby alone the extra fuel can be brought to these islands.

Such an offer has been submitted to the Government from a Canadian source, understood to be the Crown Oil Company, of Hamilton, Ontario. Another similar offer on behalf of a Colonial company is mooted, but does not emerge definitely yet. The Canadian one,

however, is on a scale that would provide tank vessels for bringing fuel here from this fresh source to the extent of 4 million gallons a month, or 48 million gallons a year, which, with the 70 million gallons already estimated to be available for civilian uses, would give us 118 million gallons a year towards total requirements, amounting to 153 million gallons for the civilian community, according to the census of petrol requirements. To put the matter another way, the civilian community needs nearly 13 million gallons a month, whereas the present quantity of fuel available for distribution is estimated at less than one-half that figure—namely, 6,300,000 gallons a month—so that an additional four million gallons a month from Canadian sources should provide enormous relief to the situation, particularly as obviously such a supply would be distributed first in alleviation of the case of commercial cars and industrial processes, and to meet the requirements of doctors and veterinary surgeons. In other words, the private car user and the private motor cyclist would necessarily be the last to share any such additional relief, particularly as the total estimated needs of the users of commercial vehicles, according to the census returns, amount to more than 6,300,000 gallons a month.

The only certain point about the present fuel situation of the medical profession is that all the members of it are practically assured of receiving each the full amount of fuel allotted to him, whereas in the cases of private motorists no such thing is assured. On the contrary, I should not be surprised to see no licences, beyond those now granted for three months, issued to private motorists. It will depend entirely on the course of the war.

HOW PETROL COMES HERE.

Practically all the petrol that comes to this country from America arrives in the form of what we call third grade spirit. It has to be redistilled here before what motorists know as No. 1, or even No. 2 spirit is produced. The average motorist in the United States drives on a fuel about equivalent in quality to that used by the London General Omnibus Company to date. Petrol, even of this third grade, has to be imported in specially built tank steamers. The handling of it in course of landing it here is an elaborate and costly operation, attended by many unnecessary restrictions, particularly as regards storing it in bulk and the unnecessarily long distances from the actual main centres of distribution to the places where alone the authorities allow it to be unshipped. The result is that it has to be sent long distances by road and rail at great expense and in retail form to the large centres where the market exists.

AVAILABLE ALTERNATIVE FUELS.

The net outcome of the present motor fuel situation is a great deal of talk about the use of alternative fuels. Alcohol—which many regard as being the fuel of the future because it does not well up out of the ground, but is, instead, limited in quantity only by the extent to which beet and certain sorts of grain crops, from parts of which it can be distilled, are grown—is not available to us in this country, because we have done nothing in the way of establishing the necessary machinery either for cultivation or for distillation, though on the Continent the alcohol fuel industry has been appreciably developed in years past. As far as this country is concerned, however, during the war, we can look for no relief under this head.

Shortly before the campaign broke out there was established what may be styled a nucleus coal-tar industry concerned with the production of benzole in these islands. Germany has seventy makers allied in the Deutsche Benzole-Vereinigung, which embraces 1,100 sale dépôts, the present year's production to date being 140,000,000 kilos. No section of the civilian motor-using community, however, can look for relief under this head, even in face of alterations to the Board of Trade unit of gas for supply to the public; because all benzole is needed either for the Services or the aniline dye industry.

The production of the Scottish shale industry goes to the Government.

The medical profession is therefore driven to a consideration of the problem of burning the heavier grade distillates of petroleum, such as paraffin, or a type of white oil from which the fatty substances have been extracted, and which is to be marketed in strictly limited quantities by the

Anglo-American Oil Company under the name of "Petrofin," which is a distillation from spirit distillate as imported into this country. For motor purposes it is superior to the ordinary refined petroleum oils, inasmuch as it has the tail or heavy residues cut out. There is talk of other fuels, chiefly of the mixed variety, coming from other sources. But the points the medical man has seriously to consider in the case of using any alternative fuel are the following:

(a) Will it work with a standard carburetter or involve the purchase of some special alternative device concerning which the question arises whether, assuming that it will answer in this warm summer weather, it will prove practical for starting up in winter, since a car that cannot be got going quickly is worse than useless to the medical man.

(b) What guarantees are there that the given alternative fuels will be procurable continuously from now onwards throughout the period of the war, since it is both expensive and unpractical to lay out capital on the purchase of an alternative fuel carburetter device if the fuel for it can be obtained for a few months only.

(c) Will the employment of the given alternative fuel do any hurt to the mechanism of the engine?

As to the availability of alternative fuel supplies we know, first, that in the case of petrofin these will be strictly limited; while in the case of paraffin there are not vast stores in the country, and what there are have been bought by utility vehicle users; hence all subsequent supplies will have to be imported. Though this will not necessarily be so difficult as in the case of the more volatile spirit, petrol, nevertheless, extra ships will have to be provided to bring in any such additional supplies.

Some guess of the situation of the individual medical man endeavouring to obtain a share of future imported paraffin supplies may be had from the fact, first, that the Government is seriously considering the desirability of relaxing regulations concerning the emission of smell by vehicles using alternative fuels; secondly, that the London General Omnibus Company is understood to have completed its experiments with a paraffin carburetter, which it would be useless to standardize unless arrangements have already been made to ensure continuous supplies; and, thirdly, that the petrol licences do not contain the word "petrol," but "motor spirit." Therefore we may assume that huge contracts for the continuous supply of paraffin or other heavy grade fuels either have been or are about to be placed by the big carrying corporations, consequently the medical man who is minded to use paraffin would be wise first to enter into a contract for continuous supplies with a firm, if any be available, of such standing as shall at least offer a reasonable prospect that the conditions of the contract will be fulfilled. Even so, however, there are risks. If alternative fuels come to be used to any appreciable extent sooner or later the Government will be bound to treat them in the same fashion as petrol, in connexion with which a regulation has been issued under powers conferred by the Defence of the Realm Act whereby all contracts for supply may be broken.

HOW TO PROCEED.

Thus it is well to realize that at this stage of the war it is absolutely impossible for the medical man to take steps which will positively ensure his having adequate supplies of motor fuel for the rest of the campaign period. All he can do is to weigh these and other obvious factors against one another, form his own estimate, and take what is nothing more than a sporting chance, remembering that the utility vehicle users have for some time been very active buying up all manner of alternative fuel supplies in the country.

The method of procedure which will probably be found to be most practicable for the average medical practitioner in the country is to continue to employ his car with the carburetter as supplied by the makers, and endeavour to eke out his petrol allowance by mixing a certain amount of paraffin with it. The advantages of this method are, first, that no permanent outlay of capital for buying a paraffin vaporizer is involved; and, secondly, that the practitioner does not commit himself definitely to paraffin, or some other alternative fuel the supply of which may, for reasons already indicated, fail the individual medical man at any moment without warning.

The disadvantages of such experimenting are that one is apt to start off in too great a spirit of optimism, as, for

example, by taking half a tankful of paraffin and mixing it with half a tankful of petrol. That is quite the wrong way to proceed, particularly at this period when the average petrol supplied is of much heavier grade than obtained before the war. The proper way to set to work is to begin with a very small proportion of paraffin to petrol, say 10 or 12 per cent., and gradually to increase the proportion of heavy fuel if and as the carburetter is found to take it. Scarcely any ordinary carburetter will take half and half. Some, though few, experimenters with this sort of mixed fuel are wary enough to weight the floats of their carburetters to counteract the effects of the greater density of the fuel. Even so, I find that even among professional motorists sparking plug troubles are a frequent and early consequence.

THE USE OF PARAFFIN BY ITSELF.

Assuming, however, that the individual medical man is satisfied that he can secure sufficient supplies of pure paraffin to serve his purpose—despite the fact that the wording of the petrol licences now granted makes it abundantly apparent that, if the present extra and sudden demand for paraffin or any other substitute for motor fuel upsets other industries and trades by causing the price to advance rapidly, or defeats the aim of the Exchequer in the matter of revenue raising, such alternative fuels will be embraced in the scheme for taxing and licensing motor fuel supplies during the war—there are some further points concerning which he should be informed before making a final decision. In the earliest days of the motor movement the Government and the public alike were a great deal more frightened of petrol than they are to-day. Hence an extraordinary amount and variety of experimenting was then done with paraffin carburetters, a fact which we are apt to forget because that enterprise was not crowned with success. For months past, not only the big carrying corporations, but also all the big motor manufacturers concerned in the production of utility vehicles, have been experimenting with paraffin vaporizers, a number of these devices hailing from America. Furthermore, that the situation may be judged, one may give a hint to this effect: it would be erroneous to imagine that no attempt is being made towards using paraffin abroad in connexion with army service.

The burning of paraffin in the larger, heavier vehicles has an advantage deriving from the fact that they work at a lower piston speed than the average touring car. Nevertheless, certain makers of chassis that are used for passenger car work are conducting experiments with paraffin carburetters, and with two-fuel varieties. In my last notes in the BRITISH MEDICAL JOURNAL I mentioned that Willys-Overland were experimenting with a device, not of their own evolving, for using the electric current in connexion with the engine-starting apparatus to warm a special carburetter and the intake pipes sufficiently and very rapidly to enable the engine to be started on pure paraffin, at least at this period of the year. Now there is talk of the Ford Company making a two-fuel carburetter. Two-fuel carburetters, of course, are numerous, those on the market including the Binks, the King-Zenith, and the Smith-King, to name three only out of a large variety.

A SUGGESTION.

Even more interesting is the letter from Dr. F. W. Style, published below, concerning his three months' satisfactory experience in Devonshire with a "superheater" that has enabled him to run his Ford car on paraffin at 1s. a gallon once the engine has been started on petrol. His experience indicates that in three months' running he has already economized the cost of fitting the "superheater" and making the necessary alterations. Thus, if he continues to get the same results that he has obtained to date, from now onwards he will be saving a matter of £30 a year. His tip about turning on to petrol just before stopping the engine, so that the carburetter is full of petrol, is valuable.

Inasmuch as I have shown how very experimental is this matter of using alternative fuels, and as it is impossible in the time available to relieve the fuel problem arising out of the war through exhaustive tests carried out by the recognized automobile trials body, it would be to the best interests of the medical profession if doctors in various parts of the country would furnish the BRITISH MEDICAL JOURNAL with their experiences of the use of alternative fuels, and of special carburetter and of other

auxiliary fittings wherever such experiences have varied from those recorded in these pages.

A NOTE OF WARNING.

In the meantime a note of warning should be sounded concerning one source of trouble that may result from the use of paraffin, and concerning which it is necessary to be careful. By reason of its quality of very rapid evaporation, just before ignition petrol is in the cylinder in the form of vapour; whereas with paraffin the evaporation ordinarily remains incomplete the moment before the spark ignites the mixture present in the cylinder, when the paraffin is rather in the form of spray than vapour, even in the cases where hot water jackets are employed. The extraordinary power of rapid percolation possessed by paraffin constitutes the chief danger of using it. For instance, if it is in the cylinder in the form of spray, often the spark fails to ignite all the globules. In practice, paraffin spray easily percolates past the pistons, and, descending by gravity, is enabled in a brief space of time so to thin the oil in the base chamber as to render it no longer suitable for its work of lubricating the engine bearings, which are injured in consequence. In the ordinary way one hears the argument against the use of paraffin that it results in sooty plugs. Though this, of course, is caused by incomplete combustion, nevertheless it is a result of no importance whatever compared with the destruction of the lubricating scheme of the engine.

In many devices for using paraffin the heat of the exhaust gases of the engine is used to warm the carburettor and intake pipe, while in most modern European cars of up-to-date efficiency the carburettor and intake pipes are hot-water jacketed. Either of these arrangements, however, suffers from the practical disadvantage that at the time we most need the aid of heat they do not render it available—namely, when starting up the engine from the cold. Even with a spirit so highly volatile as petrol this may become a serious difficulty in cold weather. In the case of heavy grade fuels like paraffin it is impossible to start from cold. Hence, on the one hand, the wide variety of bi-fuel carburettors on the market whereby the engine can be started on petrol and, as soon as it is warmed, run on paraffin, and, on the other, the devices for warming the intake pipe by electrical means from the storage battery on the vehicle before the engine is started. This latter idea was really brought into practice first by a car standardized to use petrol and furnished with the original and still the best mechanical engine-starting apparatus of the electrical variety. I refer to the Cadillac vehicle, wherein the idea of pressing a button and using electricity to heat the engine and intake pipes while the motor was cold was evolved to relieve the Delco engine starting apparatus of a great deal of unnecessary work when it was set to start the engine in winter time in very cold countries.

THE MEDICAL MAN'S MOST PRACTICAL COURSE.

If he has no apparatus for warming his carburettor and intake pipes the medical man whose car is equipped with a mechanical engine starter will be just as ill off in regard to the difficulty of starting on pure paraffin in cold winter weather as the practitioner who cranks his motor by hand. On the whole, at the moment the two-fuel carburettor, or the carburettor with some adaptor device whereby the medical man can warm his engine on petrol, suggests itself as being the most likely course to give him satisfaction, particularly as in the matter of receiving petrol rations he is in a privileged class. Therefore, betide what may, certainly he will be assured always of sufficient petrol supplies to start his engine not only before issuing from the motor house but also on leaving the house of each patient.

I trust, moreover, that I have made it abundantly plain that there are very solid grounds for entertaining a doubt whether the medical profession as a whole, and apart from an individual exceptionally favourably situated here or there, will be able to secure for the continuance of the war adequate supplies of paraffin or other alternative heavy-grade fuel. In this connexion announcements about the advent of such alternative fuels and their availability should not be accepted by the medical profession without careful investigation. In some cases a new fuel is accompanied by the announcement that so many million gallons of it are in stock. Suppose the individual medical man

were to have his car altered to enable it to use such a fuel only to discover that the given number of millions of gallons was the total quantity the vendors ever had it in mind to dispose of? The country's consumption of motor fuel is so great an amount that what it is necessary to consider is: What is the rate at which alternative fuel supplies can be maintained by the vendors?

Another point to have in mind is that paraffin, as an example of a heavier grade fuel, should really give a better mileage than petrol. If it gives only the same mileage per gallon, it cannot be burning perfectly. We know that, on the average, it has not yet been found to burn perfectly; hence the question brought before the Local Government Board, and being considered by it, touching the official attitude to be adopted towards the emission of visible or malodorous exhaust, which is a sure sign of imperfect combustion. As to medical men entertaining fears that they will be harried by the authorities on purely red tape lines if alternative fuels they may use shall come under these heads, I do not think there is much ground for apprehension. I understand at the time of writing that fumes from burning paraffin, for example, may be regarded as either "temporary" or "accidental." Certainly, it ought to be so because the fuel crisis has been almost entirely due to Government neglect arising from its failure to realize in sufficient time the importance of motor fuel to an island nation waging the biggest war in history and in a motoring age; also because, without practical experience all over the country, it will be impossible for us to progress sufficiently to discover how to ensure perfect combustion at all times and under all conditions in the case of much less volatile fuels than petrol that will have to be used not only during, but also after, this war; and, lastly, because it has not been proved that there is anything injurious to the health of the community in visible or invisible malodorous vapours resulting from imperfect combustion of motor fuel.

The fuel problem is one that is likely to occupy increasing attention from the Government for a long time to come. At present it appears to realize merely that it is a very serious problem. Seemingly, it has yet to be educated to the extent that will enable it to grasp the point that the time factor is all-important in dealing with this problem.

PRACTICAL EXPERIENCE OF PARAFFIN.

SIR,—It may possibly interest Ford car owners to know that three months ago I fitted a "superheater" to my car, which has enabled me to run on pure ordinary lamp oil at 1s. a gallon, and that the car runs in every respect as well as it did on petrol.

The total cost of superheater, together with cost of fitting and of certain alterations I made, amounted to £6 18s. 6d. The mileage with paraffin is the same as with petrol, so that using, say, 30 gallons a month and allowing for a small quantity of petrol for starting, etc., the "superheater" pays for itself in less than three months, whilst the annual saving works out at about £30.

As sent out by the makers, the superheater was provided with a glass reservoir, connected with inlet pipe. This had to be filled with petrol each time one wished to start up. Finding this a nuisance, and extravagant with petrol, I discarded it, and had an auxiliary petrol tank fitted. By means of a three-way tap, worked by a lever near the driver, having started upon petrol, one turns off the latter after a few minutes and gets on to paraffin without any trouble.

Naturally there are certain drawbacks to the use of paraffin. So far as my experience goes they are as follows:

(a) The piston heads require cleaning more frequently; I have had mine done three times. On a Ford this is not a very difficult job.

(b) Inability to restart without injecting petrol after the superheater has cooled down. This is not a very serious drawback, as petrol can easily be injected through a tap on the inlet pipe and a teaspoonful is sufficient. In the event of a lengthy stop, in order to avoid trouble in restarting, I turn off paraffin a few minutes before stopping the engine and get on to petrol, so that the carburettor is full of the latter when I wish to start up again.

When first installed I did not get quite such good results as I am now getting. There is a certain difference in driving on paraffin, but after a few weeks' experience one notices no difference whatever.—I am, etc.,

South Brent, Devon, Aug. 1st.

F. W. STYLE.